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PUBLIC ADMINISTRATION MANAGEMENT

THE PROCESS OF DECISION MAKING AT LOCAL LEVEL; BASED ON THE MODEL OF THE CITY MUNICIPALITY OBRENOVAC

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Abstract: *The article deals with determination of the concept of direct citizen participation and analyze its main features. The primary goal of this research is to determine the key characteristics and the actual development rate of the four levels of direct citizen participation at local level: informing, consulting, proposing and participating in decision making; based on the model of the City Municipality Obrenovac.*

Keywords: *citizen participation, mechanisms of citizen participation, decision making, city municipality Obrenovac*

1. INTRODUCTION

Citizen participation in the public affairs of a community is considered to be one of the basic conditions to introduce democracy completely. It is also a crucial characteristic of life quality. Local policy is the cornerstone of democracy since it provides participation at the highest level possible. Citizen participation in the public affairs of a community creates new forms of social relations and represents engagement of each individual in decision making with reference to them and their immediate community (Vukelić, 2009).

This project has two primary goals. The first one is to determine the key characteristics of the concept of direct citizen participation at local level and the second one is the analysis of the actual development rate of the four levels of direct citizen participation at local level: informing, consulting, proposing and participating in decision making; based on the model of the City Municipality Obrenovac.

Depending on the author, citizen participation can refer to a wide range of similar but different issues. With reference to the concept of devolved power and decision making, civil participation could be defined as a process in which society members, who are not engaged either in politics or establishment, devolve power with public employees when it comes to making crucial decisions and carrying out activities with reference to community (Milosavljević et al., 2006). In conclusion, citizen participation represents all the activities of citizens aimed at having influence on making political decisions.

Direct citizen participation can be manifested at all the levels of government, but it is the most feasible at local level. First and foremost, the reason is the size of the departments. It is common within the following sectors: education, health service, social service, ecology, economy and communal service development, etc. Citizens can also take part in analysis, initiation, formulating, carrying out and evaluation of different decisions. Methods of direct participation are numerous and various, therefore citizens have a variety of possibilities for participation at their disposal. The most important are the following ones: referendums, assemblies of all the citizens, national or civil initiative, citizens meetings, panel discussions and other forms of collective political consulting, communication by electronic media and the Internet, participating in polls, passing information on local government initiatives to citizens and obtaining information from the part of the citizens, submitting petitions, suggestions, requests and complaints from the part of citizens, addressing local authorities with public criticism, taking part in activities organised by interest groups, local media or citizens associations, nongovernment, humanitarian, professional and other citizens associations, informal collective activities, neighbours initiatives, neighbours' councils, protests, peaceful gatherings, demonstrations, school boards and other consulting authorities, individual forms of participation such as charitable and philanthropic work, organised funds raising for mutual interests e.g. local voluntary tax, etc.

City Municipality Obrenovac is one of 17 Belgrade municipalities. According to Law on local self-management and Law on capital city, the City of Belgrade, as the unit of local government, is entitled to define in its statute the following issues: territory organisation, responsibilities, organisation and responsibilities of the authorities, forms of direct decision making on the part of the citizen and other vital matters important for implementing rights and duties of the city. Constitution of the Republic of Serbia and the above mentioned laws do not define "city municipality" as a unit of local self-management. Therefore they cannot be directly implemented on city municipalities. For the same reason, the City of Belgrade is given an explicit authority to define position of city municipalities within its statute.

2. FORMS OF CITIZEN CONTRIBUTION- CLASSIFICATION

There are different forms of citizen participation and decision making at local level of government. Typology given by Bogoljub Milosavljević has been chosen for the purposes of this project because it is, on one hand thorough and systematic, and on the other one relevant to concrete conditions in Serbia, i.e. legally stipulated forms of direct citizen participation in the country. In this sense, there is a difference among the following forms of citizen participation: (a) *informing* – which refers to passing information on work, plans and intentions of representative authorities to citizen and providing them with other sorts of information of public interest; (b) *consulting* – which includes different forms of citizen participation referring to deciding on priorities for the local community, such as panel discussions, public discussions, consulting by electronic media and the Internet, participating in the consulting sector; (c) *proposing* – which includes various forms of citizen participation in making proposals and expressing criticism on the part of work of representative authorities, such as citizen meetings, petitions, individual proposals, complaints, forms of public criticism, protests, peaceful gatherings, demonstrations, etc.; (d) *decision making* – which refers to the forms of direct democracy, i.e. direct citizen participation in decision making. It includes assemblies of all the citizen, referendums, citizen initiatives and forms of local self-management (Milosavljević et al., 2006).

2.1 Informing

Passing information on work of municipal authorities and their plans is the basic condition for equal rights of citizen participation in decision making. An individual, who is not informed, is not in a position to take part in managing the activities of the local community accordingly, nor to influence or control the work of the authorities. Therefore, passing information on the work of all the authorities in public is the principle confirmed by all the relevant international and local legal documents. The process can be made difficult if some of the potential problems arise, such as one-way direction in passing information – from municipal authorities to citizen – and directions to provide the flow of feedback information are not developed enough. News in the media, pamphlets, brochures, etc. are the most often used means in one-way communication between the authorities and the citizens. There is a danger of making public only basic data about meetings held, regulations and reports, while many of the important notices are not presented in public. Citizens are deprived from their right to participate in municipality management. Under the conditions mentioned, especially when citizens are informed at the late phase of planning or decision making, citizen are not in a position to influence the programmes made for „their own well being“.

The Statute of the City Municipality Obrenovac defines that making work public can be done in the following ways: publishing bulletin and informative booklets, cooperation with the media, presenting decisions and other acts in public, designing web presentations, organising public discussions and in other situations according to the statute and other acts of the city municipality authorities (The Statute of the City Municipality of Obrenovac). City Municipality Obrenovac shows the initiative to inform the citizens on its activities and future plans. There is a tendency to make it easier for citizens to realise their rights and provide them with timely, precise and high quality information on the work of the city municipality. In order to improve passing information to citizens, Municipality of Obrenovac has created and developed methods which provide greater rate of being informed on the part of citizens, openness and transparency of work of the local government and easily and timely information availability, especially concerning current municipal acts to all the citizens (in printed or electronic form). Methods of passing information used by the Municipality of Obrenovac are the following: web site of the municipality (only last year, on the municipality web site is published 813 articles); e-mail (on official e-mail municipality receives about 150 e-mails per year and sends the same number of answers; municipality also uses mailing lists for passing information); social networks profiles (on daily level Facebook and Twitter accounts have several posts or links. Official Facebook account has 9063 likes and Twitter account has 1408 followers); public announcements of municipal representatives in the media (public announcements, statements and taking part in talk shows, press conferences); publishing and distribution of occasional publications, brochures, informative booklets (during the year Municipality Obrenovac publishing and distribution from five to ten publications, brochures or informative booklets); public meetings with citizens in local community centres (more than 20 meetings per year); council and assembly meetings which are open to public and representatives of the media (60 meetings are year average).

There is more space to introduce greater transparency into functioning of the city municipality, especially within the range of the following: public decision making process (announcing agenda for assembly and council meetings); availability of information on the work of city municipality – each citizen should be provided with access to information (by organising public database, using information technology, simplifying administrative procedures); adequate passing information to the public on administrative authorities and their organisational structure; as well as passing information to citizens whose interests are influenced by a current procedure, sending them a report on the development of the procedure and contact details of the person in charge.

2.2 Consulting

Consulting is the form of participation in decision making which gives citizens the opportunity to decide on the priorities of local community in cooperation with municipal authorities. Consulting citizens, collecting their proposals and complaints includes two-way process in which the authorities ask for and receive citizens' opinion on certain issues which are of mutual interest for both parties involved. With difference to informative process in which citizens are the consumers of information, in consulting process authorities are the user of information provided by citizens. Legally stipulated methods for this form of participation are the following: panel and other forms of political consultations, public discussions, consulting by electronic media and the Internet, taking part in different consulting teams, etc (Milosavljević et al., 2006).

Public discussions are one of the important forms of citizen participation. Public discussions offer each individual opportunity to consider every single local issue and reconsider critically in order to come to adequate solutions. However, realising a public discussion can include serious disadvantages: inadequate announcement of the date and place of the discussion to be held, choosing the time for discussion that could be inadequate for certain groups to attend meetings, choosing the venue that could be inadequate in terms that its capacity is limited and can provide place for a small number of interested citizens, etc. Besides, it is often the case that public discussions are only used for providing legitimacy for already made decisions and therefore, they are not intended to active cooperation and decision making. It is usually done through consultation with selected experts, and the final proposal is passed to the public as information, which can be talked about, but which cannot be changed. If there is no openness and readiness on the part of politicians and administration to respect contribution of all the participants in discussion, public discussion is only a screen to provide legitimacy for already accepted aims, and citizen do not consider their contribution is worth it.

In the Municipality of Obrenovac it is a common practice to have an annual public discussion during the procedure of municipal budget verification. Citizens are invited to fill in a questionnaire in local community centres, municipality building hall or online and to make their proposals for creating budget for the coming year. The same citizens are invited to attend public discussion where received proposals are discussed about. Discussion is also attended by municipal representatives and managers of public companies. Experiences so far indicate that citizens are not interested in this form of participation, although the number of received proposals based on the questionnaire is always considerable. Lack of interest for public discussions is probably consequence of bad experience, lack of time, inadequate time of the event and apathy.

Consulting citizens by the Internet – in technologically advanced countries the Internet has become important means of communication between citizens and different levels of authorities and place where citizens gather to discuss different issues. It has greatly influenced relationship between authorities and citizens and made it more complex and diverse.

Municipality Obrenovac uses the following forms of communication between citizens and authorities: municipal web site – with option which offers asking questions and making comments under the news announced (these kind of questions and comments are not common); citizen service "Answer in two days" (more than 200 requests per year); profiles on social networks (Facebook and Twitter) are actively used for consulting on different priorities of local community. Several times a year municipality organises online campaigns for collecting proposals for different purposes (most often for infrastructure improvement, taking care of the place and surrounding public area). According to Population, household and flat register in Republic of Serbia in 2011, 54 % of citizen in Obrenovac aged 15 and over are computer illiterate (they do not use computers). It could be concluded that communication between authorities and citizens on the Internet is at the developing stage. The reason is lack of knowledge and use of modern communication technologies. Therefore it is necessary to develop and promote off line tools for consulting as well.

Participation in the work of various advisory bodies – taking part in dealings through councils of assembly and municipal consulting councils is the right of citizens. It is an opportunity to express opinions of professionals and distinguished citizens, no matter what their political attitudes are.

Unfortunately, in the Municipality Obrenovac members of the working bodies of the Assembly and of the commissions of the Council are delegated by political parties, so participation in the work of these bodies is the opportunity to implement the party goals and target target groups, not to present ideas for the improvement of life in the local community. Municipality Obrenovac has 5 working bodies of the Assembly with a total of 25 members and 12 commissions of the Council with a total of 84 members. However, the Youth Council of Obrenovac is an example of good practice of this form of citizen involvement. Council members were elected after a public invitation for nomination of candidates for members was announced. The Council of Youth comprises three representatives from public services and institutions, one

representative of student parliaments, two representatives of two largest parliamentary groups, one representative of youth organizations and informal groups. In the municipality of Obrenovac the following forms of consultation are also used: public forums, expert meetings with representatives of the institutions, thematic discussions with citizens' associations, surveys, boxes for complaints and suggestions, books of impressions, chatting with citizens which is realized through "open door" method, collection of comments and suggestions regarding some topics in a particular period.

The strongest recommendation for the improvement of this form of civic participation is a wider introduction of various methods for consulting citizens.

2.3 Proposing

Proposing, as a form of participation, involves putting proposals forward and criticism of the work of the authorities. Compared to the level of information and consultation, proposing involves a higher degree of citizens' influence on decisions taken by local authorities. It can occur in many different forms of collective (public meetings, petitions, peaceful protests, gatherings, demonstrations) or individual (individual suggestions, complaints, petitions) character.

Citizens' meetings are gatherings organized in closed areas of the municipality intended for discussions and suggestions on matters within the competence of the municipality. The Statute of the municipality of Obrenovac defines the mode of convening such meetings, how they work and state their attitudes. The bodies of the city municipality or local community are obliged, within 60 days from the date of the citizens' meeting, to consider citizens' requests and suggestions, to take a stand on them, make an appropriate decision or measure, and inform the citizens.

Petition and public criticism include citizens' right to put forward proposals, suggestions, requests and criticism to the authorities. In Serbia, there is no precise legislation on petition, so petition is viewed as a non-binding citizens' appeal. Accordingly, the deadlines for replying are largely extended, which creates a sense among the citizens that this means is inefficient (Milosavljević et al, 2006). Consequently, citizens do not initiate or sign petitions to the extent they would if there were more confidence in the positive outcome of these activities. The Statute of the Municipality of Obrenovac contains no provisions on the right to petition.

In the past five years there were not organizing citizens' meetings, but there were two petitions. One of them was against refinery near the river and the second one was for dog playground in the town. Both of them were successful. However, in the Municipality of Obrenovac the practice of organizing citizens' meetings, and filing of petitions and public criticism has not been recorded.. The main initial recommendations for improving this aspect of civic participation is that it should be positioned and defined. The Statute and the decision of the Municipal Assembly should define and regulate it as a flexible form of citizen participation, which will provide an opportunity for groups and individuals to, as simply as possible, express their opinions and proposals on matters within the competence of the local government bodies.

2.4 Decision making

Direct (participatory) democracy is based on direct and continuous participation of citizens in government. Citizens can be directly involved in the process of making important political decisions at the local level in different ways. Referendum and Citizens' Initiative are the most common form of decision-making today, that is, of the implementation of direct democracy at the local level (Civic Initiatives, 2009).

The Statute of the Municipality of Obrenovac also provides for referendum and citizen initiative (in addition to citizens' meeting) as forms of direct citizen participation in the performance of urban municipalities. However, it should be noted that only a referendum is a form of decision-making, while the citizens' initiative is a form of previous plea in which citizens propose to the Assembly and other municipal bodies to solve an issue using their decisions. The above-mentioned forms of direct participation of citizens provide protection in cases where elected representatives do not make decisions that are in the interest of all.

Referendum is a form of participation that allows for direct voting at the polls on various issues that are of importance to the community. The Statute of the Municipality of Obrenovac allows a referendum to be announced on the own initiative of the Municipal Assembly or at the request of citizens. However, the statute does not precisely define a range of issues that can be decided by referendum, nor the times when it must be carried out. It is generally considered that the referendum should be organized on the occasion of "big things" such as the mayor or a shift of defining priorities for capital investment in the municipality.

Citizens' initiative gives citizens an active role in the management of municipal policy and represents the right to propose solutions to certain questions or bring in certain acts. The Statute of the Municipality of Obrenovac defines it that citizens, through the Citizens' Initiative, propose to the Assembly of the City

Municipality, within which a particular issue within the jurisdiction of the municipality of the city will be regulated, change of the Statute or other acts and call a referendum. The Assembly of the City Municipality is obliged to hold a hearing on the proposal from the citizens' initiative and to submit a detailed reply to citizens within 60 days of the receipt of the proposal.

Citizens in the Municipality of Obrenovac do not use referendum or citizen initiative as a mechanism for citizen participation although they represent two fundamental forms of direct citizen participation in decision-making. Encouraging this form of direct citizen participation is possible by the introduction of new, or, if necessary, by improvement of the existing legislation that allow: citizen initiatives seeking the elected bodies of local government to resolve the issue raised in the citizen initiative, or to initiate a procedure for calling a referendum; advisory referendum or referendum in which decisions are made on issues of interest to the local community, which local authorities are carrying out on its own initiative or at the request of the local community.

When analyzing the lack of public participation in decision-making we should not neglect research results (Zdenka Milivojević) which indicate that the majority of Serbian population, accustomed to strong and (all) powerful state, still does not see themselves as citizens responsible for their own rights and obligations, but still view themselves as (subordinate) inhabitants whose life is in the hands of the state and whose problems are a matter of state institutions' concern. Such attitudes narrow the space for civil initiatives. In addition, citizens are insufficiently informed about both the existence of decision-making mechanisms, as well as about the method and the reasons for their application.

3. LOCAL COMMUNITIES

The Statute of the Municipality of Obrenovac provides that, in order to meet the needs and interests of direct relevance to citizens from a certain area, local communities be established in the city municipality. The local community is established for one or more villages and, as a rule, covers an area with approximately the same population. The local community considers issues related to the creation of better conditions of life in the local community. The work of the local community and the real participation of citizens in exercising their right to local governance largely depends on the determination of funding for the implementation of programs and tasks of the local community. In the Municipality of Obrenovac there are 29 local communities, out of which 25 are villages. In the elections for local communities of 2012 the members of local community councils were elected by direct citizen votes and this was the first time that members of local community councils had been elected in this way. This practice, however, has not been continued. Local community councils play an important role in decision making, especially those related to the creation of better conditions of life in the local community. Communication between the authorities and citizens of the local community is better in rural local communities, because citizens of the village rely more on the local community than those living in the town.

