Reengineering of Software Processes in Municipality for Construction Permission Requests

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Abstract.. The software processes associated with some administrative procedures sometimes can undergo a process of re-engineering especially when an emerging technology demands a new organization of the whole process. Also, there are some legal changes of the administrative procedures. For that reason, we present the old and transformed process with re-engineering of the software processes within the municipality. These processes support a specific topic which is part of the administrative document issues within the municipal sector of urban and communal planning. Instead of a classic software tools, web based solution have to be made. The whole solution is separated in two main parts: for public citizen service and the appropriate public administration institutions responsible for services. Our research's aim is to gain knowledge of administrative processes that need to be supported by applying software based solutions within municipality in the Republic of Macedonia by the local public administration.

Keywords: Re-engineering, Business processes, Conceptual design, Logical design, Web based information systems, Urban planning.

1 Introduction

When we talk about re-engineering of software processes, we usually talk about finding effective and efficient ways of solving some problems and gaining faster and better solutions (Haddad, 2011). With new emerging technologies, the processes can be simplified and enhanced, their availability increased and also, the risk of errors minimized. A previous version of software processes and structures was connected with a software solution that largely depended on human factor and was centralized within the Department for Urban affairs, Public works, Transport and Environmental protection (More precisely, see the Department of Urban and Public Affair in the text below). The software solution was not possible to be applied anywhere except at the location designed for this purpose. This decentralized software was a major obstacle to the integration of the software into the overall operations of local government. For this reasons, supported by globalization demands, ZELS (The Union of Units of Local Governments) and the Ministry of Transport and Communications proposed creation

of a new web-oriented information system with a different approach in setting up administrative processes. The software solutions have to be modern ones, web oriented and user-friendly (Laplante, 2012). Also, an e-government concept requires strong procedures for supporting concepts that enables web oriented solutions for citizens (McLaughlin, 2007).

In this paper we describe how the old system can be improved and transformed with new processes by re-engeneering. The new system has to be more effective, efficient, time-saving and better organized. With the new software solution, the civil public services can be enhanced and the citizen satisfaction can be improved.

The software processes associated with the old procedures demand better knowledge of complex administrative procedures, given the small number of officials, separated within each local government. For this reason, the absence of officials usually means inability to get things done within the deadline. The new web-based software solution for this administrative problem has to be made already by a Macedonian IT company according to the administrative procedures provided by the existing governmental policy.

2 Legacy Information System used for Issuing Documents for Construction Permission

The case study of a legacy information system for issuing documents for construction permission comes from the Department of Urban and Public Affairs within the municipalities in the Republic of Macedonia. Software solution which they used was made regionally and demanded knowledge of the prescribed procedures. The employees used the software until 2002 and they were able to produce all the needed documents by using software solution and to respond to client's construction permission requests (See below Figure 1).
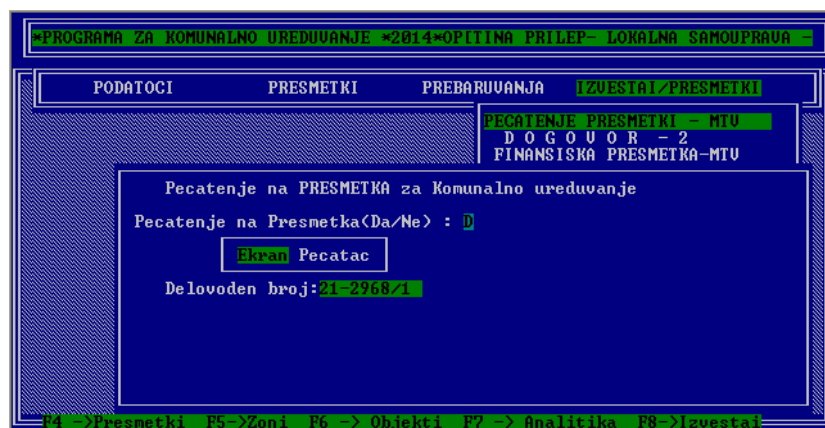

Figure 1 – A screenshot of a legacy system of issuing documents for construction permission requests

The first step was filling administrative application of issuing construction permission request. Also, all needed documentation (as building plans, approval for right to build, proof of payment of administrative fees and the other documents) had to be provided. The software solution enabled a creation of a detail Calculation of construction agreement, Financial and Detail Calculation for construction and issuing an Invoice of a municipal fee. The clerk entered all the necessary data for a classification of urban zones, types of facilities, locations and the other classification issues. Also, they provided building prizes for all zones and types of facilities, detail sizes of the living and business area within the interface and after that they got a precise calculation of the proposed living and business space. Depending on the calculated area, the invoice for municipal fee was created automatically. Software solution also provided reports and searching facilities (See below Figure 2).

