

Using Knowledge Management for Creating Knowledge Society through e-Government Services in Montenegro

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Abstract—The waves of eGovernment are rising very fast through almost all public administration, or at least most of the public administrations around the world, and not only the public administration, but also the entire government and all of their organization as a whole. The government uses information technology, and above all the internet or web network, to facilitate the exchange of services between government agencies and citizens, businesses, employees and other non-governmental agencies. With efficient and transparent information exchange, the information becomes accessible to the society (citizens, business, employees etc.), and as a result of these processes the society itself becomes the information society or knowledge society. This paper discusses the knowledge management for eGovernment development in significance and role. Also, the paper reviews the role of virtual communities as a knowledge management mechanism to support eGovernment in Montenegro. It explores the need for knowledge management in eGovernment, identifies knowledge management technologies, and highlights the challenges for developing countries, such as Montenegro in the implementation of eGovernment. The paper suggests that knowledge management is needed to facilitate information exchange and transaction processing with citizens, as well as to enable creation of knowledge society.

Keywords—information, eGovernment, knowledge management, knowledge society

I. INTRODUCTION

TECHNOLOGY initiatives and reform of administrative processes and in general, implementation of ICT in Government, made it possible to realize that governments are composed of a dynamic mix of goals, structures and functions. eGovernment initiatives essentially presents the efforts for complex changes with the intention to use of new and advanced technologies in order to support the transformation of the operations and effectiveness of government that arises as a result of the introduction of new initiatives for more efficient operations and the enforcement of the operational functions of government. The new challenges of public administration in the 21 Century are to create e-Government.

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E-Government can be defined in narrow and broad sense. The Strategic Plan for eGovernment, in the state of Texas (Department of Information Resources, State of Texas, January 2001), eGovernment is defined as: government activities that use electronic communications among all levels of government, with citizens and business community, including: acquisition and providing products and services, giving and receiving orders, delivery and search of information, and complete financial transactions.

Gartner (2000) gave a broader definition: "eGovernment is the continuous optimization of service delivery processes, participation and control of voters through transformation of internal and external relationships using technology, Internet and new media." [8]

Recognizing the implications of e-Government, it can be defined as - the ability to obtain government services through non-traditional electronic way, providing access to government information and completion of government transactions from anywhere, at any time and in accordance with the requirements of equal access - offering the potential to transform the public sector and build the relationships between citizens and government. Theresa A. Pardo states his functions as follows [9]:

- Citizens' access to government information. Providing access to government information are the most common digital government initiatives.
- Facilitating general respect. eGovernment can also include providing electronic access to services that facilitate compliance with a set of rules or regulations.
- Citizens' access for personal benefit. Electronic benefit transfers and online applications for public assistance and workers compensation are examples of services that enable electronic access to citizens in order to achieve personal gain.
- Procurement, including bidding, purchasing and payment. Applications for the purchases are allowing government agencies to feel the benefits that exist in the private sector using the eCommerce applications. These include catalogues of electronic retailers, bid proposals and tabulations, electronic purchasing and payment transactions within government and between government and business entities that meet the needs of both government agencies and private trading partners.

- Government-to-government integration of information and services. Integrated service delivery programs within government agencies and between different levels of government, requires electronic integration and sharing of information.
- Participation of citizens. Online democracy involves access or contact with elected officials, discussion forums, online meetings, voter registration, and at the end online voting. These services are developed in order to meet the needs of the whole community.

From a technical perspective, eGovernment are integrated tools that include three possible sets of new technologies: the infrastructure, solutions and the exploitation of public portals. eGovernment infrastructure can enable the implementation of specific applications to address specific problems and management issues in government. So, in providing of the Internet access and e-mail service available at public portals, the most positive impact will come from those solutions and services that can be accessed by exploitation of public portals with these communication tools. On the basis of internal and external government telecommunications and Internet infrastructure, exploitation of public government portal, provides the solutions that enable electronic delivery of public services.