4. CONCLUSION

Most citizens do not feel participant in the decision-making process in their local community and they are insufficiently informed about the developments and plans of the local authorities. Many are not aware at all that direct forms of participation exists in their municipality. Generally speaking, citizens are poorly informed and are rarely willing to use the existing mechanisms to contribute criticism of the government or make proposals. Launching initiatives to solve certain issues and improve life in the community, is rather the exception than the rule. Also, rare attendance to meetings where proposals or decisions of the authorities are discussed further alienates citizens from the decision-making process (SCCM, 2006). While Obrenovac Municipality is making efforts to improve citizen information and consultation, it is noted that proposals and decisions are not present, nor is anything done regarding the mechanisms for their encouragement. The efforts of municipalities are merely a single - action practice, but not a systematic and continuous approach to strengthening and fostering civic participation. Recommendations for greater citizen participation are openness of the local authority, stronger dialogue between local authorities and the citizens and sharing responsibilities in local public life.

Openness of the local authority to citizens is the first step towards greater citizen participation and the achievement of a democratic society. Informing citizens, their right of access to documents of the local government and timely and adequate information are indisputable prerequisite for deeper direct involvement of citizens. Transparency, public disclosure of the minutes and decisions of local authorities, organization of modern information services, live communication with the citizens and creation of cities' and municipalities' web domains are some of the recommended forms of active information.

Dialogue between local authorities and the citizens is the second part of the process of citizen direct participation in public life at the local level. Citizens' right to petition and public criticism or public debate are

some of the forms through which dialogue between citizens and local authorities may occur. Better and more accurate organization of dialogue with citizens, specification of mandatory issues that citizens must be consulted about, establishment of the obligation of local authorities to respond to the suggestions, remarks or criticisms of citizens, participation of citizens in working and advisory bodies, better and more frequent organization of public hearings or the introduction of innovative forms of consultation, are the guidelines proposed.

Sharing responsibilities is a key part of citizen direct participation in local public life. Developing their awareness of belonging to the community and encouraging citizens to undertake the responsibility to contribute to public life, are aimed at improving the dialogue between citizens and their elected representatives and the exercise of citizen right to participate directly in decisions making important for the future of their community (SCCM, 2006).

Organization and promotion of citizen direct participation can and should be focused on the formal and informal forms and methods of involving citizens in local public life. The system should work to raise awareness and responsibility for democratic participation of citizens in public life and decision-making. Finally, openness, dialogue and sharing responsibilities for build up a long-term partnership between citizens and local authorities. The goal of each local government should be building of a community of competent and aware citizens who will be ready to fully assume their role in society.

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PUBLIC SERVICE INTERFACE SOLUTION BASED ON BACK OFFICE INTERCONNECTION FOR E-GOVERNMENT DEVELOPMENT: A MACEDONIAN CASE STUDY

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Abstract: *The core of e-government efforts is focusing on citizen-centric orientation with more user-friendly interfaces for the citizens. This paper has a purpose to present user-friendly interface solution for one public service for citizen in the e-government framework that takes part in smart city development. The proposed interface solution is based on back-office connections of whole stakeholders included in the process of public service issuing that belongs to the "life events" category. The offered solution is based on deep research in the area of Civil Registration in Macedonia, with focus on back-office connections in this public service delivery.*

Keywords: *e-government, back office, public services, interface, smart city*

1. INTRODUCTION

Cities are the future of humankind. In the last two century is noticed fast enlarging of the population that live in the cities: if in the 18th century less than 5% of the global population lived in a cities (Harrison and Donnelly, 2011), now, in the 21st century, in general at least 53% of the humankind lives in the cities (data related to 2014, <http://kff.org/global-indicator/urban-population/>) what is 10 times more than in the past. In the developed countries in the world as USA, United Kingdom, Japony, Russia, Germany, France, Spain, and many others, this number is between 75% and 91%, what point out that living in the big cities in the developed countries is bigger trend. Macedonia is no exception even belongs to the group of undeveloped countries – in 2014 around 65% of the population in the country live in the cities.

The challenges that are emergence as a consequence of this trend within the cities caused problems like: lack of places to live, contamination, damaged or inadequate infrastructure, lack of effective health and education, poverty, low transparency of government, etc. Public administration institutions usually are located on different locations in the cities and very often there are long distances between them, what is also a part of the challenges of the smart city.

The revolutionary discovers of the last century that marks the way and style of life of this century (information and communication technologies (ICT), Internet and digital technology) are seen as the tools that offer possibilities for solving those above mention problems. The emergence and development of "Internet of things" opportunity arose much of everyday objects and processes to be controlled automatically by the Internet. Those tools enable the cities evolution from traditional to smart city where the improving of the quality and efficiency of citizens lifes is highlight of the efforts.

E-government as an interdisciplinary scientific field that is on the intersection of computer, information, administrative, and political sciences (Bogdanoska Jovanovska et al.,2012), is a predecessor of smart city concept. Its focus on identifying opportunities and developing solutions based on ICT used in public administration domain by interconnection of the whole stakeholders involved in the public services delivery, have a great contribution to the process of facilitating the lives of the citizens in the big cities, where long distance between institutions are one of the biggest problem.

Based on the research of Bogdanoska Jovanovska et al. (2012): document analysis on relevant laws, procedures; survey on web-sites of public administration institutions; and interviews with servants included in the process of life events service delivery, related to Civil Registration area in Macedonia, qualitative information relevant for back office interconnection between relevant stakeholders involved in life events public services that belongs in this area were collected. Drawing of information flow network between all relevant institutions (public or business) included in the process of this life event realization was used as base for creating front office solution for one public service in this area: issuing Marriage Certificate. The final goal of this paper is creating the most user-friendly interface for front-end service realization of this e-service, based on well defined back office database connections between all involved stakeholders in the service delivery.

Further on the paper is organized as follows: next section gives the description of the civil registration area in RM, after that back office database connection by using information flow network is discussed Interface

solution public service – issuing Marriage Certificate is presented as fourth section. The conclusion with directions for further work concludes the paper.

2. DESCRIPTION OF CIVIL REGISTRATION AREA IN REPUBLIC OF MACEDONIA

The Civil Registration Area is a segment of the public administration in the Republic of Macedonia that utilizes the recording of crucial events related to citizens, i.e., changes in citizens' personal status from birth to death. More specifically, the Civil Registry records births, marriages (and all modifications) and deaths. In the Republic of Macedonia, birth, marriage and death certificates are commonly required and used for performing numerous distinct public services. The activities of the Civil Registry are within the sphere of competence of the Registrar Office, a legal entity within the Ministry of Justice of the Republic of Macedonia, established in 2010. The Registrar Office functions on the local level, through its 8 regional offices, 26 local offices of the departments for register operations and 239 local offices in rural settlements. The traditionally service delivery in this area - issuing the certificates for all events means realization of few steps: (1) citizens obligatory need to visit local offices that belongs to the city/municipality where the event happen (birth place, marriage place or death place); (2) fulfilling application for the certificate that the citizen needs, (3) completed all need documentations as support (personal identification card, identification card of the parents, prove of payment realization for that certain service issuing, etc.); and (4) when the certificate is ready, citizen needs to visit office again to take the certificate.

Currently, there isn't any offered on-line public service organized as front-end in Republic of Macedonia. The information for public services mainly is available at one general web portal of e-government services in RM (www.uslugi.gov.mk) and specifically, the information related to issuing Marital Certificate is given at an official web site of the Registrar Office of RM (www.uvmk.gov.mk). At the general web site citizen can take information for all public administration institutions in RM (ministries, biros, or other institutions) as well as the documents that the citizens need for issuing any of the public services that those public institutions offer. Registrar Office is part of this web page with all information also related to the issuing Marriage Certificate. The way of finding this information is quite complicated because the citizen needs to know which public institution issue this document. Additionally complications exist because up to 2010 this document was issued by the Ministry of Justice in the premises of Ministry of Interiors, and now this is duty of the new institution named as Registrar Office. Further on, as was already mention above, citizens can use second possible web site <http://uvmk.gov.mk/?q=taxonomy/term/13> where he/she can see the form of the document in two versions: in Macedonian and in two languages form. If citizen click at given option (on left side) "documents" all document that Registrar Office issue are listed. The citizen does not have option to start procedure electronically for getting the document – Marriage Certificate.

3. BACK OFFICE CONNECTION IN THE PROCESS OF MARRIAGE CERTIFICATE ISSUING

For the purpose of presenting back-office interconnection between institutions (public and/or business) in the process of Issuing Marriage Certificate, i.e. for a visualization of the network, we use the Pajek software package (Batagelj and Mrvar, 2007) for social network analysis.

The network on the Figure 1 corresponds to the situation at the field, traditional realization of the process after the reform that took place in 2010 and involved establishment of the Registrar Office.

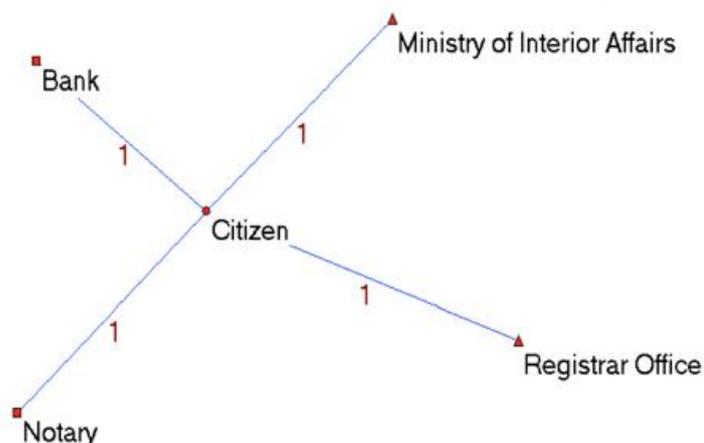


Figure 1: Information-flow network for the service "Issuance of marital status certificate"

The inter-organizational network presented at the Figure 1 is related to the information and document flows between public administration bodies and other stakeholders involved in the process of certain service

delivery: issuing of Marriage Certification. It is the traditional way of this certificate issuing where „the citizen“ is in the center of the network – he/she has a role to connect the different stakeholders in the process of issuing public service.

According to the analyses that specifically focus on qualitative evaluation of e-services and European Commission DG Information Society (2001), four-stage model for the assessment of public-services online sophistication (EC1 model) is proposed:

- 1) information: the information necessary to start the procedure to obtain the public service is available online;
- 2) one-way interaction: the form (for printing or downloading) to start the procedure to obtain this service is available online;
- 3) two-way interaction: electronic intake with an electronic form to start the procedure to obtain the service including a form of physical or juridical authentication is possible;
- 4) transaction: covers full electronic case handling so that no other formal procedure is necessary for the applicant via paperwork; complete treatment of the public service is possible via the website, including decision, delivery and payment if required.

Above described public service delivery indicates that realization of this public service-issuing Marriage Certificate in Macedonia belongs to the first level of e-government development.

Electronically realization of this public services in the scope of e-government means back office connection of mention institutions, „behind the scene“ documents interchange and information between public administration institutions as well as other stakeholders, and issuing document to the citizen without leaving its home, only by using some ICT device (computer, smart phone, credit card for payment, etc.). With other word saying: instead citizen to be in-line (traditional) he/she will realize this service on-line (e-government).

It is worth to mention Vintar et al. (2004) work on this problem, where the authors establish two dimensions of service maturity: sophistication and integration. The sophistication level according to them is defined according to the EC1 model, while the integration level according to the authors refers to “the degree of integration of service and corresponding processes required to solve a particular life-event problem:

- 1) dispersion: services needed to solve particular life-event are dispersed over different websites of different institutions;
- 2) coordination: services in the life-event are accessible through single entry point on the internet, but essentially services and corresponding processes remain unchanged;
- 3) integration: services and corresponding processes are integrated into one single process to solve the particular life-event in the whole.”

Other very important thing for realization of this as well as any other public service on-line is interfaces that government institution offers to the citizen during the process of applying for public service realization i.e. submitting of the application. This part is important for two aspects: one – easy to use for every one even for those that have not high level of digital literacy, and second one (most important for us) solution that offer the best interconnections with all stakeholders involved in the process of that certain public service delivery, with all levels of controlling and cross-checking of the data that the citizen put in the process of application.

The process of electronically provision of public services includes two main parts: front office (portals, web sides) and back office (interconnections mainly between public administration institutions). Taking this in consideration “The provision of public services should be customer-oriented, taking their point-of-view: what the customers (citizens, business or even non-profit organizations) perceive in their relationships with public bureaucracy” (Vintar et al. 2004). So, motivation of the citizens to use portals/web sites depends of the user friendly interface of the portal as basic for easy managing of the services, as one side of the coin, and back office integration between public institutions, as other side on the coin, what is even more important, for functioning of the front office.

4. INTERFACES OF THE E-SERVICES

The crucial part of information system for using a smart government service is the user interface. Taking into consideration, many country governments take care about interface of the smart government services. For example, although the Singapore eCitizen portal had been assessed as the best of all analyzed portals already in the first measurement, it has improved from very good to excellent in the one-year period, which indicates that developers of the portal still take care of development of high-quality user-friendly public services (Leben et al., 2004).

The government services are used from beginners to experts (in term of using information system) and that is the main concern for interface designer. Most of the system users preferred an interface with small density (less than 50 percent of the interface to be filled with information). The experienced computer users preferred interface with higher density (sometimes approaching 90 percent occupancy of interface information). The designers are concern to offer interface that is easy to use or interface that allows quick access to necessary action/information. Sometimes these requirements are complementary but sometimes they lead to a completely different design decision. Beginners, for example, often prefer menus that show all the available

features of the system because they enable easy navigation and access. Experts, on the other hand, want menus organized around the most frequently used functions. The designers need to offer appropriate interface for all users, so they should try to balance between simple to use interface and interface with quick access.

Further, the user interface designed for public services, despite of principles for designing, should incorporate specific standards or document formats.

5. INTERFACE SOLUTION FOR ISSUING MARRIAGE CERTIFICATE

In the proposed case study, Issuance of Marriage Certificate (MSC), the user interface (UI) is created by using the official document as background for data entering (Figure 2).

РЕПУБЛИКА МАКЕДОНИЈА

ФОРМУЛАР - барање за извод од матична книга на венчаните

ИЗВОД ОД МАТИЧНАТА КНИГА НА ВЕНЧАНИТЕ

ОПШТИНА:

ГРАД:

Во матичната книга на венчаните што се води за местото _____ под тековен број _____ за година _____ запишано е склучувањето на бракот:

Ден, месец и година на склучувањето на бракот	03.05.2016	<input type="text" value="15"/>
Место на склучувањето на бракот	Аеродром	
	на младоженецот	на невестата
Име	Петар	Снежана
Презиме	Петровски	Спасовска
Ден, месец и година на раѓањето	18.02.1980	26.11.1983
	<input type="text" value="15"/>	<input type="text" value="15"/>
Место на раѓањето	Битола	Прилеп
Државјанство	Р.Македонија	Р.Македонија
Матичен број	1805980410012	2611983415011
Живеалиште и адреса на станот	Партизански одреди 53	
Име и презиме на родителите	на таткото на мајката (и матинско презиме)	
	Стојан Петровски	Драган Спасовски
	Марија Моминско Петровска	Мира Стојанова Спасовска
Брачните другари после склучувањето на бракот го носат презимето:	младоженецот	Петровски
	невестата	Петровска
Забелешки:	e-mail: petar.petrovski@gmail.com	
сертификатот да се достави:	<input type="text" value="на домашна адреса"/>	<input type="button" value="ПОДНЕСИ БАРАЊЕ"/>

Figure 2: User interface for issuing marriage certificate

The user should not enter all fields, but only those that contain the basic information needed for issuing marital status certificate. Elements which facilitate the entry (Figure 3) are used in the created UI:

- Dropdown lists are used for choosing a city, municipality and place for delivering the certificate (e.g. the place where the marriage is concluded);
- Entering dates is supported with datepickers (e.g. date of birth for each of the spouse, date of marriage, etc.);
- Entering text - certain fields for text input are limited in length (e.g. identification number must be 13 characters), while some other fields are not limited (e.g. Entering mail address of the applicant).

By entering all necessary information, button for sending and processing the request is allowed. After the user sends the request for issuing the marital status certificate:

- The information inserted by the user are checked within two institutions. When the information are validated the request is processed;
- User receives an email with account and amount that need to be paid (costs for issuing the certificate);
- After the validation of electronic payment, user receives an email with notifications for completed certificate and information about the delivering of the certificate (as shown in the request form - in the branch Registrar office or on home address).

If there are inconsistencies in the information entered by the user, he/she receives an email with further information that are needed for completion of the request.