But, all these procedures were intended for the clerk in the Sector of Urban and Public Affair (as was shown in Figure 2). There were not any procedures and facilities for clients within the software solution. For that reason, under the mutual project of ZELS (Union of units of local government) and the Ministry of Transport and Communications was decided a provision of an e-service, so-called: "Information system of e-approval and construction". That system had to provide a new approach of the problem solving and also, enhance the existing software solution in some local governments. Also, this software solution had to upgrade the approach of the client as part of e-government solution. The new software solution as e-service had to be web based, user friendly and to provide specific information for the clients and the governmental institutions. They had to provide aggregated data for the Ministry of Transport and Communications officers, for municipal officers and for the government. Also, the solution had to include all the previous operation of local government office support. For that reasons, this part (legacy information system for construction permission requests) had to be reengineered but also included within a new software solution.

As we mention above, there are many legal changes implemented in the legal software solution within the last few years, but they are just adaptation of existing software solution to the changes of laws that were enacted in the past few years in this area. Some adaptation of the software solution for other services, such as Cadaster service and financial sector within the local government was also made in the past few years.

3 Proposal of a New Information System for Construction Permission Requests as e-service

The analysis of the legal information system of issuing documents for construction permission requests shows some maladjustment of the legal software solution based on the new concept of e-service. For this reason, we made a re-engineering of the administrative processes in order to improve speed and other performance indicators for the services to the clients. During that process, it is important to be careful with the solution, it has to be web enabled and can be accessed anytime and from anywhere. Also, the solution has to be user-friendly, easy to learn and with a needed

help for clients and for the institutional clerks. It has to be safe, secure and to provide enough information for its proper use.
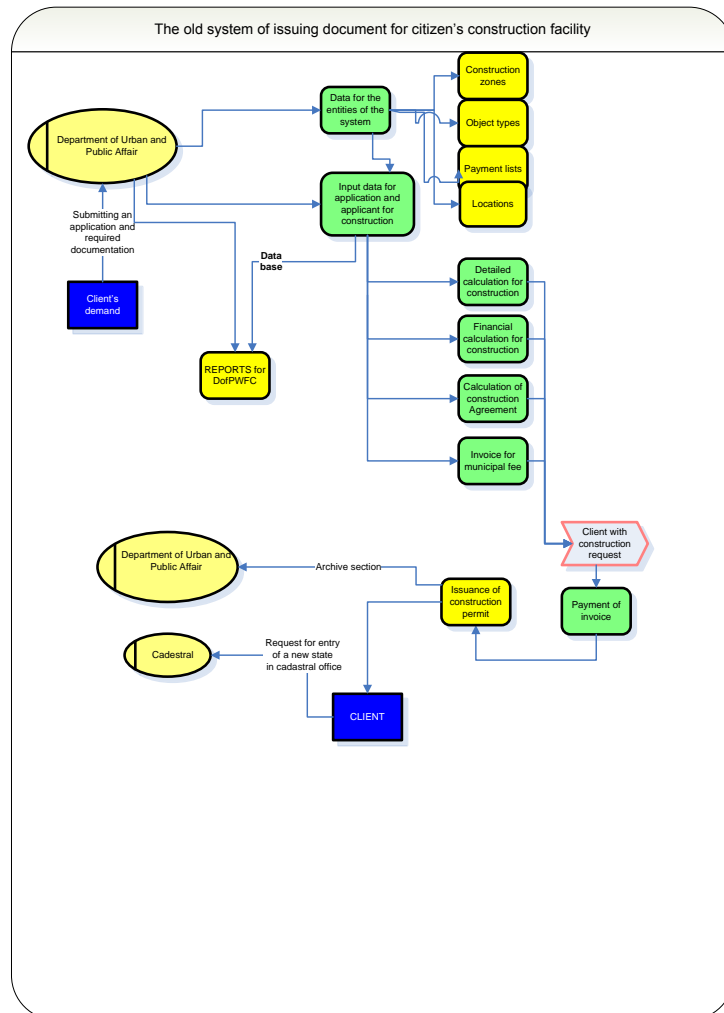

Figure 2 – A legal system for construction permission requests

First of all, it has to be web-based login screen with a possibility of a client registration. For this topic, the web application needs to be created in two official languages (Macedonian and Albanian). After login or registration on the web, the client has to obtain the possibility to enter and edit client's information. Also, a digital certificate for all users of the system has to be provided because of the system security issues.

