PUBLIC SERVICE INTERFACE SOLUTION BASED ON BACK OFFICE INTERCONECTION 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 arround 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 evoluation 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 takes 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.

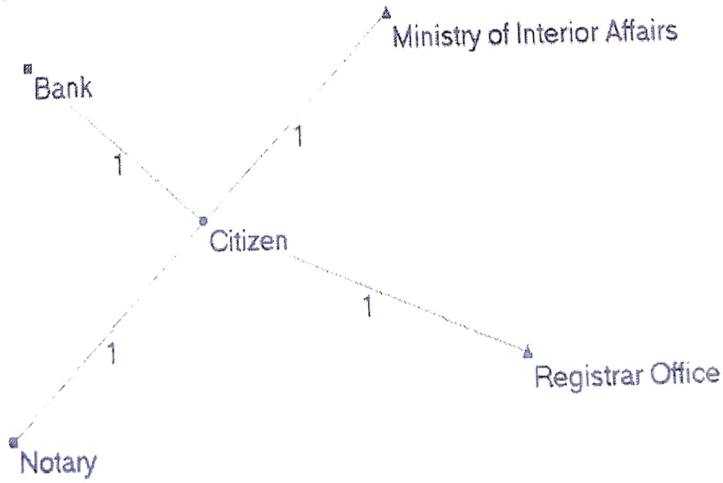

Figure 1: Information-flow network for the service "Issuance of marital status certificate"

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).

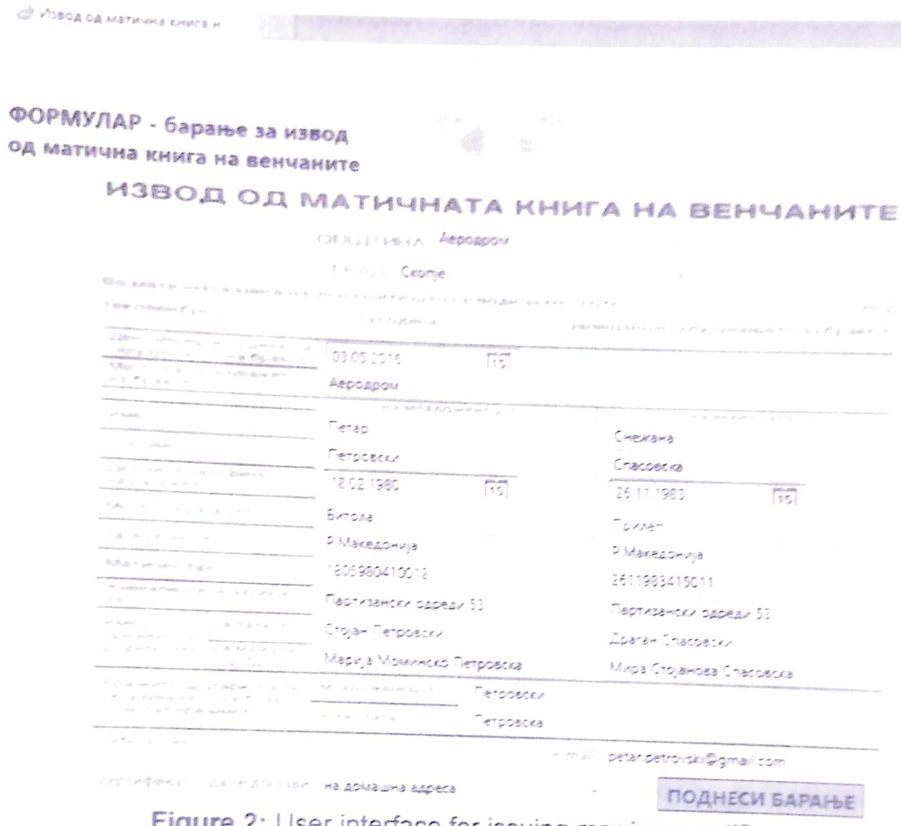

Figure 2: User interface for issuing marriage certificate

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:

a) Dropdown lists are used for choosing a city, municipality and place for delivering the certificate (e.g. the place where the marriage is concluded);

b) Entering dates is supported with datepickers (e.g. date of birth for each of the spouse, date of marriage, etc.);

c) 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:

a) The information inserted by the user are checked within two institutions. When the information are validated the request is processed;

b) User receives an email with account and amount that need to be paid (costs for issuing the certificate);

c) 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.