Thus, the eGovernment can be defined as the way the governments use the most innovative information and communication technologies, especially web-based internet applications, to provide citizens and businesses more comfortable access to government information and services, to improve the quality of services and provide much more opportunities for participation in democratic processes and institutions.

II. KNOWLEDGE MANAGEMENT IN e-GOVERNMENT

Recently, the management of knowledge began to emerge and be used in the public sector. In the UK, for example, eEnvoy whose office was established in 1999th and has been replaced by the eGovernment Unit, in 2004, introduced the concept of knowledge networks in 2000 followed by knowledge enhanced government (KEG) [4]. Development agencies such as the World Bank also established a secretariat for the knowledge management and within it presented a knowledge assessment methodology (KAM). One of the major reasons for this development was the sudden appearance and use of information and communication technology (ICT) in the last decades of the 20th century and early 21st century in all forms of business.

Knowledge workers have emerged as a key resource for the rapid economic development. India has, for example, undertook a unique initiative among developing countries, by establishing a national knowledge commission in order to make possible to use knowledge to affect on economic development. In any case, with expanding of education and including a growing number of people throughout the

development, it is necessary to deal with the problem of education of unemployed people. The phenomenon of Finland as a leading knowledge economy, which in the past faced with the economic crisis, presents a success story how knowledge influenced the economic development. Information and Communication Technology (ICT) and e-Government have an important role when it comes to the level and the impact on knowledge on economic development.

III. THE IMPORTANCE OF KNOWLEDGE MANAGEMENT FOR e-GOVERNMENT

eGovernment as a virtual organization that aims to provide public management and public services / services, is not involved in the creation of material resources, but it involves the knowledge management systems that contain significant features. Knowledge management in the eGovernment environment presents new management concepts and new management methods, having an important role in promoting the transformation of government functions, improve government efficiency and the image that people create about the government. In particular, the importance of implementing knowledge management in eGovernment can be divided into the following three aspects [8]:

- To be conducive to enhance government's competence- During the process of economic globalization, the competitiveness of the overall national power, and economic competitiveness depend on the competitiveness of the government. In the e-Government environment, knowledge management includes knowledge as their most important resource in order to maximize access to and use of knowledge with aim to improve the competitive power of government. With that approach the governments showed that in the knowledge management, the knowledge is the essence of all processes, and they take appropriate measures to encourage employees to continuous improvement and increased sense of competition while enhancing the overall competitiveness of the government's innovative capacity and contingency forces.
- To be conducive to raise governments' service quality - Knowledge Management which appears and occurs in the eGovernment environment presents the electronic workflow that needs to be controlled, reflects the cooperation between different sectors and awareness of employees regarding cooperation. Knowledge management is circulating around the acquisition of knowledge, skills analysis, knowledge process, distributing knowledge and other ways, in order to understand the standardization of services and experiences of the major processes, and in order to increase efficiency of the government offices and service quality.

To be conducive to promote healthy development of e-Government - During the process of governance in modern governments, knowledge management is required. Knowledge management plays an important role in the transition to the

paradigm of Governance in the government and improvement of administrative capacity in government. Separation from the knowledge management would lead to a situation in which different information resources in work independent, and also to a situation in which an electronic government is unable to form the entire body. Knowledge management can build an effective knowledge base, clean up various channels of information workflows, establish a knowledge-sharing, and promote development of eGovernment.

IV. KNOWLEDGE MANAGEMENT MODELS IN e-GOVERNMENT

From a macroeconomic perspective, the process of knowledge management in e-Government is similar to the same processes in companies, to a certain level, but it's also different in its essence when it comes to goals and intentions. The first needs to provide services to the community and the others need to increase the competitiveness and profitability of the company. Based on the software and hardware environments in eGovernment, the conceptual model of eGovernment consists of knowledge-collections subsystem, a knowledge organization subsystem and a knowledge applications subsystem. There are independent as well as mutually supportive relationships between these three subsystems [5].