After the process of registration, the client must have the possibility to obtain a screen for data input for construction permission request. There must be screens with help files that explain the legal frame, the required documentation and the other

facilitators for the proper system operation. In this process, the client has to provide the necessary documents, prescribed in the facility files as PDF or other suitable files for the system.
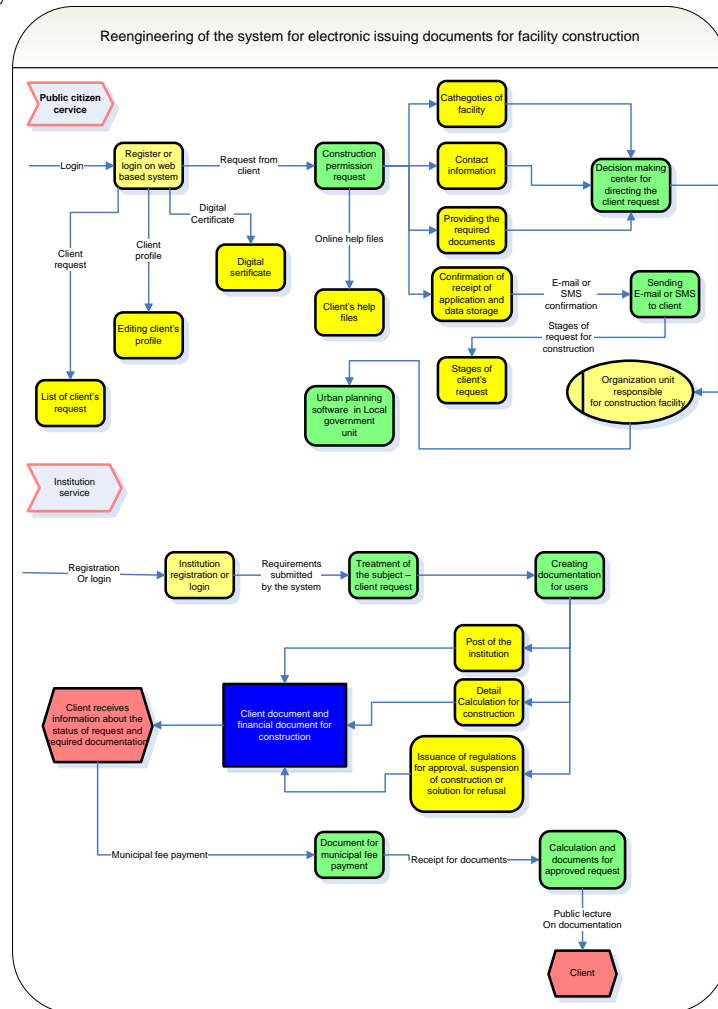

Figure 3 – Reengineering of the Information System for construction permission requests

When the client provides desired data and documents for the system, he has to validate information with a digital signature (certificate), to save the information and to finish the input of construction permission request. After data submission, the automatic verification for submission has to be provided, sent by e-mail or by SMS. Also, the request stage in database has to be always updated and this information provided for the client.

When the construction permission request is in the database, it has to be send to the decision making center that has to provide in which institution will direct the request. The decision making center has to have its own decision making rules, but the final

decision must be done from manager and officer responsible for deciding where the construction permission request will be send. After his confirmation (or alternate decision solution), the name of responsible center have to be connected with the client construction permission request and the legal time for completing the procedure has to start. All changes in the request status have to be placed in database and client must have an insight into the status of his request. The proposed system with the transformed processes as a result of the process of re-engineering is shown on the Figure 3 above. The part of citizen service (clients) is shown on the upper part of the Figure 3.

The second part of the system has to be designed for the institutional service and should be an extension of the previously described processes as public citizen service. The clerk of the respondent institution has to login on (or make a registration on) the system. After the login screen, the assigned request for that institution has to be provided on his screen. The officer has to provide confirmation for acceptance of the request and has to create the desired documents for client construction permission request. The system has to provide clerks of some institutions to get some duties from another clerk for additional information about the client in order to provide some documents (as EVN- Power Company, water and utility local companies etc.). Also, he has to check legal documents, cadaster documents and has to make decision about the approval or refusal of the request.

It is important to mention that the system has to be accessible for many institutions which are the part of the process of confirmation of issued documents needed for the client's request. Institutions that have to have access to the necessary documents for the application such as cadaster, Ministry of internal affairs, private cadaster, EVN, water and utility local companies are some of the institutions responsible for providing documentation on the subject. All of them must have access to the system in order to provide the desired information and documentation.