ИЗВОД ОД МАТИЧНАТА КНИГА НА ВЕНЧАНИТЕ

ОПШТИНА: Аеродром
ГРАД: Скопје

Во матичната книга на венчаните што се води за местото _____ под тековен број _____ за година _____, запишано во склучувањето на бракот:

Ден, месец и година на склучувањето на бракот: 03.05.2016
Место на склучувањето на бракот: Аеродром

на младоженецот		на невестата	
Име	Петар	Име	Снежана
Презиме	Петровски	Презиме	Спасовска
Ден, месец и година на раѓањето	18.02.1980 [15]	Ден, месец и година на раѓањето	26.11.1983 [15]
Место на раѓањето	Битола	Место на раѓањето	Прилеп
Државјанство	Р.Македонија	Државјанство	Р.Македонија
Матичен број	1805980410012	Матичен број	2611983415011
Живеалиште и адреса на станот	Партизански одреди 53	Живеалиште и адреса на станот	Партизански одреди 53
Име и презиме на родителите	на таткото: Стојан Петровски на мајката: Марија Моминско Петровска	на таткото: Драган Спасовски на мајката: Мира Стојанова Спасовска	
Брачните другари после склучувањето на бракот по ност презимето:	младоженецот: Петровски невестата: Петровска		
Забелешки:	e-mail: petar.petrovski@gmail.com		

сертификатот да се достави: на домашна адреса **ПОДНЕСИ БАРАЊЕ**

ИЗВОД ОД МАТИЧНАТА КНИГА НА ВЕНЧАНИТЕ

ОПШТИНА: Аеродром
ГРАД: Скопје

Во матичната книга на венчаните што се води за местото _____ под тековен број _____ за година _____, запишано во склучувањето на бракот:

Ден, месец и година на склучувањето на бракот: 03.05.2016
Место на склучувањето на бракот: Аеродром

на младоженецот		на невестата	
Име	Петар	Име	Снежана
Презиме	Петровски	Презиме	Спасовска
Ден, месец и година на раѓањето	18.02.1980 [15]	Ден, месец и година на раѓањето	26.11.1983 [15]
Место на раѓањето	Битола	Место на раѓањето	Прилеп
Државјанство	Р.Македонија	Државјанство	Р.Македонија
Матичен број	1805980410012	Матичен број	2611983415011
Живеалиште и адреса на станот	Партизански одреди 53	Живеалиште и адреса на станот	Партизански одреди 53
Име и презиме на родителите	на таткото: Стојан Петровски на мајката: Марија Моминско Петровска	на таткото: Драган Спасовски на мајката: Мира Стојанова Спасовска	
Брачните другари после склучувањето на бракот по ност презимето:	младоженецот: Петровски невестата: Петровска		
Забелешки:	e-mail: petar.petrovski@gmail.com		

сертификатот да се достави: на домашна адреса **ПОДНЕСИ БАРАЊЕ**

ИЗВОД ОД МАТИЧНАТА КНИГА НА ВЕНЧАНИТЕ

ОПШТИНА: Аеродром
ГРАД: Скопје

Во матичната книга на венчаните што се води за местото _____ под тековен број _____ за година _____, запишано во склучувањето на бракот:

Ден, месец и година на склучувањето на бракот: 03.05.2016
Место на склучувањето на бракот: Аеродром

на младоженецот		на невестата	
Име	Петар	Име	Снежана
Презиме	Петровски	Презиме	Спасовска
Ден, месец и година на раѓањето	18.02.1980 [15]	Ден, месец и година на раѓањето	26.11.1983 [15]
Место на раѓањето	Битола	Место на раѓањето	Прилеп
Државјанство	Р.Македонија	Државјанство	Р.Македонија
Матичен број	1805980410012	Матичен број	2611983415011
Живеалиште и адреса на станот	Партизански одреди 53	Живеалиште и адреса на станот	Партизански одреди 53
Име и презиме на родителите	на таткото: Стојан Петровски на мајката: Марија Моминско Петровска	на таткото: Драган Спасовски на мајката: Мира Стојанова Спасовска	
Брачните другари после склучувањето на бракот по ност презимето:	младоженецот: Петровски невестата: Петровска		
Забелешки:	e-mail: petar.petrovski@gmail.com		

сертификатот да се достави: на домашна адреса **ПОДНЕСИ БАРАЊЕ**

ИЗВОД ОД МАТИЧНАТА КНИГА НА ВЕНЧАНИТЕ

ОПШТИНА: Аеродром
ГРАД: Скопје

Во матичната книга на венчаните што се води за местото _____ под тековен број _____ за година _____, запишано во склучувањето на бракот:

Ден, месец и година на склучувањето на бракот: 03.05.2016
Место на склучувањето на бракот: Аеродром

на младоженецот		на невестата	
Име	Петар	Име	Снежана
Презиме	Петровски	Презиме	Спасовска
Ден, месец и година на раѓањето	18.02.1980 [15]	Ден, месец и година на раѓањето	26.11.1983 [15]
Место на раѓањето	Битола	Место на раѓањето	Прилеп
Државјанство	Р.Македонија	Државјанство	Р.Македонија
Матичен број	1805980410012	Матичен број	2611983415011
Живеалиште и адреса на станот	Партизански одреди 53	Живеалиште и адреса на станот	Партизански одреди 53
Име и презиме на родителите	на таткото: Стојан Петровски на мајката: Марија Моминско Петровска	на таткото: Драган Спасовски на мајката: Мира Стојанова Спасовска	
Брачните другари после склучувањето на бракот по ност презимето:	младоженецот: Петровски невестата: Петровска		
Забелешки:	e-mail: petar.petrovski@gmail.com		

сертификатот да се достави: на домашна адреса **ПОДНЕСИ БАРАЊЕ**

Figure 3: UI elements for facilitating the information entries

6. CONCLUSION

In this paper, based on dedicated research on front and back office situation in Republic of Macedonia related to issuing public service of Marriage Certificate, we propose interface solution for on-line realization of this service in context of e-government in direction with smart city development.

Having in mind that mainly websites and portals are examined from the governmental point of view and assessed upon the governmental offers for the customers (which is not always user friendly) we are offering solution that will be more suitable for people with low level of digital literacy. Furthermore, our interface solution (front office) is based on high level of back office development solution.

The advantage of the presented interface is not only the simplicity – intuitive data entry and reduced chances for errors. But more important, saving time and money, which is general attribute of e-services, and ability for the citizen to receive the certificate by mail on his/her home address or in local branch office by his/her choice (not in the municipality where the marriage is concluded).

The proposed interface solution has several characteristics that are important for citizen-oriented user-friendly e-government: usability, customization, openness and transparency. The advantage/strength offered by this interface solution reduces the burden of citizen (going from one to other institution for gathering need documentation necessary for getting Marriage Certification) and enabling the citizen from his/her home, at own PC starts/end procedure for getting this document.

The main purpose of this interface solution is actually the integration of various public and business institutions into a unified well coordinated back office system. We expected that the proposed interface will give successful results not only in increasing the citizen's satisfaction, but also in improving of the overall effectiveness of service delivery process and public administration functionality.

It is essentially to emphasize that the approach of replacing the traditional e-services should be based on an analysis of back office and then creating the interface, which is not practice so far. Analyzes of back offices for different certificates on local and republic level, as well as adding new public on-line services can be done as further work.

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INSTITUTIONALISM AND ORGANISATIONAL LEARNING IN THE PUBLIC PROCUREMENT MARKET

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Abstract: *Transaction costs represent one of the most important elements of institutional economics. Their importance in studying current regulations and practice in public procurement domain is constantly growing due to the fact that production costs of bidders converge. Differences in regulations (institutions) and procedures related to public procurement create atmosphere that can significantly change negotiation outcomes. Bounded rationality, opportunism and imperfect information are identified as the key factors that generate transaction costs in public procurement. Organisational learning can influence a decrease in direct costs of closing a transaction, but cannot influence fundamental sources of transaction costs, such as uncertainty and risks.*

Key words: *transaction costs, public sector, organizational learning, bounded rationality, imperfect information, opportunism*

1. INTRODUCTION

Public expenditure in the Republic of Serbia accounts for 45.5% of GDP, which is similar to the Czech Republic and Poland, but more than Bulgaria, Romania, Croatia and Turkey (Veselinović, 2014). Most part of public expenditure (for many years it has covered over 50 per cent of Serbian budget) has been directed towards salaries in the sector, pensions and social benefits. The topic of this paper draws our attention towards the expenditures related to procurement of goods and services. Since the enforcement of the Public Procurement Law in Serbia, the share of public procurement costs in GDP has been monitored through reports of the competent state agency (according to official reports of Public Procurement Office), and it is found that public procurement accounts for 8 per cent of GDP. On the other hand, in reference countries (EU members above all), the value of public procurement (EU Commission, 2011) is about 3.5 per cent of GDP. Nevertheless, there are only few scientific studies that give attention to the analysis and conditions for improving efficiency and effectiveness of public procurement, particularly from the aspect of economic and organisational theory (Jaško et al, 2015). The aim of this paper, from the aspect of institutional economics, is to analyse the procedures and practices of public procurement and their influence on the efficiency of spending public funds (bearing in mind the possibility that the key factors of transaction cost levels can change), by applying the concept of organisational learning in public sector.

2. INSTITUTIONALISM THEORY AND PUBLIC PROCUREMENT

Today, transaction costs are inevitable part of public sector economy analysis and have their place in research papers and works of numerous theoreticians. On the other hand, it seems that there is no field with clearer reflection of this concept on practice than the field of public procurement. Numerous authors made their main contributions trying to connect the two research subject matters. Some of the most commonly mentioned relations between these two research subject matters are the issues of public choice (always related to decision-making in public administration) that were discussed by Brown and Potoski (2003), Wals and Davis (1988). Mana, Matějková, Jurčík, Heidu (2014) expanded research on the issues of transparency, while Domberger and Jensen (1997), Reeves (2008) and many others researched into market-based public procurement. However, in this paper as well, it seems fair to give full credit to those whose contributions are in the basis of consistency and applicability of transaction cost concept, including a number of authors that are now considered to be the creators and developers of institutional perspective on economics.

Institutionalism is much older than its most significant result – transaction costs. Institutionalism was established on the works of those who followed the statement of Veblen that humans do not act exclusively

rationally and in accordance to their own interests, since their choices and decisions depend on tradition, customs, habits and other kinds of rules (e.g. laws, author's remark), so their natural surroundings, where they make their decisions, is social, i.e. institutional—(Veblen, 1899). North (1991) defines institutions as "humanly devised constraints that structure political, economic and social interactions". Constraints, as North describes, are devised as formal rules (constitutions, laws, property rights) and informal restraints (sanctions, taboos, customs, traditions, codes of conduct), which usually contribute to the perpetuation of order and safety within a market or society.

For example, let us observe the role of public policy makers. The first dilemma they have to face while deciding on which values to set upon their citizens is whether to offer a certain public service internally, through public services and enterprises, or externally, through private providers. Such dilemma is recognized in management of private companies as the question whether to ~~make~~ or buy—There are various factors, both in public administration institutions and public enterprises that can influence this decision, but Levin and Tadelis (2005) divide them into two separate groups – economic and political, while Brown and Potoski (2004) introduce a wide range of different factors. Some of the factors include city size, financial situation, i.e. indebtedness, specificities of procured goods or services, their susceptibility to quality changes, the possibility to measure the volume of provided services, etc. It is obvious that the answers to these questions are strongly related to the model of public sector, where there are examples of wide and narrow volume of public offices in different countries, and only partly to the economic effects achieved by different choices. Therefore, a decision is not only the result of choosing a good as such, but also of choosing the model of how to procure it and why that is useful, so the purpose of the good itself is sometimes disregarded, and attention is only given to the purpose of its procurement. Sometimes it seems that it is more important to procure goods and services in accordance to 'rules', than to procure them under best economic conditions. Most commonly used public procurement rules are the ones that enable equal access and equal treatment in procedures, and transparency (Truchet, 2012).

A significant methodological difference between neoclassicism and institutionalism lies in the institutionalism concept that humans limit maximization preferences, which neoclassical economics built into the foundation of its microeconomic analysis that always takes into account the market participant, 'homoeconomicus' (Zabieglik, 2002). The economy based on 'homoeconomicus' can be seriously questioned if decision-making context is broadened, and if it is taken into account that humans always make decisions in social context, especially if they hold public positions, when from the level of individual interest, they move to a higher, common, general, or more specifically – public interest.

Neoclassical economics has been criticized because of its inability to deal with important and deep questions such as happiness and welfare, laws and justice (Gilboa, 2010). Rational choice is not always the one that maximizes the gain of the participants in transaction. It is usually considered in a broader context, including other people who are related to the transaction, but do not participate in it, and those who can have a future opportunity to make such transaction. These very consequences were first discussed by Pigue, who used them to establish his view on externalities, and then by Coase (1960), who called this effect - social cost transactions. Pigue's solution rests on taxation, which has to be conducted by the third party (the government) that does not participate in making the transaction, in order to reimburse the expenses to damaged parties on one hand, or to reduce undeserved advantages on the other. Coase's solution rests on direct negotiation between the parties, while the third party needs to create necessary conditions, so that the negotiation costs (transaction costs) tend towards zero (Coase 1960). Obviously, the costs of this kind of transactions will grow when there are lots of transactions (for instance, a lot of people living near a thermal power plant) and therefore most authors claim that the efficiency of Pigue's taxes will win over the low cost of Coase's transactions, which may result in transaction blockade. Apparently, inefficient contracting is one of very important aspects of institutionalism. If institutions are inefficient, they will not be used, or participants will tend to avoid them. Such examples of institutional inefficiency can lead towards improving institutional economy.

3. PUBLIC SECTOR AND PUBLIC PROCUREMENT INSTITUTION

Public procurement refers to the process by which authorities purchase goods and services intended to meet the needs of community, or that are necessary for proper functioning of public administration. It is clear that public procurement serves as means to obtain the goods that public sector cannot produce itself, or if it is not justified by economic or other reasons. The rules of public procurement, as compared to private sector procurement are not fully compatible to one of the key postulates that have been developed thanks to Coase (1937) and Williamson (1975). They noticed that a company or public sector in this case, will be developed

by vertical integration of transactions if that is the way to reduce total business expenses, which along with production costs include transaction costs, i.e. the costs of transaction realization. However, since the number of transactions is getting larger, it may not be possible to achieve the goal of reproducing market conditions within an organization, and the decision-making within an organization may become even less credible. So, these authors set the foundations for establishing company (public sector) limits in a cost-oriented way (Williamson & Winter 1991), but it is clear that the creators of public policies are not consistent in applying these rules when making decisions about public sector limits. That is how the demands for reducing public sector due to unsustainable accumulation of authorizations (Claus, 1984), neoliberal demands for introducing market mechanisms in public sector (Pierson, 1994), and demands of New Public Management representatives to transfer public authorizations to independent public agencies, all can be relevant at the same.

The number of people employed in public sector or public services that are conducted in public sector organization can be taken as a measure of changes of the rules applied in making decisions on how big public sector should be. Some relevant studies show that “we separate evidence that downsizes work from evidence that does not (or equivalently here, that upsize work)” (Lee & Strang, 2006). Institutional approach provides several optimal solutions, which is one of its specific features as compared to neoliberal approaches in economy, and the forces that work towards applying one of the solutions are known as coercive, mimetic and normative pressures (Dimaggio & Powell 1983). As for the rules that are applied in public procurement domain in Serbia, it seems that all three sources had their respective roles in creating institutions.

Commons (1931) was the first to introduce the term “working rules” as a significant decision-making instrument, while Hamilton (1919) used the same explanation to introduce the term “institutional economy”—while trying to prove that development of economic principles has to overcome a passive position where economy is reduced to buyer-seller relationship. That relationship depends heavily on the rules that are being used between buyers and sellers, and that is the basis of institutional economics. Commons believed that economic problems which cannot be solved in market conditions can be solved in the conditions of institutional reforms, whereby he clearly pointed to strong relation between economy and law, which was in part, his key standpoint while being involved in establishing “state of wealth” where he participated while taking part in numerous committees and forums in the USA. (Such commitment contributed to the fact that institutionalism is viewed as pre-interventionism).

One of the oldest regulations concerning public procurement refers to regulatory provisions that public procurement contracts between the state or its representatives and suppliers, have to be the result of tender procedure (Truchet, 2012) (public offers and competition), which has been mandatory in French legislation system since 1786, and on municipal levels since 1837.

4. APPROACHES TO INSTITUTIONAL CHANGES BASED ON ORGANISATIONAL LEARNING

Commons was also the first to introduce the term “reasonable price” that referred rather to the procedure needed to get it, than to its amount. Namely, he points out that transaction price can be reached in negotiation process by gradually adjusting viewpoints, rather than by a discrete market mechanism with one price matching one type of goods. A price can vary depending on who sells, and who buys, but when “a transaction has been contracted following a regular procedure, its value is guaranteed by the highest court of justice in the country—(Commons, 1931). The procedure is regular if it is transparent, if all the interested parties have access to it and if the same rules apply for all the parties.

One of institutionalism concepts is that both rules and institutions are historically changeable (Veblen, 1899), not only because of the passage of time, which affects changes in social rules, but primarily because of technological progress. In the conditions of general application of ICT and orientation towards better efficiency and better results (Čudanov&Jaško, 2012), public procurement rules have been integrated into the procedures of electronic public procurement. Not only that public procurement procedures are now based on using electronic communication between the contracting authorities and bidders, but growing usage of electronic auctions emerges as the highest level of electronic procurement development.