Knowledge collection subsystem - The knowledge collection subsystem is an input system in e-Government knowledge management system, which is the foundation of knowledge management. This system focuses on the area of knowledge in government. His initial collection contains a wealth of knowledge and information resources which need to be identified and which need to be used by the other two systems. This subsystem includes the knowledge recognition, the knowledge acquisition and the knowledge accumulation of these three knowledge management processes [10]:

- Knowledge recognition. Knowledge recognition is the first step in knowledge management process. From the perspective of cognitive theory analysis, knowledge can be divided into explicit knowledge and tacit knowledge. Explicit knowledge can be used exclusively for data, formulas, language, symbols and other expressions which can easily be stored, exchanged and shared. Tacit knowledge is highly personalized and hard-formatted knowledge and it is rooted in the personal experience, intuition, insight and values. Both types of knowledge by its nature are not characterized by visibility, and in that sense it is necessary to identify them, making them transparent in order to create and create basis for its application.
- Knowledge acquisition. Knowledge acquisition refers to access to knowledge from external organizations and in a way that it will be easy to use from the aspects of the organization. eGovernment means access to knowledge through databases, internet and online forums, blogs, search engines, network data mining. Knowledge Management in eGovernment aims to "capture" the necessary knowledge

and skills necessary for relationships with governments, regardless of where this knowledge is located. It can easily access to knowledge through the computer databases, and monitor trends in network and server to help the government to achieve maximum efficiency and decision making.

- Knowledge accumulation. Knowledge creation process of exporting of knowledge assets must be accelerated and stored in e-government to be conducive to knowledge application and knowledge innovation. Dominant systems of knowledge through a process of knowledge creation and establishment of a portfolio can be stored in databases of e-Government knowledge in the form of documents. The biggest advantage of tacit knowledge is the fact that it is difficult to clearly define it using a system of symbols. Governments should pay particular attention to those employees who have tacit knowledge, in an effort to foster loyalty and a sense of belonging and also to encourage them to accumulate their knowledge.

Knowledge organization subsystem - Knowledge organization subsystem is the core of knowledge management, to the orderly process of mixed knowledge. This subsystem is the bridge that connects knowledge collection subsystem with knowledge application subsystem, and its functions may directly affect the function of knowledge application subsystem, and even the success of the entire system of knowledge management. This subsystem includes the classification of knowledge, knowledge depot and knowledge map, three knowledge management processes [10]:

- Knowledge classification. Knowledge classification is the base of effective knowledge application. In the e-Government activities a lot of complicated knowledge will be produced. The classification of knowledge according to content and application is very useful for civil servants in administrative jobs, in order to quickly retrieve the necessary knowledge and improve efficiency in search of knowledge. They can not still find or create new knowledge through the integration and the decomposition of knowledge.
- Knowledge depot. Knowledge depot is the government's electronic database of information. Knowledge depot generally contains three types of content: first, the government's electronic resources of knowledge, including institutions, experience and wisdom of management and operations of e-Government; second, the internal organization resources, including e-Government organizational structure, internal information sector etc.; third, the intelligence resources, including international development policy, comments on policies, customer requirements and other details. In short, knowledge depot will make information and knowledge within the organization better structured, able to share and exchange the knowledge, and to facilitate collaboration and communication between organizations.

- Knowledge map. Knowledge map is a system for navigating the electronic resources of knowledge, which provides an environment for learning, helping employees and customers from the community quickly to find the necessary sources of knowledge, shows the distribution of resources overall eGovernment knowledge. Knowledge maps can also provide a system for search and navigation of knowledge depot through it by the user; describe the flows of knowledge in e-Government, to express knowledge about the administrative processes using charts. Knowledge maps are a guide to the knowledge depot, as well as the crucial link in establishing knowledge management system.