Finally, all needed documents have to be prepared and send to the client. The urban planning clerk is responsible for preparing the data for final documentation and the documentation must be signed by the clerk and the head of the Department. Also, the invoice for payment of municipal fee has to be provided for the client. After invoice payment and sending the confirmation from the customer, an issuance of the building permission has to be sent to the customer. Also, all documentation has to be send to the clients address in a hard format. These processes are shown on the bottom part of Figure 3.

4 A Need of Maintaining and Updating the Web-based Software Solution

The constant need of maintaining of the software solution is needed for the constant change of the working conditions as well as adaptation of new regulations and amendments to the laws, intervention laws that apply in certain time periods. In this case study we show the adaptation of the Law on the treatment of illegal buildings which was published in Official Gazette No. 23 of 24.02.2011 which goes together with the Law on Urban Planning and Development, published in Official Gazette of

RM. No. 51/05 from 30.06.2005. Under this law, the government allowed citizens to legalize all those buildings that were built without obtaining construction permission in the past. The statutory deadline for implementation of the law was to 01.01.2014, but at the request of institutions and citizens is extended to 30.09.2015.

Under this law, administrative procedures adopted by the Government of RM should begin by completing the application for legalization of illegal buildings and should be submitted to the Department of Urban and Public Affairs in the Local Government. The administrative procedures that are provided in the process of legalization of illegally constructed buildings are visually displayed in Figure 4. All the process ends with a Public Announcement of the Awarded Recipients by City Authorities to the client – the owner of the illegal object. In order for this administrative procedure to fit the proposed system, it is necessary to provide the same service in the proposed web-based solution – a new information system. A logical suggestion would be to add new categories of services that are provided when applying for construction permission request. This additional service would only cover services possible with addition of a new service - the legalization of illegally built objects, which will require submission of the same documents as in the case when a client makes a construction permission request through a web -based system. Further processes would be made according to projected pattern of business processes for the issuance of construction permission with dynamic accelerated and shortened deadlines.

The implementation of such a system is certainly not an easy task and requires a commitment of professional software companies that will provide the anticipated tasks and solve the set of emerged problems with web-based software application. To facilitate the operation of such a system which serves as e-service, it should be part of e-government solution that should provide, despite functionality, security assumptions. In order to provide data, encryption web based system should be enabled as well as client and institution's certification. This requirement assumes implementation of encryption with certification authority. If there is a set of the opportunity for a payment method for regular banking online payment or credit cards, it is necessary to introduce additional bank secure payment methods.

5. Real Implementation of Web-based Software Solution for Construction Permission Requests

The project started in 2013 with the support of the Ministry of Transport and Communications and ZELS. The site created for this purpose is already in use, but only some parts of them. It is made by Nextsens, Macedonian IT Company. It is web-based solution for client construction permission requests and other stakeholders in the process (See Figure 5 below). The part of anticipated processes is enabled by this system, but the system is still on the phase of implementation and development. Efficiency of this new web-based system should be improved especially for the clients, with decreasing of the needed time for application and the time to complete the process of submitting a request. It remains to analyze the satisfaction of a client from the new web-based solution (clients as citizens and institutions who use the new

system), and satisfaction of other service users of the Department of Urban and Public Affairs, Ministry of Interior, Power company, Water supply and utility local companies in each local government and other entities for which the system is intended (on the side of the institutions). Of course, it has to make benchmarks for its use and efficiency achieved on the part of clients and institutions.
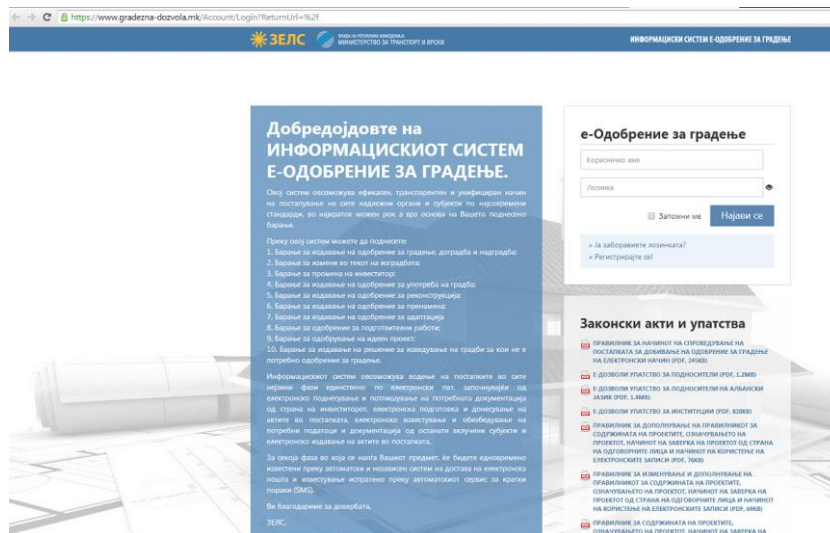