A specific characteristic of electronic auctions in public procurement is that buyers, not sellers, initiate them. This characteristic causes another – the prices are getting lower, not higher, since the main goal is to obtain goods at the lowest possible price, while other conditions remain the same (quality, life cycle, payment terms, etc). Moreover, certain kinds of auctions enable bidders to change their bids several times, since they are familiar to the bids of other participants in the auction. Several auction procedures have been developed

and the most familiar type is called English auction (Abulaban & Qadah, 2006). The procedure is as follows: Contracting authorities determine reservation price (the highest they are ready to pay); bidders are not familiar with the reservation price; auction expiration time is determined; bidders are given chance to make their bids; after all the changes have been done in the given bids, the one with the lowest value will be chosen. In some cases, it is possible to limit the changes that can be done in the initial bid, which serves as a protective mechanism against speculative behaviour of the participants. Dutch auctions that are considered to have the most efficient procedure, from the perspective of buyer can begin with a symbolic price for the demanded good, which represents an offer to contracting authorities to accept the terms. Then the price gradually gets higher, and the first one who accepts the offered price wins the auction (Vickrey, 1961).

A thorough explanation of the effects such auctions have on the efficiency of public procurement was provided by William Vickrey, back in the 1960s, and many others since then. Today, they are integral parts of standard applications (SAP 2007) for procurement management not only in public, but also in most private companies. Except the mentioned ones, there are types of electronic procurement with elements of classical tender procedure and auction. *First-price sealed bid* is electronic procurement where no changes can be made to the initial bids, so it is the most similar to classic form of bidding, except that it is made electronically. *Second-price sealed bid* also does not let a bidder see other participants' bids. Bidders provide not only the price, but also the information on quantities they are ready to offer. What is particularly interesting is that tender winner will not pay the price he has offered, but the price offered by the participant who came second, which contributes to even greater price reducing (Abulaban & Qadah, 2006). Since the described rules can change the way bidders behave, several more options for auction procedures have been developed, especially for the English auctions, where bidders cannot see the value of other participants' bids, but only the sequence of bids, or they can only see their own and the leading bid, or the leading bid and/or the sequence of bids, without the values (Pridavok, 2011), etc.

Empirical inductive method has been used in developing institutionalism, as compared to neoclassical economics where abstract deductive method has been used for research and deduction (Bresser-Pereira, 2003). For example, the mentioned auction practice has become a rule that is now included into regulations in the field of public procurement, since it has been proved that such practice can improve both transparency and competitiveness of the procedure (Kumar & Chang, 2007). Nowadays, there are regulatory provisions about when and how auctions can be conducted in the public procurement process, which is an obvious example that institutions can also appear as results of experiments.

Institutions appear and change as the result of a long-lasting and incremental process of learning (Groenewegen, Spithoven & van den Berg 2010). Learning is recognised as:

- Improvement of performances and achievements.
- Memorising, or using the information from experience.
- Evaluation of knowledge, where learning means making changes in knowledge stock, its characteristics or distribution to units.

Knowledge obtained by improving processes and performances is at the very core of learning as presented by Nelson and Winter (1982), and it is achieved by codification of knowledge according to routines performed by individuals. That is –learning by doing–access to learning. Routines are the result of a balance that appears between the forces that support changes and those that believe in the efficiency of current situations or processes. Routines are considered to be a form of organizational control that does not engage resources, and therefore reduce transactional costs, which makes them even more efficient.

Organizational learning is a synthesis of two processes: learning and dissemination of knowledge. Learning demands the existence of certain mechanisms that enable members of an organization to collect, analyze, distribute and apply knowledge, which can be done in classical manner, with technology enhanced learning (Čudanov et al 2012) or in blended learning approach (Mijatović et al, 2013; Horvat et al, 2015). Some of the mechanisms of knowledge dissemination in the field of public procurement have also been turned into rules, and what is more – into formal rules. For example, professionalization of clerks working in public procurement field is decidedly required by legislation through since each contracting authority is obliged to have at least one licensed clerk for the job. Certain exams have to be taken in order to get the license, and the acquired knowledge has to be improved by constant training throughout the year. The subjects to learn about are regulations, routines and procedures in public procurement.

Natural sequel, or special kind of evolutionary approach to establishing institutions is Path dependence theory. It was introduced by Nelson and Winter (1982) and was in accordance to North's understanding of how institutions are created. Institutions also appear as incremental connection between the past and the

future (North, 1991), being the result of collective learning that evolves from informal into formal institution, which again proves that the inductive method lies at the heart of institutionalism. Evolutionary process has to be understood as transformation process of cumulative changes, where the result of each modification or transformation, at a certain moment makes the conditions where future reproduction and transformation can take place (Martins, 2009). That is why the mentioned electronic procurement and electronic auctions in the bidding process are not an innovation, but a technologically advanced replica of the procedures that have been occurring in trade, or even procurement for decades, or even centuries. Electronic procurement is an example of adaptive learning (Argyris & Schön, 1978) because the basic set of postulates on how routines should look like is not reconsidered, but the changes in technology used to conduct them.

It has to be noticed that certain differences still exist in degrees of innovation and transformation in evolution processes (Tsang & Zahra, 2008), on the basis of which continuous and discontinuous changes can be distinguished. A continuous change is less intensely different from the previous situation or procedure. It is introduced as a continuous change of cumulative character, which means that it contains larger or smaller share of the previous situation and is conducted by continual updating of the existing organizational routines. Discontinuous change is discrete, caused by a decision or action of the participants in a process. It is much more intensely different from the previous situation or procedure. Discontinuous changes are usually conducted to make important strategic shifts, when the crisis is fully developed and is often followed by deposition of managers. Discontinuous change comes as a result of generative learning, or double-loop learning (Argyris & Schön, 1978), because it affects basic postulates of previously developed routines. As regards public procurement, centralization and decentralization can be the examples of such changes.

5. AMOUNT OF TRANSACTION COSTS AS A CRITERION OF PUBLIC PROCUREMENT EFFICIENCY

Transaction costs can be defined as costs related to the activity that needs be conducted, so that a certain product or service can be transferred from one organizational system to another (Jaško, Čudanov, Jevtić & Krivokapić 2013). More operative definitions of transaction costs, which describe their contents, point out that all costs except the costs of production (providing services) are transaction costs. Some authors explain the structure of transaction costs as a process, which makes it easier to identify them within the procedures of public procurement. They claim that transaction costs are the costs related to the process of connecting to markets, and specifically, they include “costs of negotiation and writing contingent contracts; costs of monitoring contractual performance; costs of enforcing contractual promises; and costs associated with breaches of contractual promises” (Rahman & Kumaraswamy, 20026).

While searching for operatively usable identification of transaction cost contents in order to conduct a research about transaction costs in the area of public procurement, it has been found that they can be divided into four categories: 1) research costs, 2) contract costs, 3) monitoring costs and 4) conduction costs (Williamson 1981; North 1991; Hennart 1993). Research costs include the costs of collecting market information related to supply, competition, etc. Contract costs include the costs of procedure to draw up and conclude a contract. Monitoring costs include the costs of monitoring whether each party fulfils obligations prescribed by the contract, while conduction costs include the costs of litigation and sanctioning contract parties which fail to fulfil their obligations (Dyer 1997).

What is it that generates transaction costs, what is it that influences the level of costs, and vice versa, how is it possible to put them under control?

After Williamson (1975) identified the fact that the amount of transaction costs is heavily influenced by imperfect information, i.e. the fact that market decisions are made with incomplete information induced further search for finding answers to the given question. Next level of insight is that bounded rationality and opportunistic behaviour of market participants cause imperfect markets. Both bounded rationality and opportunism influence the amount of costs before and after a transaction, i.e. they can be *ex ante* and *ex post* (Williamson 1975). *Ex ante* bounded rationality is the result of inability to fully determine all specific qualities of a procurement subject, and to envisage all the circumstances that may appear during the procurement process. The more complex procurement object is, more time and recourses are needed to reduce or even eliminate this uncertainty. On the other hand, bidders need more time and resources to formulate their offer. *Ex post* bounded rationality generates costs of monitoring the contract execution and costs of making and accepting consumer complaints. On the other hand, bidders hedge against counterparty risk, currency swings, inadequate procedures on the side of contracting authorities while planning procurement, unjustified consumer complaints, etc.

Opportunism, which is defined as a tendency to gain personal interest by legal, but often morally unacceptable behaviour before or after closing a transaction, can also cause transaction costs (Williamson 1975). Information asymmetry suits opportunistic behaviour, since one party has more information on the subject matter of contract agreement, the conditions needed to conduct a transaction or the outcomes that will ensue (e.g. insurance holders hide risks (ex ante opportunism), or true facts about causes and amounts of damage (ex post opportunism)).

Competition level in the market is an important factor of the amount of transaction costs. If both bidders and contraction authorities can close a transaction with numerous participants in the market, opportunism risk is very low and thus the opportunism-based transaction cost. This observation is related to Williamson’s statement that bounded rationality and opportunism gain more influence by using asset specificity to conduct a transaction, by measuring service scope and frequency of transactions (Williamson, 1981). An asset is more specific if its use is limited to a smaller number of goods or services where it can actively participate in their reproduction. In this case, this specificity category does not include only funds, but also people needed to produce transaction subject. The greater number of specialists needed to realize transaction subject, the greater are transaction costs related to it.

If transaction subject is not easily measurable, both parties are burdened by measuring transaction efficiency, which can put pressure on them to show opportunistic behaviour in the process of creating and performing a contract.

Table 1: Classification of public services by specificity of investment and measureability of output

Specificity of investment Output measurability	Low	High
Easy	Measurable market services <ul style="list-style-type: none"> • towing service • disposal of solid waste TrC: +	Measurable monopolistic services electric energy, gas and water supplying TrC: ++
Difficult	Non-measurable market services <ul style="list-style-type: none"> • public health services • social services TrC: ++	Non-measurable monopolistic services <ul style="list-style-type: none"> • Firefighters • Police TrC: +++

Key: TrC =total transaction cost

The expected number of transaction repetition also affects the outcome of negotiation. The easier it is to determine frequency and number of repetition, the lower is uncertainty, and thereby the cost calculated due to specific qualities of resources to be engaged. This is connected to the calculation influenced by the experience curve (Sallenare, 1985) in all the processes determined by certain routine.

While determining transaction costs contracting authorities and bidders do not calculate with the same values concerning specificity, measurability and frequency of procurement. A bidder can be a specialist for certain type of production, having economies of scale, while contracting authority may have this single purchase of that good. Contracting authorities and bidders may have different ideas about quantity of services or intensity of engagement in contract performance, which is not so relevant when it refers to products. Contracting authorities may intend to conduct a procurement every year, but a bidder assumes that it is going to be performed only this time. The consequence of such behaviour may be that transaction cost is not equally perceived by both parties. Since the price obtained in public procurement procedure is a result of negotiation, regardless of how it has been conducted, it can be assumed that the price will equal the sum of production and transaction costs of the party with bigger sum. The variation in price that can be achieved still needs to be determined by conducting research that will take into consideration not only negotiation results, but also negotiation processes, price convergence of both buyers and bidders.

6. CONCLUSION

Institutionalism introduced into economic analysis some new categories and perspectives on market relations and organizational dynamics within a system. Some fundamental categories of neoclassical economics have been challenged by introducing new approaches that include transaction costs, reasonable instead of market prices, negotiation as a procedure for obtaining a price, as opposed to supply and demand relations and prices that depend on negotiation methods. Institutionalism offers economic perspective on the

world that highly corresponds to organization of public procurement market and the degree of behavioural dependability on that market under the influence of regulatory institutions. Institutions make it possible to decrease transaction costs, since knowledge of transaction costs can decrease market imperfection, growing opportunism of the participants and can also increase efficiency in the entire public sector. In that market, institutions are viewed as dynamic categories that undergo changes under the influence of market participants' learning, but due to progress in technology that is being used, as well. Knowledge improvement related to transaction costs that are generated by current institutions is a cornerstone for making changes in behaviour of both participants and institutions.

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EMBRACING THE OPEN DATA INITIATIVE IN REPUBLIC OF SERBIA

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Abstract: *Open data as a term is being used more often than ever before. It is an initiative which represents the idea that some data should be available to everyone, without any restrictions. In this paper we described several formats for representing open data and we discuss which format should be used for data of specific nature. Also, we gave an example of open data based application, Serbian Parliament Open Data REST API. Finally, we describe legislation in Serbia concerning Open Data, in contrast to the laws of other more developed countries which could be considered as mature Open Data practitioners.*

Keywords: *OpenData, OpenParliament, GovernmentData, StartUp, entrepreneurship, SymOrg*

1. INTRODUCTION

Many companies and governments collect tremendous amounts of data in their regular work activities. Often, those data have only one purpose, and, after being used, those data are stored and probably never used again. The thing is that companies and governments maybe are not using those data, but someone could benefit of that kind of information. The concept behind open data is that some data should be available to everyone to use it, build upon it, make money of it and modify it and all that without any restrictions (<http://opendefinition.org/od/2.1/en/>). Open data initiative is becoming stronger and stronger as the time is passing by. The reason of such a trend is that more institutions are starting to see benefits of opening their data.

Why should someone put a lot of effort and time into releasing data to someone who just might use those data and benefit from it?

Several reasons to open data have been described by the authors of (Janssen et al, 2012), which can be summarized as follows:

- The first reason is that most of the data that should be opened is the data that is already publicly available. For example, governments must provide their citizens with certain information, but only when citizens request that information. That process is usually slow, not very effective, and it discourages people to ask for new information. In addition to that problem, format of the data that governments usually provide is not standardized, and it is in physical form, as paper, pictures etc.
- The second reason is that sometimes, companies and governments don't have enough resources to start a project and create a new value based on their data, but they know that it could be done. So, their motive could be to open their data to everyone, give example of usage, and wait for someone to do that work, or even to do a better job.
- The third reason is that there are lots of people that are great in their field of expertise who are eager to create new value from which they, or even the community, could benefit. By opening the data, companies and governments will give a push to the entrepreneurship spirit of that kind of people. More entrepreneurs lead to smaller degree of unemployment, which again lead us to better life quality, higher standards and better developed economy.

2. DATA QUALITY OF OPEN DATA

It is difficult to define data quality, because the perceived data quality differs from the one use case to another. A definition which is commonly used is that data is considered to be of high quality in correlation to fitness of use of that data (Zaveri et al, 2013). To be able to provide high quality data is of the utmost importance to understand the perception of the data consumer, who assess data quality based on several factors as accuracy, completeness, relevancy, consistency, availability, verifiability and timeliness. (Wang & Strong, 1996).

Tim Berners-Lee, the inventor of the Web, developed a 5-star deployment scheme for Open Data, which is widely used for determining the openness of the data (Berners-Lee, 2012):

- *1-star data*: To achieve one star on Tim Berners-Lee's scale, you have to make your data available on the Web, in any format, under an open license. It is the lowest score because the data is available on the Web, but it is difficult to process it, by hand or by machine. It can be said that data is locked-up in a document.
- *2-star data*: To achieve two stars, data has to be available as structured data which is structured using some proprietary software as Excel. Difficulty lies in data processability, because data consumer has to use same proprietary software as the data publisher, which represents an obstacle in open data context.
- *3-star data*: To achieve three stars, data has to be available on the Web in open format as CSV (Comma Separated Values). Now, everyone can find free tools to process those data. It is possible to publish data with ease. The problem is that data is not embedded into Web. Consumer has to search for new data to be able to use it and process it again, whenever he or she has a need for it.
- *4-star data*: To achieve four stars, data has to be linked to the specific URI (Uniform Resource Identifier). This means that others can pinpoint data using specific URI, bookmark data, reuse at will. It takes some time to organize data in the right way and to implement services, but it can produce great benefits to the publisher and consumers, such as better control over data, possibility to link data to other locations on the Web, and promoting it in that manner.
- *5-star data*: To achieve five stars, all it has to be done is to link existing four stars data to the other data on the Web. In that way, you can move through world of data, discover new data, interact with it, use it and reuse it whenever you wish to.

Quality and openness of data in Serbia is around three stars data. In year of 2015, official Serbia Open Data portal has been established (<http://data.gov.rs/>). In a moment of writing this paper, that portal had links to websites of other institutions in Serbia, like Ministry of interior, Ministry of Education, Science and Technological Development and several others. They have uploaded some of their data on their websites and data is mostly in CSV format. Their data is rather badly structured and difficult to find. Large number of databases and connections between those databases, without any open data regulatory entity, makes the task of opening the data quite difficult.

2.1 Open Data formats

In order to increase data quality, existing and widely used data formats should be used. Choosing the right file format depends on the nature of information data contains.

If data is published only once, without any need to change it afterwards, CSV, JSON (JavaScript Object Notation) XML, or any similar structured data format should be used. Chosen format must be machine processable, which means that file formats like PDF, Word documents, pictures or similar are not suitable for this purpose.