Knowledge application subsystem - Knowledge application subsystem is the output system that represents a system of knowledge management. Its user interface is the final visible part. This subsystem colligates the results of the other two subsystems, cleans and organizes relevant information, and provides them to different users in different ways. It may also create knowledge based on the two other subsystems. This subsystem includes knowledge sharing, knowledge exchange and knowledge creation three processes to knowledge management [10]:

- Knowledge sharing. Knowledge sharing means that information and knowledge about e-government is as open as possible, so that each of the civil servants has access to and uses the knowledge and information provided by other users. Knowledge is power, but power is not created due to the confidential knowledge, but because of the sharing of knowledge. The biggest difference between knowledge and other curable material is its expanded role in the process of sharing. The owners do not lose their knowledge through the sharing and free access to knowledge, instead, knowledge will become greater, and it will allow access to the innovative effects of knowledge accumulation. In addition, knowledge is subjective, specific knowledge or experience does not necessarily represent value for someone, but it can be very valuable to another person. Knowledge sharing is very easy to implement to progress of the entire organization of learning.
- Knowledge exchange. The key of knowledge management is to establish an organizational structure and culture in eGovernment, which can enable knowledge-sharing with employees, and make the exchange and communication effective through various mechanisms. Knowledge and information will be upgraded and the owners of knowledge will be inspired by the process of integration and exchange. The second function is to spread knowledge sharing tacit knowledge to some degree.
- Knowledge creation. Knowledge can be created through the interaction between the visible knowledge and implicit knowledge, which is known as knowledge conversion. In the eGovernment environment, knowledge creation is the process of knowledge conversion, which includes four models (socialization, externalization, combination and

internalization). More specifically, socialization refers to the transformation of tacit knowledge to tacit knowledge; it is a process of sharing experience and association of tacit knowledge. Externalization implies that tacit knowledge becomes explicit knowledge, which represents the process of expressing tacit knowledge through the concept and language. The combination leads to the creation of new knowledge through adaptation, addition, composition and classification, which represents the processes that synthesize a system of explicit knowledge through an independent composition of explicit knowledge. Internalization is a process of individual absorption of explicit knowledge and its conversion into tacit knowledge.

V. WHAT IS KNOWLEDGE MANAGEMENT FOR EGOVERNMENT

On the macro level, knowledge management (KM) can be defined as the impact of knowledge in order to achieve the goals of productivity and competitiveness of the national economy. At governmental level, knowledge management for the government may be defined as the impact of knowledge in order to improve internal processes, the formulation of government policies and programs and for effective delivery of public information to increase productivity. Finally, knowledge management (KM) for eGovernment can be defined as the management of knowledge for and by e-Government in order to increase productivity. KM4Eg (Knowledge Management for eGovernment) a management tool that serves the decision makers in government and their program implementers [11].

The government has always been the main user of knowledge. The primary function of government is the decision-making process and eGovernment provides unique support to a decision-making processes. Government also contains the largest repositories of information and databases and e-Government can help in their effective management. Governments have always had access to the best technologies and technological solutions in order to be able to manage their relationships. In recent years the explosion of information also emerged, and it is very important to know how to manage such information. Not all information are equally applicable to any process of decision making, and generally to any process within the government, so in that case e-Government plays a significant role because it enables more efficient and more transparent management of such information. In addition, using e-Government enables easier search of information by end users, and therefore, not only by government employees, but also by citizens, businesses, NGOs, etc. Also, the access to information is much easier, i.e. the higher amount of information is available.

VI. PYRAMID OF KNOWLEDGE IN EGOVERNMENT

The pyramid of knowledge is often used by scholars of management of knowledge. Knowledge management (KM) for e-Government has four components, namely:

- a) data, which consist of facts and figures
- b) information, which represents interpreted data (data + interpretation)

- c) knowledge, which uses the information (data + interpretation + use) and
- d) wisdom which is the application of knowledge (data + interpretation + use + application), as shown in Fig 1. It can be noticed that wisdom, which is here defined as the application of knowledge rather than knowledge per se, is the highest form of knowledge.