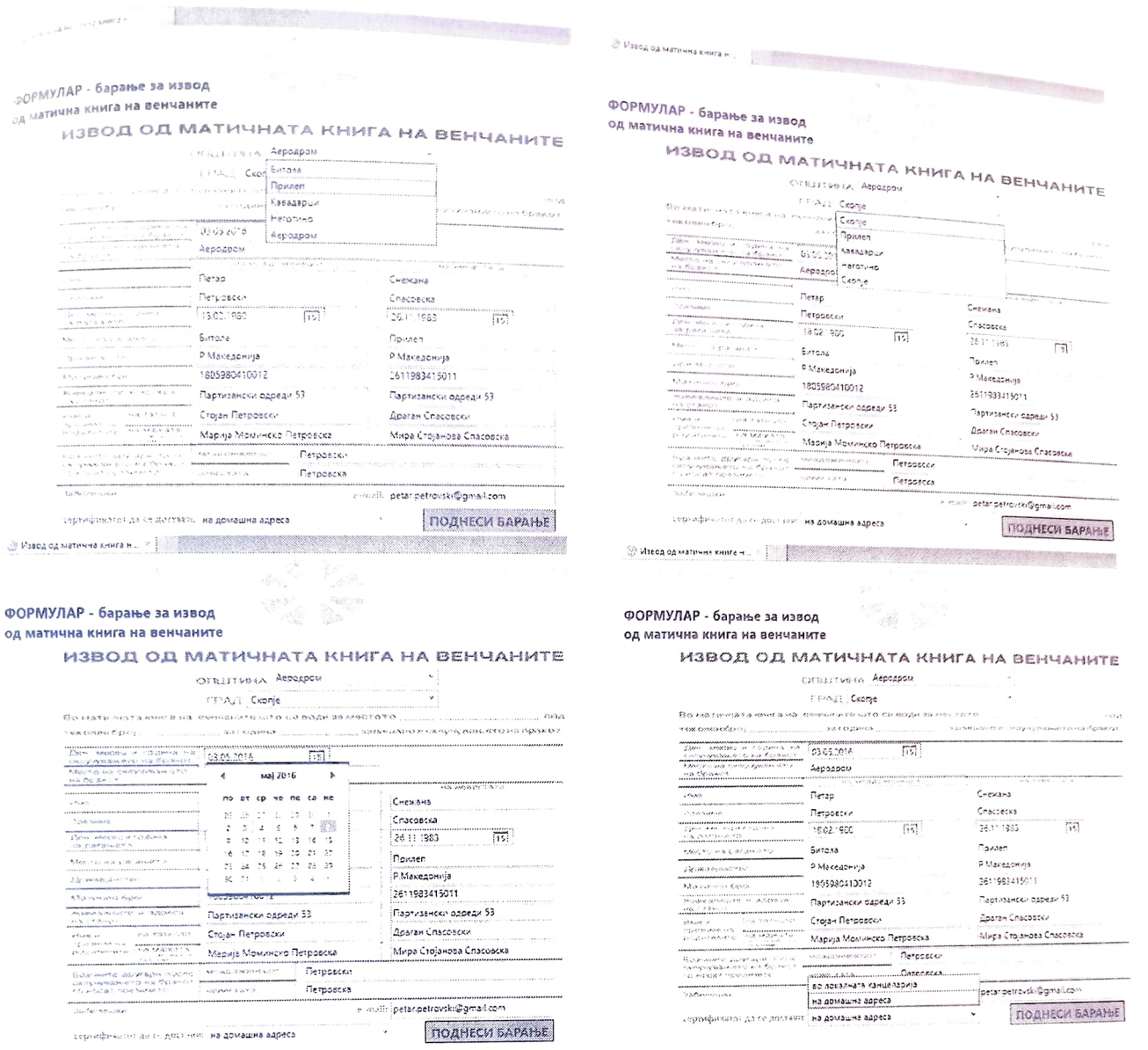

Figure 3: UI elements for facilitating the information entries

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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