Comma Separated Values (CSV) format is used when dataset is relatively easy to represent in a flat structure. Tabular data in some proprietary format is not a good choice for opening the dataset and CSV file format should be used. There is no official definition of CSV file format, but RFC4180

(<https://tools.ietf.org/html/rfc4180>) gives a most standard recommendations how to use it (Tennison et al, 2015).

Example:

Marco,Polo,United States

Comma is used as a delimiter which delimits values of different properties. In this case, Marco is a name, Polo is a surname, and United States is an origin country of some person. Different persons are described in a separate rows.

JavaScript Object Notation (JSON) format is a lightweight textual format for data representation (<http://www.json.org/>). It can be used to represent even complex datasets. It is not dependent on any programming language, and it is easy to process it, even for humans. Nowadays, it is often used to replace XML format. Same data described in JSON format has smaller footprint (less bytes) than in XML format.

Example:

```
{
    "name" : "Marco",
    "surname" : "Polo",
    "country" : "United States"
}
```

JSON is a key-value structure. For every key, a value should be provided. A value can be a number, string, null value, boolean value (true/false), other JSON or array of JSONs.

Extensible Markup Language (XML) is widely used as a data-representation format. It is a reliable format, because there are a lot of XML Schemas which are used to represent the data structure of some XML document. If it is necessary to be sure that data are in right format, XML file format should be used. Each XML document has logical and physical structure (Bray et al, 2008). It is relatively easy to create validation schemas to be sure that document has a valid structure. Existence of many tools for processing and creating XML format documents represents great advantage of XML format.

Example:

```
<person>
    <name>Marco</name>
    <surname>Polo</surname>
    <country>United States</country>
</person>
```

We can see that same information has more text in XML format than in JSON format.

If data is being published regularly, creating an API (Application Programming Interface) should be considered. By creating an API, it would be possible to look up for data over HTTP protocol (Bizer et al, 2011). It would be easier to add new data through creating new URIs. In addition, updating the data would not be a problem because data would be available using same URI. Through API, different formats of data could be served, like JSON, JSON-LD (JSON Linked Data), XML, RDF (Resource Description Framework) etc.

3. EXAMPLE OF AN OPEN DATA APPLICATION

3.1 Purpose of the application

Open Parliament Data is a project with a purpose of opening data from the Parliament of the Republic of Serbia about its members, political parties, sessions and speeches to the public (<http://147.91.128.71:9090/parlament/>). In order to make the data from the Serbian Parliament available to the wider audience, we have developed, under supervision of Laboratory for Artificial Intelligence (<http://ai.fon.bg.ac.rs/>), an API that can be utilized by everyone without any limit. This API enables any programmer, data analyst, news reporter or any other interested party to easily access the data that was previously stored in databases, documents and internal records of the Serbian Parliament.

3.2 Data provider

Data was originally created by Serbian Parliament. Non-profit organization “Otvoreni Parlament” (<http://www.otvoreniparlament.rs/>) requested and got this data from Serbian Parliament. The same non-profit organization has created a MySQL relational database, has structured and siloed data in it and gave us the access to it in order to create REST API.

Database consists of data of more than 1100 parliament members, 160 thousands speeches, more than 1200 sessions and more than 70 parties from year of 2002 to year of 2012.

3.3 REST application development

REST is an architectural style which is based on web-standards and the HTTP protocol (Li & Chou, 2011). Open Parliament REST API was built using Java programming language. We used Hibernate framework to “map” the database. Mapping database tables enables transformation from relational to object model. So we represented every object with URI (Uniform Resource Identifier) in order to be able to get specific data record by specific HTTP GET request. For building REST API we have used Jersey framework. Jersey is an open source, production quality, serving as JAX-RS (JSR 311 & JSR 339) Reference Implementation for building RESTful Web services. Jersey provides a well-formed API so that developers may extend Jersey API to suit their needs. Our architecture is designed by well-known design principles, and it is easy to explore the opened dataset (Massé, 2012).

3.3.1 URI specification of the REST services

Every parliament member can be accessed by sending an HTTP GET request which follows the next pattern:

{domain name}/members/:id

Example: <http://147.91.128.71:9090/parlament/api/members/12411>

where :id represents specific identifier of every member.

To be able to get speeches of a specific member, URI has to be built in the following pattern:

{domain name}/members/:id/speeches

Example: <http://147.91.128.71:9090/parlament/api/members/12411/speeches>

where :id represents specific identifier of every member.

In order to access data of some specific political party, URI has to be built in the following pattern:

{domain name}/parties/:id

Example: <http://147.91.128.71:9090/parlament/api/parties/476>

where :id represents a specific identifier of every party.

In order to access data of members of a specific party, URI has to be built in the following pattern:

{domain name}/parties/:id/members

Example: <http://147.91.128.71:9090/parlament/api/members/12411/members>

where :id represents a specific identifier of every party.

In order to access data of a specific session, URI has to be built in the following pattern:

{domain name}/sessions/:id

Example: <http://147.91.128.71:9090/parlament/api/sessions/889>

where :id represents a specific identifier of every session.

To be able to get speeches from a specific session, URI has to be built in the following pattern:

{domain name}/sessions/:id/speeches

Example: <http://147.91.128.71:9090/parlament/api/sessions/889/speeches>

where :id represents a specific identifier of every session.

Also, it is possible to get data of a specific speech by building URI following pattern:

{domain name}/speeches/:id

Example: <http://147.91.128.71:9090/parlament/api/speeches/409344>

where :id represents a specific identifier of every speech.

There are possibilities to control number of results (limit, page), ordering (sort), date range (from, to) by setting values of the specific query parameters. It is also possible to search data for specific keyword by setting specific parameter (query).

3.4 Results and benefits of the application

This API has been developed to support Open Government Data initiative. This initiative in Serbia is just starting, so this kind of application can contribute to popularization of Open Data. In addition, this API was designed by Open Data design principles (Massé, 2012; Government service design manual, n.d.). That means that API is scalable, and learning curve of API usage is not steep. API is well documented, so others can use it with ease. Also, data and API are licensed under the Creative Commons license (<https://creativecommons.org/licenses/by-sa/4.0/>) so everyone can use, modify and redistribute the data for any purpose. Besides API, we have provided several examples to show usage of the created API (<http://147.91.128.71:9090/parlament/>). That will help others to quickly grasp principles of API usage.

Currently, application is in testing phase. Eventually it will be used by non-profit organization “Otvoreni Parlament” to provide application on their website to explore the given data (<http://www.otvoreniparlament.rs/>).

Source code of the application is stored at GitHub, with detailed manual how to start the project, to test it and even how to contribute (<https://github.com/faculty-of-organizational-sciences/open-parliament-api>).

3.5 Comparison with other similar applications

Open Data at the Scottish Parliament has the same RESTful architecture style, and provides information about core parliamentary business, informal work at the parliament such as cross party groups and awareness raising events and details about members including their contact details and their Register of Interests. While both applications have complete documentation, complex HTTP request and response examples and the same architecture style, the difference is in volume of the available datasets. Significantly larger amount of available data in Scottish open parliament makes conducting of complex statistic possible, which is currently not the case in our application (The Scottish Parliament, n.d.).

4. OPPORTUNITIES

Local and state governments around the world are becoming more aware that smart data management helps to create new opportunities for economic development, to increase the efficiency of service delivery, to improve citizens' outcomes and to increase citizens' participation in decision-making processes. Opening Data is globally recognized as a process that will significantly contribute to achieving the objective of sustainable development after year of 2015 (Cerović, 2016).

In Serbia there are several groups that are initiating opening of data sets from Serbian administration sphere. UNDP (United Nations Development Programme) has significant influence on data opening. They published Estimation of the readiness to open data, organized first competition for developing applications which use different data sets and organized conference "Open data: open possibilities" (Cerović, 2016). „CRTA" (Center for research, transparency and accountability) (<http://www.crtars.rs/>) is a group of activists and journalists, which influenced on institutions and public officials through monitoring and control of their work to increase their transparency of their regular work by opening their data. Their work resulted in providing several applications on the "Otvoreni Parlament" (<http://www.otvoreniparlament.rs/>) website and "Prati pare" application. "Prati pare" application name translated in English means "Follow money" and the purpose of the application is to provide conditions for the responsible management of public funds and to increase the transparency of work of local authorities (<http://www.pratipare.rs/>).

The data value is in possibility of data usage. It is important to put pressure on the government services to open their data. In that way, they will recognize Open Data as a need they have to fulfill to be able to achieve economic prosperity by implementing socially important services for citizens. Socially important data has to be open by default, not open by request. Opening data can be initiated by civil society, the private sector, international organizations, donors and individuals, and even the state's administration.

According to the McKinsey Global Institute survey, open-data can be used as a significant factor of unlocking great economic value by minimizing the gap between different industries where traditional intuition based decision making would be replaced by data-driven decision making (Manyika et al, 2013).

Serbia has joined a partnership for open government in year of 2014 (<http://www.opengovpartnership.org/how-it-works/dates-and-deadlines>). Since then, more and more organizations have worked on open data initiative. As a result of three years of putting pressure on the government, UNDP in cooperation with SEE ITC and Norwegian Embassy organized a competition "Open Data Hackathon" (<http://hakaton.rs/>; Zrnić, 2015). The competition was 48 hours hackathon where programmers have been working on applications based on open data provided by several Serbian institutions. As a result of the competition, several socially useful applications have been made.

Organizations could use open data to improve their decision-making process. Analysis of open data enables companies to discover what users prefer, e.g. what are their desires and habits, in order to improve products and services and detect potential anomalies. By investing in technology for gathering, sharing and analysis of data, as well as standards for comparison using data from multiple sources improves the business models and production processes. Also, the meta-data (data about the data itself) further contribute to the usefulness of open data, because they help to acquire better insights into the characteristics and quality of the data.

Progress of some companies are based only on open data. Authors of this survey (PSI_Open data in business, n.d.) provided us with several examples:

Mobile App for events in Vienna helps Tourist Organization to promote events, and this application is only based on the open data from the catalogue data of the City of Vienna (<http://itunes.apple.com/de/app/viennaevents/id442891364?mt=8&ls=1/>).

Belgian company, Graydon Belgium, helps you to correctly assess and control the health of your business relations. You obtain all relevant and up-to-date information enabling you to evaluate financial situation of your possible business partners. A thorough financial analysis will help you make the right credit decisions. This application was developed thanks to open data of Belgium (<http://data.gov.be/en>).

5. LEGAL REGULATIONS

The first successful step towards the opening of the data in Serbia is The Law on Access to Public Information, which describes procedure how to gain access into official documents, however, the law did not include open data as information of public importance. The most important contribution of this Act is the introduction of the Commissioner for Information of Public Importance and Personal Data Protection (United Nations Development Programme, 2013).

It is defined by the law (The law on Free Access to Information of Public Importance, 2007) that citizens have rights to require public information. In the Constitution (Republic of Serbia Constitution, 2006), it is clearly defined which information should be publicly available. Also, it is clearly defined which information must not be provided to public.

This question is regulated in accordance to the standards of The European Union, relating to the protection of personal data.

Serbia has signed the Convention on the protection of individuals with regards to automatic processing of personal data in September 2005, which was ratified by the Law on Ratification and which was passed in 2008. This helps us to make a distinction between which data we are able to request for and which we are not.

The regulations of this law which are associated with the opening of data are:

- In the section “Measures to improve public work of government authority” (The Law on Personal Data Protection, 2009) there is an Article “The obligation to publish a directory” in which is stated that state authorities are obliged, at least once a year, to create a data report such as descriptions of authority and organizational structures, information about the budget and means of work, types of services and other information in addition to the main data about its work.
- In the section “Measures to improve public work of government authority” (The Law on Personal Data Protection, 2009) there is an Article “Damage compensation” in which is stated that if the public information is not provided to a person who requested that information, public authorities have to compensate for damage if they had unreasonably denied to provide the requested information.
- Laws, decrees, regulations, official materials of state bodies and persons working at publicly important positions, as well as all official translations of these documents, are not considered as work of an author, but as public domain documents (The Law on Copyright and Related Rights, 2009).

When requesting for certain information to become publicly available, certain law regulations could be used (United Nations Development Programme, 2013):

- Law about state administration stipulates that work of public administration bodies is considered to be public. That means that they are obliged to inform public about their work, using medias or other appropriate way to inform public.
- Resolution of legislative policy stipulates that is necessary to ensure full transparency and openness throughout the process of passing the law.
- The National Assembly, the President and the Government have the right to disclose annulling the obligation of secrecy.
- Upon written request, the Department of Statistics and other authorities authorized to process statistical data can provide some information without identifying scientific and research institutions. The institution requesting the information must clearly indicate the usage purpose of these data.
- Different agencies have regulations governing their duties regarding the collection and storage of data.

The largest contribution to the opening of the data would be to establish a format in which information is reported, as well as licensing and further use of open data.

Legal regulation is very important and there are lots of governments that have published their Open Data laws. For example, Dubai Open Data Law, which allows sharing of non-confidential data between government entities and other stakeholders (WAM, 2015). United Kingdom Government has created the Open Government License (<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>) and public bodies now can publish their Crown Copyright material under this license.

6. CONCLUSION AND FUTURE WORK

Information is power, but only when it's on time and when it's available. Data can provide a lot of information but we can use it only if it is given in the right format. Power of open data can be used for fast development of small businesses. It will result in more employed people, a lot of different applications from which society can benefit greatly.

As a matter of future work, we will continue to maintain Open Parliament REST service. Also, we will implement new solutions like JSON-LD (JSON Linked Data) response format. We will try to popularize Open Data by giving open data workshops and passing our Open Parliament open source project to the community to help others to engage easier into Open Data projects.

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DEVELOPMENT OF SYSTEM FOR COORDINATE AND EFFICIENT RESPONSE TO CYBER INCIDENTS

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Abstract: *Traditionally, the main responsibility for safety of the society lies with the state. The particularities of cyber space, however, require the necessity of full cooperation of all segments of society since they can all be and are constant targets of cyber attacks. Many nongovernmental actors have more resources for cyber defence compared to the state: dominant resources are in the hands of private sector - telecommunications companies and providers, hardware and software manufacturers and large enterprises. Likewise, nongovernmental and academic communities often possess specific skills, analytic and research capacities, and international contacts in this field, as well as the potential to draw attention to possible violations of human rights. Therefore, it is of utmost importance to completely and actively include both private and nongovernmental sector, as well as academic communities, into strategic and operational activities at the state level and to establish multipartner cooperation based on mutual trust.*

Keywords: CSIRT, CERC System, cyber incident, cyber defence, cyber security

1. INTRODUCTION

The safety of cyber space is one of the key topics and implies protection against damage, unauthorised use, and Internet, cyber space and user abuse. Therefore, network management is brought into focus of state and global policies due to the geo-strategic importance of network infrastructure, digital data flow and control, as well as due to its influence on new standards that will define the functioning of society in the near future.

EU policies, international experiences and national strategies of developed countries identify several strategic key issues to be analysed for the purpose of forming cyber security framework at the national level:

- 1. Cyber threats:** cyber crime, cyber wars and cyber terrorism. Cyber threats target the infrastructure, individuals, businesses and governments, both nationally and internationally. Critical infrastructure servers and controllers that are connected to the network are vulnerable to attacks which can result in disruption of services and remote takeover. The development of information and communication technologies placed many pieces of information about individuals on the Internet, which left them exposed and vulnerable. Enterprises, especially small and medium ones, increasingly base their business on technology, and new approaches and models. Governments turned to new paradigms, authorisations and types of functioning, diplomacy, democracy, defence, and protection. At the centre of everything is trust which is compromised by each threat. The effects of the attack can have serious impact on society, national and international community, and the costs and weight of consequences increase through time unless there is a quick response system. The rate of new technologies and crime development requires continuous improvement of the crime-fighting system, knowledge and levels of cooperation. International cooperation through existing mechanisms, such as the Council of Europe Convention on Cybercrime, Europol and Interpol, is still facing obstacles due to incompatible policies and bureaucracy, and lack of capacities at national levels. Cyber attacks will be increasingly used in contemporary hybrid warfare and conflicts, a fact confirmed by the *Munich Security Report 2015* (Munich Security Report, 2013). At the same time, the necessary knowledge and resources the attackers are investing are minimal, the effects are great and the risk is mainly small.
- 2. Protection:** technical, organisational, legal, diplomatic, political, and societal measures and mechanisms. Cyber attacks and incidents occur daily and their number grows at an increasing rate. It is imperative to develop an efficient mechanism for effective defence against current and future threats, decision making, and early warning systems. Taken measures can be preventive or reactive, aimed at early threat identification, target "resistance" enhancement (infrastructure, individuals, businesses, governments, international community) and efficient cyber risk reduction. Technical measures are hardware and software solutions meant to provide mainly physical protection (Poonia et

al., 2011). As for the organisational measures, crisis management, cooperation and communication of subjects, development of human resources equipped to perform that, as well as the promotion of all protection measures, are particularly important. Legal measures comprise the appropriate legal mechanisms (national, international, self-regulatory) to protect the data, information and communication technologies, and processes related to it, as well as subjects (Warren, 2011). For the purpose of maintaining cyber space security, it is necessary to set a strong flexible legal and institutional framework, but the cooperation based on mutual trust and sharing of common resources is just as important since the legal and institutional framework makes no sense without it. Due to the geo-strategic importance of the Internet, important new questions have been included in diplomatic agenda, such as: digital policies synchronisation on national, regional and global level; critical resource and standard management; maintaining Internet security and openness; protection of the public and citizens' interest; protection of personal and national data, human rights and freedoms; children and marginalised groups rights and safety; cooperation among stakeholders through a comprehensive multipartner model; institutional capacity building, etc. Political and societal measures comprise measures to protect the society from unauthorised use and abuse of data, information and communication technologies, and infrastructure. The aim is to eliminate and reduce the cause of system "vulnerability" that could affect the society as a whole, the state, and/or individuals. These measures are realised through outlining protection and security policy, as well as development plan and programmes, both nationally and internationally (ENISA, 2013).