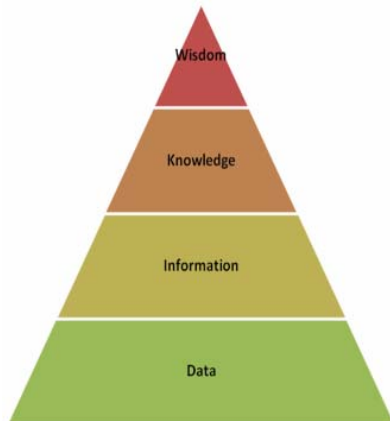


Fig. 1 Knowledge Pyramid in eGovernment [11]

Knowledge can be stored within the 4P: 1) Places - written and saved in an existing document or database, 2) processes - integrated into existing already known business processes, 3) people - knowledge that has a particular individual, and 4) pieces - distributed among several people or processes (such as value chain).

VII. EGOVERNMENT IN MONTENEGRO

As previously discussed, information and communication technology (ICT) can help public administrations to cope with many challenges. However, the ICT should not be in the spotlight. Instead, attention should be focused on the use of ICT combined with organizational change and new skills, in order to improve public services, democratic processes and public policy, which is a sense of eGovernment.

In late 2006 Government of Montenegro began the implementation, and in June 2007 has completed and implemented the project of the electronic sessions of the Commission for economic policy, one of the Government Commission. The goal of the task was to create and establish a system for electronic support of the Government of Montenegro operations. Develop and fully establish a system that will enable the preparation and operation of commission meetings and the Government of Montenegro, based entirely on electronic documents and web technologies. Develop a system of direct work on data sessions using new technological solutions for accessing and querying data. The system is primarily supposed to be a show case of the use of information technologies in Montenegro and like that it is supposed to give some impetus to further development of information technologies in the same.

In addition to the primary objective, which is realized, the system has enabled the fulfilling the following goals for the future:

- Directly accepting electronic documents
- Use of digital signatures in the exchange of electronic documents, with the establishment of certification authorities, and the system for issuing digital certificates with the aim to identify users, so the system itself is built on a higher level of protection
- Establishing direct communication between government bodies using the ePortal
- Expanding the portal to a level at which they will be able to provide eDemocracy services

The basic purpose of the portal is aimed at improving efficiency in the work, primarily in the preparation of acts and other materials for the sessions of the Government Commission and the session of the Government itself.

Structure and complexity of the portal is multiple and can be divided into several sub-portals. The functioning of the portal can be viewed as dependent units that participate in the sessions and preparation of the sessions and committee meetings of the Government of Montenegro. Besides the structural division of the portal units, which effectively correspond to the hierarchical structure of the institutions of Government, the portal for the Electronic Sessions of the Government is divided according to the access portal interface. Each Ministry has its own site to prepare a proposal for a session of the Commission or the Government. The site provides complete support for the ministry of making and tracking of documents related to meetings of the commission or the government, the circular flow of documents, document versioning, circuit-making and approval documents (workflow).

What is one of uniqueness and values of eSessions of the Government is the online monitoring of session. Participants of the session can see that all points in the plan for the session, and with choosing point they are able to see the supporting documents and agenda items (supporting materials, suggestions of conclusions, a working plan of Government). Participants follow a parallel session on a special website that is specifically tailored for easy and comfortable monitoring. The Secretary may, if necessary, during the session to update the agenda and related content, and participants can track changes all the time. Finally, after the adjustments, the Secretary of the Commission closes the on-line session. In this way it does not require any further adjustments to the material and the proposals can be approved to go into the procedure.

VIII. ANALYSIS OF THE RESULTS ACHIEVED THROUGH IMPLEMENTATION OF EPORTAL

ePortal for electronic committee meetings and electronic meeting of the Government is only the beginning of government initiatives aimed at developing information

society, and associated with that the development of eDemocracy in Montenegro.