Figure 5 – Screenshot of information system for e-approval for construction

6. E-Service Portal for End-users and Future Improvements

Project e-service for constructiom permission requests is supported by ZELS and the Ministry of Transport and Communications and for this reason it is strongly supported of all state government departments. This project includes a wide range of institutions involved in the review process and issuance of documents necessary for gaining a construction permission, the holder of the activity (as Ministry of Transport and Communications and the Department of Urban and Public Affairs). While the clients are the service users.

For secure and safe operation of the web system, all stakeholders of the system should possess digital certificates issued by a legal Certification authority. It includes collaboration of clients and institutions with aim of improving public service using web-based technology and providing deadlines for a completion of the process by strictly defined working procedures. Through this solution, the performance of staff responsible for the completion of the process can be monitored as well as the working performance of other institutions.

Using the web based software, some necessary forms and documents for clients are created and send by e-mail in the frame of deadline, followed by sending the documents in a classic way (in the transitional period and completely passed to electronic mode). Only the part of legacy system is not enabled yet with the new

software solution. These parts of processes are the responsibility of clerk and are made with word and excel documents.

Collaboration and communication between institutions is also done electronically. In this way, it preserves the system of overall correspondence between institutions providing electronic archive during the actual procedures and processes for each request from the client. These data are very favorable for other activities of the Government of RM which are ongoing and which are supported by the Law of Public Servants adopted on 16.04.2010 and the Law of Administrative Servants adopted on 05.02.2014 and relates to the administration evaluation during the periodical assessment of the staff.
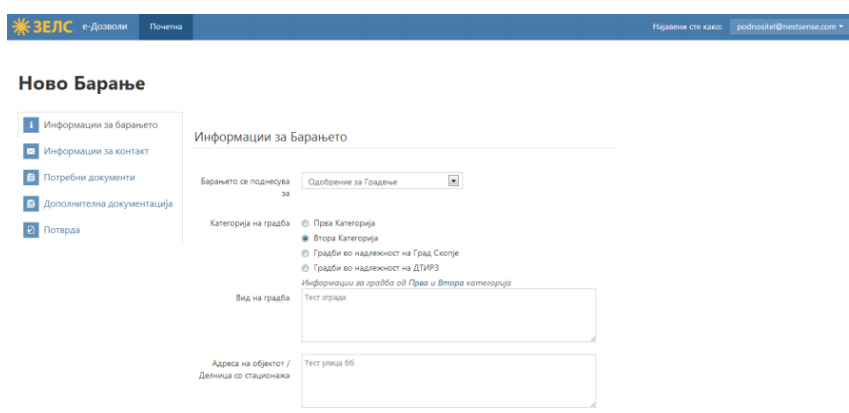

Figure 6 – Screen for Construction permission requests from the web-based system

However, for successful implementation, it is necessary to gain additional and detailed work instructions, good institutional clerk training (they should be included in the system, whether they belong to civil or private institutions as cadaster or other institutions). However, the most important factor for a successful implementation of the project is the support from the government and its determination to implement this complex project. The project should be related to the whole e-government project as a long term strategy of the Government of RM.

8 Conclusion

From the items explained in the previous text, we can conclude that the actual administrative processes for issuing the Construction permission request in R.M. already are changed. As e part of e-government concept, this web based application connects the clients and institutions involved in the process of issuing permits for construction. These processes have to be improved and upgraded in the future with new services as well as new technology opportunities, such as: mobile application, e-payment and BI tools and software for managers (Ming, 2010). Also, the actual software tools have to be improved with the usage of some visual representation of

the data in format suitable for administrative managers in local governments in Macedonia as dashboard or strategic maps of activities.

 Besides all, the municipal governments in the Republic of Macedonia must integrate all the needed resources of different nature in order to successfully implement web based software solution that will help the process of issuing construction permits on a municipal level. In addition, there must be a wide spread training of the local public administration servants in different municipal departments of the software use and maintenance.

Figure 7 – Screen for attaching demanded documents for web-enabled system

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