3. **Cyber security:** priorities, principles, institutionalisation, cyber security management, capacity-building with *Computer Security Incident Response Teams (CSIRTs)*, national and international cooperation in cyber space – cyber peace, peaceful coexistence, coherency, climate of trust, mutual cooperation, collaboration (Christou, 2014). Regarding EU Cyber Security Strategy and *International Code of Conduct for Information Security* of General Assembly UN, as well as national needs and documents in the development of the Information society, special attention is given to the global culture of cyber security in Serbia. Currently, a public hearing is being held on the proposed Law on Information Safety which should institutionally establish a national CSIRT¹ (Proposal, 2013) and the jurisdiction should be assigned to the Regulatory Agency for Electronic Communications and Postal Services (RATEL). The primary mission of a CSIRT is to help other organisations handle incidents occurring in computer networks, as well as provide a wider set of services (Munich Security Report, 2015). National CSIRT will be responsible for coordination of individual CSIRTs in Serbia (Ministry of the Interior – Mol, Ministry of Foreign Affairs – MFA, Administration for Joint Services of the Republic Bodies – UZZPRO) with other relevant institutions: Ministry of Trade, Tourism and Telecommunications (MTTT), Special Prosecutor's Office for High-Tech Crime (PTVTK), and private sector CSIRTs (Serbian National Internet Domain Registry – RNIDS, Internet Service Providers – ISPs, mobile telephone operators, etc.). In order to enable such networking, it is necessary to develop tools and techniques which will provide standardised and efficient communication. By defining/forming this mechanism, a framework would be set for undertaking long-term activities which would connect all stakeholders, enable national critical infrastructure protection and joining international 24/7 network (Javaid, 2013).

2. OBJECTIVES OF THE PROJECT

The main goal of this project is to improve information processing, information analysis and information-sharing infrastructure so as to allow for the exchange of sensitive and confidential data among the competent authorities. Other goals that will be achieved in this project: open, reliable and free digital society; safe and reliable business environment; safety of citizens; the development of economy and critical infrastructure; fight against crime and improved defence; creating of safe environment for institutions, economy and citizens; greater use of modern technologies; raising end-user awareness. That will be achieved by effective decision making, early warning systems and cyber security management - **System for Coordinate and Efficient Response to Cyber Incidents (CERCI System)**².

The objective of the project is to explore how the responsiveness of individual CSIRTs supported by CERCI System can be radically enhanced by advanced technology, exploiting, in an innovative way, sharing of information among different national authorities and sector-specific CSIRTs in private sector.

¹ That coordinates and facilitates the handling of incidents for a particular country

² Proposal of *Directive of the European Parliament and of the Council concerning measures to ensure a high common level of network and information security across the Union* specifies the necessity to improve cooperation on network and information system security at EU level with a view to counter cross-border incidents and threats effectively. <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52013PC0048>

That will be achieved through the development of two key services in **CERCI System**:

- (a) service for efficient management of collaborative CSIRTs activities and access to and supply of shared content (event, threat, incident, etc.) - **Security Information and Event Management (SIEM) Services** and
- (b) improved information processing, data analytics and visualisation - **Cyber Incident Data Analytics Tool (CIDAT)**.

Numerous international experiences show that the practical and operational cooperation platform, such as CERT (Computer Emergency Response Team) or CSIRT, is essential as a hub for collaborative multipartner model. Information about worldwide risks, omissions and incidents are distributed and available in many global analytic sources and shared among national CSIRTs. It is also of great importance for Serbia to form such a national operational body as soon as possible, so as to be able to access the networks of CSIRTs, exchange information about risks, process information about reported and identified incidents in Serbia, prepare reports on the state of the Serbian cyber space and regularly act to eliminate incidents in the country (Urosevic et al., 2014).

It is also important to emphasise the necessity of cooperation between CSIRTs and European institutions for cyber security. The expected adoption of *Directive of the European Parliament and of the Council concerning measures to ensure a high common level of network and information security across the Union* will demand that the member states develop a network, information security strategy and a national cooperation plan, as well as define competent authorities and establish CSIRTs. Due to the delay in adoption of this Directive, building of a secure infrastructure has not begun yet.

National centres and teams for combating cyber crime have been formed by most European countries. Apart from Bosnia and Herzegovina and the Republic of Macedonia, the Republic of Serbia is the only country in the Balkans that does not have an established centre of this type. This provides the opportunity to review experiences and shortcomings of national solutions in the EU countries and establish state-of-the-art cyber security solutions.

The process of harmonisation of the legal framework of the Republic of Serbia with the EU acquis within the Negotiation Chapter 10 - Information Society and Media, encompasses EU documents that refer to cyber security and impose an obligation of forming an adequate national institution for combating cyber incidents, i.e. cyber crime. For years, all relevant Serbian institutions have been exchanging experiences through trainings, instructions or study visits with European professional and government bodies. Considering the fact that the realisation of this project primarily requires connecting all national stakeholders, a decision has been made to develop solutions (CERCI System) in-house in the first phase by the representatives of executive authority, academic and professional Serbian community. This project would meet some specific requests stated in the proposed Directive.

In order to achieve high level of cyber space safety, all potential weak links must be secured, including military and civilian sectors, government authorities, critical infrastructure, organisations, small and medium-sized enterprises and the end-users themselves (Haller et al., 2011). CERCI System actively includes all societal sectors as partners into national cyber security framework and utilises the existing resources in those sectors.

3. CONCEPT AND APPROACH

To explore validity of the stated viewpoints, CERCI System will address the government and private sector as the most critical. The project viewpoints and new services will be, therefore, validated within Business Cases all involving cyber security information transfer and objectives harmonisation between different organisations.

Current situation analysis will be conducted based on the data obtained by various methods and using the experiences (European Police Office, 2014) from *the Internet Organised Crime Threat Assessment (iOCTA)* within EMPACT (*The European Multidisciplinary Platform Against Criminal Threats*), and also SOCTA (*Serious and Organized Crime Threat Assessments*) UNODC (*United Nations Office on Drugs and Crime*), as well as other methods used for data collection and environmental scanning, such as PESTEL (*Political, Economic, Social, Technological, Environmental and Legislation*), i.e. PESTLE (*Political, Economic, Social, Technological, Legislation and Environmental*) that affect crime and the application of law³.

³ UNODC, *Guidance on the preparation and use of serious and organized crime threat assessments*, http://www.unodc.org/documents/afghanistan/Organized_Crime/SOCTA_Manual_2010.pdf

Among numerous services (see Table 1) needed to support collaborative SCIRT activities in a CERC System, this project has selected the most critical ones to explore and demonstrate the validity of the stated viewpoints. The services will be highly flexible and scalable, easy to integrate within different digital environments of different actors within a CERC System. The services will be applicable in a combination with existing Portfolio Software Solutions (**PSS**) and Cyber Security Management Systems (**CSMS**) to allow easy usage of the results in different environments. It is likely that such services will have a high impact on new ways of collaboration between public and private sector. The intention is to develop services to fit the Collaborative Reference Architecture (CRA) relevant for the national or sector-specific Cyber Security Centres or similar organisations. The objective is to allow for an effective combination of these new services with the existing or emerging services for collaborative work, which in turn will allow better integration of CSIRT activities with the everyday work.

The main issue is to enable an effective measurement of the synergistic effects between the services from the perspective of CERC System responsiveness. As responsiveness is defined through increased motivation to proactively learn and construct cyber security data exchange in CERC System, the measurement of system functioning as a synergetic system has to be evaluated against specified responsiveness criteria for effective decision making. Since the CERC System model is quite new, no such criteria for responsiveness have been elaborated so far, but these will be developed as part of the project.

The European Commission⁴ has presented the requirements and tasks of a CSIRT.

Table 1: CSIRT Services list from CERT/CC⁵

I Reactive Services	II Proactive Services	III Security Quality Management
1. Alerts and Warnings 2. Incident Analysis 3. Incident Response Coordination 4. Vulnerability Analysis 5. Vulnerability Response Coordination	1. Announcements 2. Security Audits or Assessments 3. Security Related Information 4. Dissemination	1. Risk analysis 2. Security Consulting 3. Awareness Building 4. Training

Networking through CERC System will provide a new concept of early warning systems, effective detection and activity identification, develop mitigation and response strategy, establish trusted communication channels, effect a coordinated response, share data and information about the activity, track and monitor this information to determine trends and long-term remediation strategies, improve coordination and standardise procedures among national or sector-specific Cyber Security Centres.

CERC System fulfils all the requirements of a CSIRT through: developing an infrastructure for coordinating response, developing a capability to support incident reporting, conducting incident, vulnerability and artifact analysis⁶.

These services will include:

I Security Information and Event Management (SIEM) Services consisting of:

- Services for **Management of Computer Security Incident Response Team (MCSIRT)** that serve to:
 - a) identify partners (from public, private and academic sector), include them in collaborative CSIRT activities, in accordance with their responsibilities, within a complex CERC System environment;
 - b) standardise policy and procedures in accordance with the report of European Union Agency for Network and Information Security (ENISA, 2012) on harmonisation in terminology, definitions, validation processes or requirements for National/governmental CSIRTs and standards published by International Organization for Standardization/International Electrotechnical Commission (ENISA, 2006);
 - c) support CSIRT's objectives and different levels of expertise in an organisation, as well as different collaboration patterns that depend on jurisdiction and organisational structure; these will include so-called feedback provision services.
- Discovery/Provision of internal and external expert sources, including accessing, managing and monitoring content available within a CERC System, to determine trends and patterns in incident activity.

⁴ European Commission, 2013 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0048:FIN:EN:PDF>

⁵ Adapted CSIRT Services list from CERT/CC: <http://www.cert.org/csirts/services.html>, There are other services not included in the project, which shall be developed within the Centre after the establishment of CERC System.

⁶ ENISA's recommendations define the activities every SCIRT should fulfil

II Cyber Incident Data Analytics Tool (CIDAT):

- Provision of the most appropriate SIEM path for CSIRT-based software solution, taking into account different models of early warning systems for vulnerability discovery, initial triage, reproducing, evaluation, distribution and notification, using machine learning⁷ techniques – Neural Networks (NN)⁸ – which will be deployed to study the types of incidents, vulnerabilities and weaknesses, the types of attackers, the patterns of incident content, etc.
- Improvement of the decision-making process of teams inside CERIC System using a rule-based system (RBS)⁹ and in accordance with different organisation objectives and policy within the SIEM activities.

The analysis of internal complexity of organisations' ICT systems and the external threat environment, institutional and legal framework, roles and purpose of the existing human and technical capacities, services provided by CSIRTs in the Republic of Serbia, as well as comparative analysis of CSIRTs in EU, Serbia and countries in the region, will show best practice of CSIRT functionality and give parameters for the efficient model for coordinate and efficient response to cyber incidents - CERIC System. The testing of the developed System will be performed in a specially defined environment within the academic network of Serbia (which already has academic AMRES - CSIRT). The pilot project will be realised with teams from Mol and RNIDS since these institutions are going to form CSIRTs in the next year. Mol, throughout the implementation of new e-government services, must additionally take care of the security of information systems and data stored in their databases.

RNIDS manages the register of national Internet domains (TLD and IDN) assigned by ICANN, maintains the main DNS server for ccTLD and IDN, manages publicly available WHOIS server for national domains, establishes the principles of operation and procedures for the operation of accredited registrars and is therefore crucial for CERIC System implementation. After the measurement, analysis and improvement of CERIC System, training courses will be organised and realised for the representatives of all institutions' CSIRTs in the project. When the quality assessment is finished, CERIC System will be handed over to RATEL. Gradually, CSIRTs of other institutions will be included, i.e. secure information systems of state administration will be integrated. Centre will provide technical support until the conditions are created for the official institutions to completely take over the CERIC System management. Also, studies will be conducted and training courses will be organised in order to continuously raise police and judicial capacities and give suggestions for legal improvements in cyber security. Alumni group will be formed and occasional meetings will be organised with training course graduates for knowledge innovation. During the project, numerous communication activities will be carried out with the media and other target publics both through Press page on project's website and other places in coordination with all PR offices within the institutions and organisations that are partners on the project. Centre will regularly follow the latest trends, develop new modules and improve CERIC System in accordance with structural and functional changes.

Therefore, this project intends to simultaneously address two tightly connected critical problems:

- How to provide effective means for collaborative teams within CERIC System, with geographically distributed partners (Diplo, 2015)? How to improve knowledge and experience sharing and the opportunity to exchange not only technical solutions and procedures but also actual software (Cichonski et al., 2012)? Although all stakeholders possess different levels of expertise, CIDAT will form a common-knowledge database for all actors and therefore improve the decision making process and efficiency.

⁷ Machine learning has evolved from the study of pattern recognition and computational learning theory in artificial intelligence. It explores the construction and study of algorithms that can learn from and make predictions on data. Such algorithms operate by building a model from example inputs in order to make data-driven predictions or decisions, rather than following strictly static program instructions.

⁸ Neural network (NN) is a machine learning technique, inspired by the way the human brain works. It consists of interconnected processing units - artificial neurons - that are able to learn from data by using specialised learning algorithms. NNs are typically used for resolving ill-defined problems, when the underlying model is unknown, when the data are error prone, and/or when generalisation ability is required.

⁹ A rule-based system is a program that uses rules to do some specific task: derive an expert-like conclusion, make a recommendation, constrain a business process, implement a policy, etc. Nowadays, RBSs are widespread and can be found under different names: expert systems, automated monitoring systems, business rule management systems, business rule engines, etc. Rules in RBSs are simple IF-THEN statements that capture domain heuristics. These can be regular rules (e.g., "IF the tire is flat THEN first try to re-inflate it") but, if the knowledge is uncertain or fuzzy, uncertain rules (with numeric certainty factors used in a rule's IF and/or THEN part) or fuzzy rules (i.e., rules with fuzzy expressions such as "IF the service is good THEN the tip is large") can be employed. Conclusions are made by using inference algorithms which associate facts with rules to derive new facts. Finally, RBSs can have explanation facilities that explain "HOW" the RBS has reached its conclusions, "WHY" it has asked some question or what problem-solving strategy ("STRATEGY") has been employed. The goal is to give users an insight into the reasoning process, thus alleviating their confidence in the system's findings.

- How to harmonise different ways of recognising incidents, classification, prioritisation, marking and handling threats by employees in CSIRTs? Deviation can be in scope (for example, cooperation with significantly more other groups or groups with special requirements such as law enforcement, government, or Intelligence agencies), technical details (for example, new technology), or novelty (for example, a new type of incident). The project responds to this question by developing a CIDAT approach between CSIRTs and CERC System. To be efficient and provide adequate response to incidents, this approach should be implemented by deploying a regulation mechanism which facilitates harmonisation and establishment of a common ground upon different CSIRTs. The project suggests that such an approach can be considerably enhanced by effectively exploiting the experience between CSIRTs and CIDAT. Exchanging these data in a secure way, reacting and providing information improve the quality of the incident handling process (ENISA, 2006).

In order to exploit the synergy between collaborative SIEM and comply with public and private objectives within dynamic, flexible CERC Systems, efficient technology for early warning systems and cyber security management in CERC System is essential. The project, therefore, focuses on these two problems, aiming to

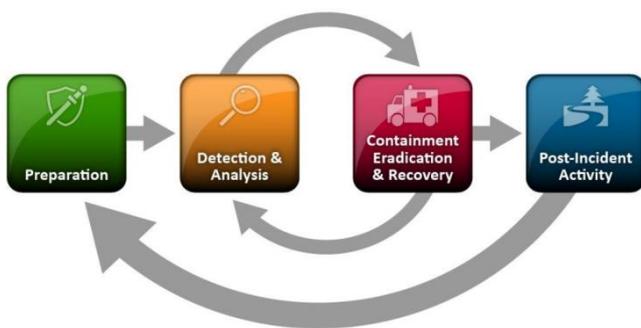


Figure 1: Incident response cycle

provide organisational and technical solutions for effective defence against current and future threats, which requires the addition of a balancing, outward focused approach on understanding the adversary's behaviour, capability, and intent.

According to some international experiences, such as the recommendations of the American National Institute of Standards and Technology, the incident response cycle comprises four phases: Preparation; Detection and Analysis (reports, assessments, classification and triage – rejection, redirection or processing); Containment, Eradication and Recovery (inquiry, collecting data, incident response recommendations, providing assistance); Post-Incident Recovery, as shown in Figure 1¹⁰.

incident response recommendations, providing assistance); Post-Incident Recovery, as shown in Figure 1¹⁰.

Theoretical models of CSIRTs consider four core principles for effective CSIRTs: technical excellence, trust, resource efficiency and cooperation (Haller et al, 2011). However, the lack of automated intelligent platforms for activities and processes in CSIRTs is evident, and the means of achieving responsiveness are still in the phase of intensive development and investigation. By investigating the assumed increase of CERC System's responsiveness resulting from the synergy of the various services, the project will actually explore how technology creates conditions for effective CERC System. It will also show the role of different services in practical application of this model.

This concept of CERC System requires technologies to support sharing, harmonisation, building, and dissemination of information/warnings among law enforcement, government, or Intelligence agencies and universities, and effective combination of content and organisational information exchange systems (at both universities and organisations). The management of content and cyber security information exchange has a key role for both collaborative SIEM and harmonisation of public and private objectives. Thus the experiences between different CSIRTs must be fully exploited for the benefit of CERC System. It is important to develop cyber security risk management tools and techniques within a CERC System and use data from as many CSIRTs as possible.

While many CSIRTs effectively support collaboration, the existing solutions mainly do not meet specific needs regarding different collaboration patterns demanded in industry, often due to, e.g. „lack of people and resources“ for processing all incidents (Chen et al., 2014). The CERC System project will explore, for the first time, how collaborative CSIRTs can be improved by exploiting synergy of these two services (SIEM and CIDAT Services).

Such cyber incident knowledge and experience “chunking” model is typically implemented as an overlay model, a stereotype model, or a combination of the two. CERC System is not only a coordinated and synergy model, but also a knowledge-sharing model (as shown in Figure 2) since it is based on knowledge and experience of all CSIRTs so that every individual CSIRT will be able to learn what any other CSIRT already knows, if it is related to protection from cyber attacks, incidents and threats.

¹⁰ NIST Special Publication 800-61 Revision 2, Computer Security Incident Handling Guide, U.S. Department of Commerce - National Institute of Standards and Technology (August 2012) <http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-61r2.pdf>

Within CERIC System, an individual CSIRT can use CIDAT for information exchange in a standardised way by using different applications. CIDAT primarily includes sharing of reports which will be precisely formatted, concise, transparent, and with data visualisation, in order to create a basis for faster and easier decision-making. Thusly built trust among CSIRTs can even lead to cooperation on levels not only related to cyber threats and incidents, which is implied by nature.

An innovative approach of CERIC System in this project will cover two issues:

- a) how to use independent knowledge and experience of individual CSIRTs in order to find the most effective model for creating „joint knowledge and experience“;
- b) how to most effectively adjust that joint knowledge to best match the needs of specific cyber security requirements.

Part of the CERIC System that relates to joint knowledge-sharing does not imply joint training courses and seminars but synergy of knowledge-building and duty-performing with a common goal to create a safer cyber space and protect users.

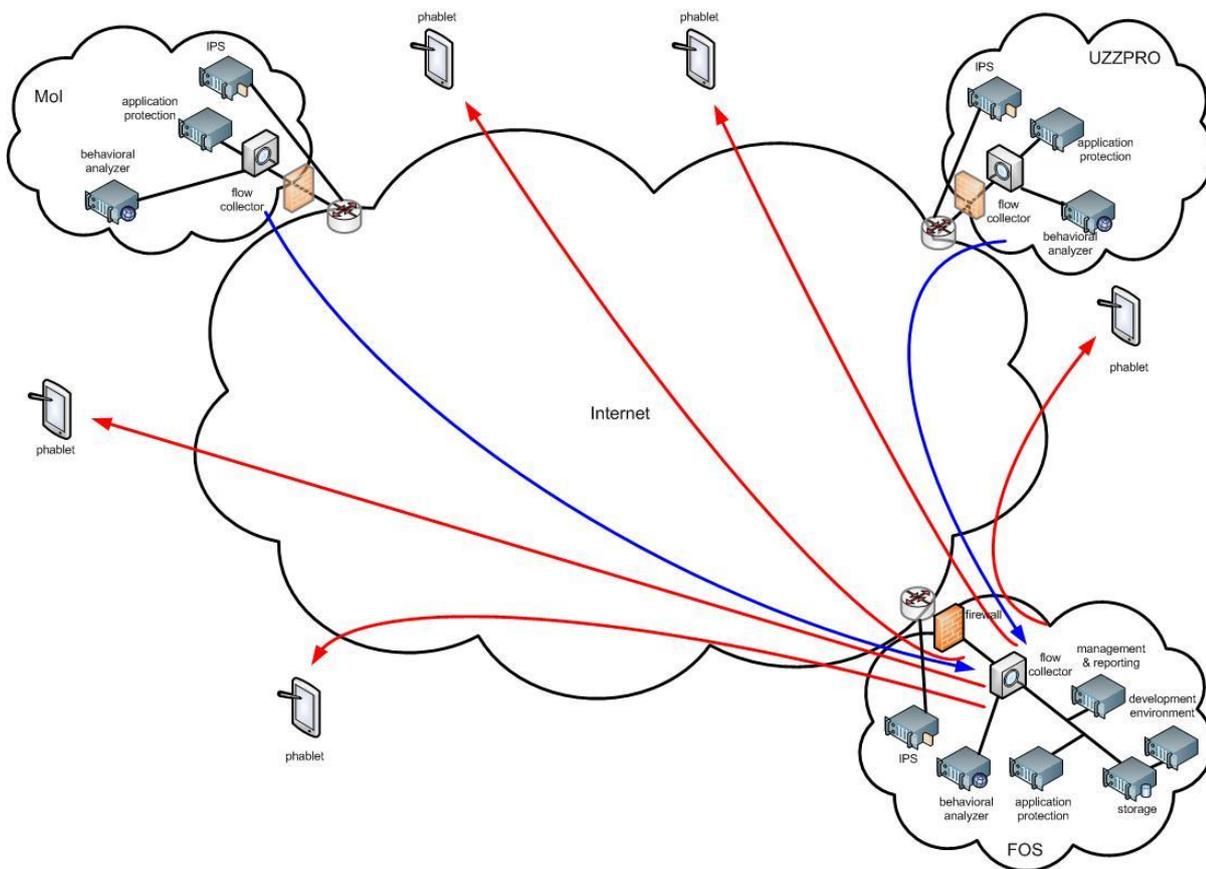


Figure 2: Scheme of CERIC System

The key part of CIDAT is quick identification and very quick classification of detected incidents using NN – it recognises typical patterns of incidents, classifies new threats according to the patterns it has learned. Software will be used by all parties according to a standardised procedure, but not all parties will be given the same authorisation, i.e. not all parties will be using the software for the same purpose, but in accordance with their individual competency, needs and interests.

4. CONCLUSION

The protection of vital societal functions through cooperation between official institutions, corporate, NGO and academic sector, and citizens will be implemented through CERIC System. Multipartner model is essential for the gathering of distributed information about safety risks, coordinated prevention and incident response, awareness and institutional capacities building, and the use of international contacts network for cooperation and support. This type of model, primarily a public-private partnership, is based on trust and cooperation, common interest and needs, all within the frame of a legally regulated system and the existing

jurisdiction of state authorities. For RATEL, the national contact point which integrates different organisations in combating cyber threats through CERC System, communication with similar centres worldwide will be facilitated, as well as operational activities in case of incidents.

Through CERC System, mechanisms and procedures will be developed for risk management, early warning systems and malware analysis (viruses, worms, and Trojan horse programs) – SIEM Service will harmonise and standardise communication procedures between individual SCIRTs and public and private sector (ISPs, hardware and software manufacturers). Also, data analytics tools and techniques (CIDAT) will be developed and they will provide, in an innovative way, automated and high-performance classification of events, threats, and risk data to provide strong security intelligence. That will create the basis for effective decision-making, faster response to incidents and extensible compliance reporting.

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RESEARCH IN THE FUNCTION OF IMPROVEMENT OF PUBLIC PROCUREMENT LAW

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Abstract: Key findings of researching the positions of enterprises concerning public procurement, conducted in June 2015, were endorsed in the course of drafting the Amendments to the PPL, and that relevant measures have yielded the first positive results in the last quarter of 2015. as registered in the quarterly reports that contracted authorities are required to submit to the Public Procurement Office, on the basis of which this Office compiles its annual reports on public procurements. This case may serve as a model for all future amendments of the laws in Serbia in the sense that sound researches and analyses should precede regulatory changes. Findings of a comprehensive research of the effects of a law implementation coming from practitioners are irreplaceable inputs to the process of designing measures for upgrading the regulation.

Keywords: public procurement, amendments and supplements, research of attitudes of participants

1. INTRODUCTION – RESEARCHING THE FUNCTION OF REDUCING UNCERTAINTY IN THE DECISION MAKING PROCESS

The public opinion poll and market research in the broadest context are the collection, analysis and control, or respectively the data exchange from the environment, under strictly controlled methodological rules (Vukmirović & Vukmirović, 2016). The result which follows represent information that is the basis for making responsible operational, tactical and strategic decisions. Research in the function of Management is a direct support for decision-making and information obtained in the process of research are aimed to decrease uncertainty in decision-making (Kochenderfer, 2015).

Decision making without relying on the information seconded from a research source represents a high-risk way of management and thus, in contemporary practice almost ceased to exist (Lacobucci & Churchill, 2015). Selection, processing and distribution of data is carried out through the use of modern information and communication technologies (ICT), all in the purpose of converting those data into knowledge starting from lower to higher decision making levels. Therefore, a user interface and the quality (accuracy, timeliness and coverage) of available information are very important for managers. Wrong decisions can still be made, but the probability is drastically reduced if decision makers have relevant information that serve as a basis for critical judgment.

2. THE PUBLIC PROCUREMENT LAW

Law on Public Procurement was adopted in 2008 after six years of applying the first Public Procurement Law ("Official Gazette of Republic of Serbia", No. 39/02, 43/03, 55/04 and 101/05), and after the adoption of the EU directives in this area (Directive 2004/18 / EC, Directive 2004/17 / EC, Directive 2007/66 / EC). According to the opinion the proposers, the law did not only fail to improve the public procurement system, in some segments it also represented a step backwards. In December 2012, third Law on Public Procurement was adopted ("Official Gazette of Republic of Serbia", no. 124/2012). The Law from 2012 was a very significant step forward when considering conditions for efficient use of public funds, in prevention of corruption and conflicts of interest, and it also was important for the establishment of a single market in public procurement and ensuring competition. The key innovations of this Law were:

- alignment with the European Union;
- more complete and simpler definition of the contracting authority;
- a clearer determination of the subject of public works contracts;
- reduce the number exemptions from the application of the law;
- tightening the conditions for the application of exemptions;
- a mechanism control prior of application of negotiated procedures that are commonly used;
- mechanisms for preventing conflicts of interest and corruption in public procurements;
- the partial centralization of public procurement;

- encouragement and in certain conditions obligation to perform electronic procurement;
- introduction of a new procedure - the competitive dialogue and regulation of two new forms of existing procedures - dynamic system of procurement and a framework agreement;
- Public procurement of small value is regulated in a way that enables process transparency and competition;
- planned mandatory publication of tender documentation, efficient publication and prescribed mandatory content of ads on public procurement;
- introduced environmental standards, and standards of energy efficiency as potential parts of the technical specifications;
- specifies the method of calculating appraised value;
- clearly stipulated manner in the decision to award the contract, procedures and deadlines for the conclusion of the contract;
- clearly and restrictively prescribed the possibility of changing the contract;
- for the first time regulated procurement in the defense and security domain;
- increased the responsibilities and powers Public Procurement Administration;
- changed the composition and operation of the Republic Commission for protection of rights where the Commission granted new powers, such as fines for non-compliance procedure itself to protect rights and the non-implementation of decisions, control of implementation of decisions of the Commission, annulment of the contract, conducting misdemeanor procedure at first instance and the submission of proposal for dismissal;
- system of protecting the rights has been made more efficient on the one hand by simplifying the procedure, and on the other through the introduction of new features such as proposing and imposition of temporary injunctions;
- misdemeanors are provided for all serious violations of laws and criminal sanctions are tightened with on the one hand, and on the other are ranked according to the severity of the offenses;
- statute of limitations for the offenses has been increased to three years;
- it is envisaged for the final decisions issued in misdemeanor proceedings to become published publicly

3. PREPARATIONS FOR THE ADOPTION OF AMENDMENTS AND SUPPLEMENTS TO THE LAW ON PUBLIC PROCUREMENT

Given that the State today represents the largest employer in Serbia, the Provisions of the Public Procurement Law were and remain the theme of national importance, and therefore are subject to permanent professional and media analysis, criticism and suggestions. On the eve of all stakeholders in the public procurement procedures, first of all the Bidders and Contracting authorities, the Public Procurement Office in cooperation with the of UNDP and support of the Kingdom of Sweden, two years after the application of the Law from 2012 has joined the preparations for the audit of the Law on PPL.

The first step was to identify major weaknesses in Public Procurement Law (PPL) implementation during past two years. In direct communications with their clients (contracting authorities and bidders), the Public Procurement Office (PPO) detected broader fields where improvements were needed: reducing unnecessary administrative burden on bidders, particularly small and medium sized enterprises (SMEs), increasing efficiency of public procurement procedure and reducing the rate of tenders annulled due to purely formal reasons (Cook & Semple, 2015). However, more detailed and comprehensive research was required in order to detect concrete obstacles and problems that have to be addressed in the planned amendments of the PPL. For that reason.

The Public Procurement Office in cooperation with the of UNDP and support of the Kingdom of Sweden has initiated an extensive research public opinion polls and market research, which included relevant categories of participants (bidders) in public procurement procedures.

The main aim of the research referred to perception of attitudes and value judgments of the participants (bidders) in the public procurement procedures and of their positive and negative experiences, as well as their attitudes about the Law on Public Procurement. In addition to the above mentioned objectives, the research had some specific objectives, such as:

1. Did Law from 2012 contributed the fight against corruption?
2. To what extent did regulatory and control measures of the Law of 2012, whose main objective was to Suppression of Corruption, hinder prolong and impede the public procurement procedures?
3. To what extent did additional administrative measures increase the costs and prolong the procedure, at the expense of suppliers as well as at the expense of clients and taxpayers?
4. To what extent is the complexity of the procedures, and the presence of corruption discouraged enterprises from participating in public procurement procedures?

5. To what extent did legal solutions increase overall transparency and how the establishment of the Public Procurement Portal contributed to this?
6. Should the Public Procurement Law regulate the procedure of public procurement so that it becomes a fast, efficient and easy to implement, and whether the Criminal Code and the Law on Misdemeanors should deal with issues of corruption and punishment?

4. METHODOLOGICAL FRAMEWORK FOR THE RESEARCH OF ATTITUDES OF PARTICIPANTS (BIDDERS) IN THE PUBLIC PROCUREMENT PROCEDURES

In Serbia, at the end of 2014, there were 331.059 of business entities operating under the status of "active." Of the total number registered, there were 115.692 active Companies, while the number of registered Entrepreneurs amounted to 215,367. Sample comprises only of active companies (excluding entrepreneurs). The study used a stratified, two-stage pattern. The strata consist form small and medium-sized enterprises (SMEs), up to 10 employees and of "large enterprises" - with more than 10 employees. Units of the first stage consisted of the active companies, while in the second stage it was selected according to business of companies (positive, negative, or "zero") in the previous year (2013).

Sample framework was the Register of companies of the Agency for Business Registers (www.apr.gov.rs). Size of the sample amounted to 1,009 enterprises and companies (companies). The sample is representative at the level of small and medium-sized enterprises up to 10 employees and companies with more than 10 employees. The target group of respondents in companies were owners / directors, then the middle management level (familiar and have a personal experience with the participation of enterprises in public procurement) as well as employees who are engaged in public procurement (searching the portal, documentation preparation, etc.). All the participants had Higher education. Data were collected by field survey in June 2015. Selection of companies was performed by software, based on a table of random numbers (Thompson, 2012). Supervisors urged companies and by telephone interview scheduling, while the interviewers were given information when and where to go and who in the enterprise / company to talk to.

5. THE RESULTS OF RESEARCH ON THE ATTITUDES OF PARTICIPANTS (BIDDERS) IN PUBLIC PROCUREMENT

Nearly three-quarters of surveyed companies (72%) participated in 2014 and 2015 in public procurement, which means that the survey gathered views not only of those who participate, but also of those which do not participate, which could indicate the reasons for non-participation. The bidders which participated in public procurement procedures were asked to say how many times they participated in during 2014 and 2015 and how many job did they get. Most of the companies that participated were positive financial (41 times on average), while businesses engaged "zero" or negative participated two and a half times less: 18, or 16 times.

From 38 participations in tenders in average for all surveyed companies, 13 cases were successful, which means that the success rate was 34%. Broken down by company size, micro enterprises (up to 9 employees), which are the most numerous in Serbia, were the rarest to participate in the tenders, while the number of occurrence (as well as the number of won tenders) increases with company size.

When asked what the first thought when it says "public procurement", the three most common associations were: tenders, state, public companies (32%), the possibility of getting a job (11.4%) and a bunch of papers and documents (10.7%).As the main source of information on public procurement, companies have stated Portal of public procurement. Reviews of the Portal in terms of its usefulness, transparency, inclusiveness and transparency were mostly good.

Of the four properties that have been evaluated a minimum was given the positive assessment of transparency (67% of best estimate). In two thirds of cases (65%), bidders do not believe that the public procurement procedures are „fixed" in advance. Tenders that are "fixed" in advance are recognized mostly on the basis of too demanding technical specifications and tight deadlines (57%) or when the price is much lower than the real (11%). Almost a third of respondents (32%) "know" that everything is pre-arranged.

Most providers (70%) believe that the law is "on their side". When this is added the fact that the Republic Commission for Protection of the rights in Public Procurement, in almost two thirds of the cases ruled in favor of the bidder, i.e. adopt their complaints, it seems that the legal solutions and institutions efficiently protected the rights of bidders. Third of bidder who were surveyed said that they use available opportunities to protect their rights so they complained to the Commission for protection of rights in public procurement procedures.

There is a significant difference in the number of complaints from the smallest (micro) company and the largest, more than 100 employees: micro-enterprises have complained, on average, in 23% of cases, a large almost twice as many (43%).

A similar situation is bound to pointing out the omissions of contracting authorities in the tender documentation which, on average, was 42%: the lowest enterprises indicated to the contracting authorities irregularities in the tender documentation in 30% of cases, and large companies in nearly twice as many cases (53%). Bidders have pointed out that they had the great gain of the use of the Registry of the bidders which frees them to collect evidence for each procedure in order to fulfill four conditions required for participating in procedures. It is enough to put them once in the Registry and enroll. 71% of them are enrolled in the Registry which clearly demonstrates the utility of the Register for bidders, particularly in the sense that they reduce wasted time and money. When asked how much it costs them participate in the procurement process, bidders are given the following responses.

In most cases (45%) the cost of public procurement procedure ranged between 10 and 50,000 dinars, while in 42% of cases were less than 10,000 dinars. In proceedings with the lowest cost (5,000 pounds) has the smallest companies (up to 19 employees), while larger companies were more involved in tenders with higher costs. That indicates that the assessment of the amount of the costs for the participation is one of the factors on which the tenderer assesses whether to participate in the proceedings or not. Another factor is assessment of the potential cost effectiveness of the transaction. Reducing the cost of participation would lead to greater participation of companies, especially smaller ones, so that this factor must be taken into account in the preparation of bidding documents, all in order to encourage the participation of small and medium enterprises and strengthening competition in public procurement. Another important factor that the bidders pointed attention, like the one that reduces the competition is agreement two or more bidders to "dictate the rules" and thus virtually excludes other bidders. In 30% of cases, respondents have reported that bidders have met with such onset.

When asked about the negative experiences with contracting authorities most common was delay in the payment of contractual obligations by contracting authorities in 40% of cases. This is a serious problem, especially for smaller companies, which usually borrow from banks to acquiring the necessary raw material. The delay in the payment of the contracting authority leads bidder in the situation that it must repay the loan from its own resources, which are usually very scarce.

In addition to the problem of delay in payment, the bidders pointed out as a problem using criteria of the lowest price (20%) and unrealistically short deadlines to perform the services (14%). Asked whether is it necessary to have more active involvement of the police and judicial authorities in order to combat abuse and corruption, most respondents (83%) gave an affirmative response.

Third of suppliers have a good or very good knowledge of the Law on Public Procurement (35%), while a somewhat smaller number considered their knowledge of the Law as average (31%). Finally, the general assessment is that bidders have a neutral or positive attitude towards public procurement (total 63%), with 48% neutral and 15% positive. 35% of them have a negative attitude, while others did not declare themselves.

6. THE MAIN FINDINGS OF THE SURVEY AND THE GUIDELINES FOR THE REVISION OF THE LAW ON PUBLIC PROCUREMENT IN 2012

The main objective of the amendments to Law were improvements in the planning of public procurement, the conditions, manner and procedure of public procurement. The Law also regulates the centralization of public procurements and determines the method of recording data relevant to a public procurement procedure (Emmett & Wrigh 2012). The law determines the jurisdiction, operation and forms of organization of the Public Procurement Office and the Republic Commission for protection of the rights in public procurement procedures, as well as of ways for protecting the rights in public procurement procedures. Based on the results of research on attitudes and value judgments of participants (bidders) in the public procurement procedures, of their positive and negative experiences as well as of attitudes of the Public Procurement Law, there were presented the following conclusions and guidelines for drafting the new Law on Public Procurement, which entered into force in August 2015.

How to simplify, accelerate and reduce costs when participating in public procurement procedures
Based on collected data, it can be concluded that the central phase - selecting the best offer, well decorated law referred to 2012, noting that improvements are needed in terms of upgrading transparency and search of procurement in Public Procurement Portal, publication of procurement plans and reducing excessive

formalism. At the same time, at the stage of preparation and planning of the public procurement is necessary to improve the lot of the functions in market survey and planning, while at the stage of execution of the contract it is necessary to introduce systematic monitoring and control of the contract conduction.

How to encourage the participation of SMEs in public procurement procedures

Negative experiences in public procurement processes primarily relate to the inability to collect or delays of several months which may take the suppliers into bankruptcy. It is important to devise mechanisms to monitor and sanction non-performance of contractual obligations, i.e. the realization of the agreement, which is an area that is not in the domain of the Public Procurement Law, but Law of contractual relations and other regulations. Given that in many companies' employees do not know enough about the law on public procurement is necessary to give through the Public Procurement Office to give special attention to the training of micro-enterprises, in order to increase their participation. Incentives for participation SMEs in Public Procurement is given special attention in the new EU directives, as well as in the Development Strategy of public procurement in Serbia.

In addition, it is necessary that the Public Procurement further encourages contracting authorities to share the procurement by the parties whenever it is economically justified in order to create an opportunity for greater participation of small and medium-sized enterprises.

How to boost competition

An important prerequisite for competition is to reduce the number of negotiation procedures without prior publication. The Public Procurement Office is estimating the merits of this procedure, pointed out that the requirements of the contracting authorities were established only in a minority of cases which reduced participation of non-competitive procedures with 17% in 2013 to just 5% in 2014 which is the average in EU countries. It may be noted that, in the context of public procurement two key preconditions for strengthening transparency and competition were created:

- a) Portal of for public procurement and
- b) Limitation of to the representation in a negotiated procedure without a prior notice.

How to prevent corruption

In almost one third of cases (32%), a factor that discouraged bidders from participating in public procurement procedures had not been specific, but this was a perception („it is known, it can be seen, heard"). This points to the fact that the participation of bidders could increase significantly if the contracting authorities have taken measures to increase the credibility of their public procurement in the eyes of suppliers. In order to overcome the problem of "fixed agreement of bidders," it is necessary that the Competition Commission effectively sanction such occurrences.

Market research involves contracting authorities have communicated with potential bidders, which has not been the case in Serbia. The Public Procurement Office should prepare guidelines for contracting authorities on how to communicate with suppliers in order to conduct market research and also how to avoid the risk of undue influence of suppliers.

Criteria of lowest tender price and unrealistic short deadlines for execution of work requires the development of a system of internal control and audit which would include monitoring whether the bidder who offered the lowest got the job only on the basis of price and whether the bidder delivered the ordering party what was agreed in the contract (in terms of quality, quantity and characteristics). Surveyed enterprises indicated that the problem with most contracting authorities is that they do not have these types of controls, allowing the abuse. Therefore, the strengthening of controls at the stage of execution of the contract by the Public Procurement Office and other control authorities and services is very necessary.

Strengthening the role of the police and judiciary

One of the key issues to overcome weaknesses in the public procurement process pointed out by bidders, is to determine to what extent it is possible to eliminate the deficiencies stated by amending the Law on Public Procurement. Disadvantages such as: a) the inadequate definition of the needs of contracting authorities in the tender documents that do not match the offer in the market, in the sense that it is not clear what is wanted from the bidder, b) the lack of discipline in paying bidders and c) control of fulfillment of contractual obligations, are not possible to solve only with the Amendments to Law on public procurement, but it is also necessary to strengthen the mechanisms of checks and balances.

Then, it is necessary to establish a process for monitoring contract execution and to control the public procurement contracting authority. Internal Audit Unit have an important role in this process, or reviews and approvals of the State Audit Institution (SAI) is also of great importance. In the case of suspected corruption in public procurement, regulatory bodies such as the Public Procurement Office, the Commission and SAI

should inform the investigative authorities (police and prosecutors), in order to effectively conduct sanction by using the courts.

It can be concluded that it is important to clearly delineate what should be edited by the Law on Public Procurement- which is the process of selecting the most favorable bid so this happens in a prompt and efficient manner and that the contracting authority gets what they need, under the most favorable terms and in a timely manner. At the same time, sanctions for violations of the law needs to be conducted by specialized and competent institutions on the basis of the regulations under which they work.

In cases where these other institutions do not do their job as expected, the solution should be sought in the direction of taking measures to increase the effectiveness of their work and more efficient sanctioning of irregularities, which is the best barrier and prevention, instead of transferring responsibilities and tasks in the sphere of public procurement, thus burdening and it makes public procurement processes becoming unnecessarily complicated and expensive measured by expenditure of time and money.

7. IMPACT OF THE RESEARCH

The research had a significant impact on amendments of the PPL. Key findings of the research concerning transparency, efficiency and cost-effectiveness of the procedure, together with the administrative burdening of bidders, were acknowledged as vital issues to be resolved by means of amendments to the Public Procurement Law in order to improve the functioning of the public procurement system. Amendments to the PPL were finalized in July 2015 and entered into force on August 6 of the same year.

With a view to upgrading the transparency in public procurement procedures, the relevant recommendation of small and medium enterprises was adopted by means of introducing duty to publish procurement plans, decisions on awarding contracts, and decisions on cancelling the procedures on the Portal. This increased the number of documents to be published on the Portal, thus improving the informing of bidders and making it easier for them to take part in public procurement procedures.

A measure under the Amendments to the PPL intended to increase the efficiency in public procurement procedure, expressed by the decreased length of the procedure, was the introducing of duty to publish decisions on awarding contracts or on cancelling the procedures on the Portal, instead of delivering those by mail. In this way, the deadlines in the procedure are counted from the moment of publishing on the Portal, which significantly affects the shortening of time between the making of relevant decision and concluding the contract. Under the former practice, there were instances where bidders deliberately avoided to receive decision on awarding contract or decision on cancelling the procedure, thus causing substantial and unnecessary prolonging of the procedure. In addition, the statutory deadlines in the procedures got harmonized with the deadlines under the new Directives and, at the same time, shortened in comparison to the previous legal provisions, which has additionally contributed to expediting the public procurement procedures.

The effect achieved in the last quarter of 2015 was that the average duration of an open public procurement procedure (counting from the date of publishing the invitation to bid on the Portal, up to the day of concluding the contract) was reduced to 61 days, as opposed to 77 days it took to complete this procedure in 2014. In low-value public procurements, the length of the procedure was reduced from 37 to 29 days.

The second set of measures designed to increase the efficiency in public procurement procedures was aimed at reducing the number of cancelled procedures. Data from the Annual Report on Public Procurements for 2014 revealed that the most frequent reason for cancelling the procedure was that all received bids were unacceptable. Quite often, bidders would omit to provide one or another evidence out of numerous proofs of fulfilling mandatory and additional eligibility requirements (which they do fulfil), ending up with the bid being rejected on that grounds. The solution introduced by the Amendments to the PPL whereby all bidders only submit a statement declaring they meet mandatory and additional eligibility requirements whereas only the winning bidder is obliged to submit proofs on meeting all eligibility requirements, has significantly reduced the risk of a bid ending up rejected due to a formal oversight on the part of bidders who omitted to provide a certain proof although they do fulfil such requirement.

The next measure, designed to reduce the number of cancelled and repeated procedures, was to allow contracting authorities to award contract to the bidder whose price exceeded the estimated value in all types of procedures, rather than in open procedures only, and this was done by the Amendments to the PPL. Before these Amendments, contracting authorities would, at times, misestimate the value so that, consequently, all submitted bids would exceed the set value. In such cases, pertinent public procurement

procedure had to be repeated (except in the case of an open procedure), even if the new procedure could not be expected to garner the bids within the limits of the estimated value that had not been properly set in the first place. This was particularly the case with low-value procurements, and especially with the ones formed in lots. According to data from the quarterly reports, in 28% of cancelled low-value public procurements in 2015, the reason for cancellation was that the entire received bid had exceeded the estimated value.

It is worth emphasizing that prices offered in all other appropriate bids must be above the estimated value and that this price is a comparable market price, under the general limitation that contracting authority cannot assume an obligation in the amount exceeding the one allocated beforehand under its relevant financial instrument for this particular procurement. In this way, the new legislation created a precondition for decreasing the number of cancelled procedures and for increasing the number of successfully completed public procurement procedures, which resulted in decrease of the share of cancelled procedures in 2015 to 11% from 13% as it stood in 2014.

The key measure aimed at reducing the administrative burden for bidders (which was one of key findings of the research) was the option to prove fulfilment of all eligibility criteria for public procurement procedure (mandatory and additional ones) by means of a statement. The measure relieving the bidders from duty to submit proofs on fulfilment of mandatory and additional eligibility criteria in each individual public procurement procedure has substantially saved bidders time and money in their taking part in public procurement procedures and, thus, stimulated them to submit bids more readily and partake in public procurement procedures more willingly. This in particular refers to small and medium-sized enterprises (with up to 50 employees) which account for the majority of bidders in public procurement procedures, and which comprise $\frac{3}{4}$ of the total number of respondents in this research.

The reduction of administrative burden for bidders resulted in their greater readiness to take part in public procurement procedures and, consequently, in the strengthening of competition. For example, the average number of bids per concluded contact in 2015. was 2.9, more than in 2014, when it stood at 2.6 bids; this has effectively discontinued the four-year trend of decline in the average number of bids (and of weakening competition), as identified since 2012.

8. CONCLUSION

In June 2015 was conducted a research in the form of an opinion survey among the small and medium enterprises on the topic of public procurement, with a sample of 1009 enterprises, which produced the following findings. Concerning the transparency of public procurement procedures, most respondents underlined the necessity to publish the procurement plans and the estimated procurement values on the Public Procurement Portal.

The second important finding of this research was that enterprises were hesitant to take part in public procurement procedures where their estimates indicated they would have to spend too much time, or where the required "administration" would be too cumbersome. On the same note, the research also revealed general attitude of bidders that "each paper costs", and their belief that the reduction of administrative costs would produce positive effects on bidder' participation in public procurement procedures. As the result of a previous substantial administrative burdening, the participation of bidders in public procurement procedures has decreased, so that the average number of bids per concluded contract in 2014 was mere 2.6.

Another finding of the research was the need to improve the efficiency of public procurement procedure. Greater efficiency in public procurement can be achieved by decreasing the length of the procedure, and by reducing the number of cancelled procedures, which then had to be repeated and caused additional spending of time and money both for contracting authorities and bidders participating in such procedures.

One can conclude that the key findings of researching the positions of enterprises concerning public procurement, conducted in June 2015, were endorsed in the course of drafting the Amendments to the PPL, and that relevant measures have yielded the first positive results in the last quarter of 2015 as registered in the quarterly reports that contracted authorities are required to submit to the Public Procurement Office, on the basis of which this Office compiles its annual reports on public procurements.

Efficiency in public procurement procedures aimed at reducing the number of cancelled procedures was increased by provision that all bidders only submit a statement declaring they meet mandatory and additional eligibility requirements whereas only the winning bidder is obliged to submit proofs on meeting all eligibility requirements. In addition, second measure, designed to reduce the number of cancelled and repeated

procedures, was to allow contracting authorities to award contract to the bidder whose price exceeded the estimated value in all types of procedures, rather than in open procedures only.

The key measure aimed at reducing the administrative burden for bidders (which was one of key findings of the research) was the option to prove fulfilment of all eligibility criteria for public procurement procedure (mandatory and additional ones) by means of a statement.

At the end, it could be concluded that this case may serve as a model for all future amendments of the laws in Serbia in the sense that sound researches and analyses should precede regulatory changes. In many cases in past, amendments of the laws were prepared by relatively small groups of experts and clerks while the “voice of the practitioners” was silent. The outcomes were problems in implementation.

This case proved that a comprehensive research of the effects of the Law implementation with focus on weaknesses in practice coming from practitioners provided precious inputs to the process of designing measures for upgrading the regulation. The first results of the amended law implementation proved the approach was proper.

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