In order for activities related to creating an information society to be successful, several factors need to be fulfilled: (i) to enable citizens and legal entities to use information technology, (ii) allow access to all and in all regions, at very favorable terms, (iii) increase public confidence in the processes of public administration, (iv) increase the level of public confidence in the direction of respect for their opinions and thoughts, etc.

When it comes to eDemocracy, one of the main indicators is the participation of citizens in decision-making processes or eParticipation. The simplest way to involve citizens in decision-making processes, is to create an environment in which they will be able to:

- Monitoring of the flow, ie. in decisions-making processes, the adoption of laws, etc.
- Posting comments on legislation and materials
- Proposing interesting topics or current issues whose resolution will later be the obligation of the relevant Ministries
- Voting for a material or an interesting topic, etc.

One idea of eDemocracy direction of development in Montenegro, in the particular case of the Government of Montenegro, may be in a direction of improving of ePortal in a way that allows citizens to send their own ideas, materials if there are any problems or anything about what they want to inform the ministry or the government, for what think it is important for the community.

This type of communication can allow raising the level of development eDemocracy in terms of: increasing impact on decision makers, increasing the obligations of the state administration to respond to the demands of visitors, the communication between the users (the possibility of creating a common idea), communication with public administration, the ability to track proposals and discussions, etc.

By implementing the ePortal solutions, Government of Montenegro has improved the level of electronic data exchange, but also made more efficient the whole process of government committees operations, from the time of preparation of materials for the session, nominations, commenting, by the time of the maintenance of the sessions.

In order to best understand the effects of this kind of business, a brief analysis is made with the following benefits as a results:

- *In the phase of preparation and the procedure of nomination materials, benefits include:*
 - Lower costs of copying materials
 - Faster distribution of materials
 - The material is in electronic form, the easier material handling
 - Less time for running and defining the agenda
- *In the phase of handling the session, benefits include:*
 - Less paper, and relaxed intention to attend the session

- It takes less time to maintain the session (more time for other administrative operations)

In order to make e-Democracy to evolve in any form, it is necessary that there is confidence in the state system, trust in public administration but also the confidence of citizens in government. In addition, it is necessary to allow everyone, to use the electronic services with the same conditions, because in this way it is possible to create a democratic society.

IX. CONCLUSION

The primary objective of a country should be the creation of a knowledge society. This means two things above all: first, reflecting the fact that ICT not only makes the economy to be productive, but also entails significant social and cultural changes, and second, it implies that the odds available to a knowledge society should be open to all citizens so that future knowledge society was inclusive and cohesive. Therefore, the future society should be inclusive in the greatest extent possible. In order to develop the information society in one country it is necessary not only to have access to advanced electronic networks, but also to have the capacity to use this network for online services, eCommerce, communication, social networking, etc.

As already noted, the concept of eGovernment is perceived differently around the world. eGovernment is more about the process of reform, the way that government operates shares information and delivers services to external and internal users. More specifically, eGovernment uses the information technology (such as WAN, Internet and mobile computing) to transform relations with citizens, businesses, and other governmental entities. These technologies can serve different purposes: better distribution and delivery of government services to citizens, improving interactions with business partners and industry, allowing citizens access to information, and much more effective management control. The resulting benefits can be reduced corruption, increased transparency, greater convenience, revenue growth and/or reducing costs.

As Jim Melitski described on his eGovernment page "Around the world, public organizations begin their eGovernment journey simply by publishing static information on the internet and establishing online presence, in the hope that they will also feel the increase in efficiency, effectiveness and organizational effects." (Jim Melitski, 2001).

One of the important issues of contemporary society is the development of an inclusive society, which requires building trust in electronic channels of communication. Trust in the Internet and motivation towards the use depends on the skills of citizens themselves and how much they use computers and electronic services. It is important to realize that ICT does not only provide opportunities for solving problems of bottlenecks, but also provides additional opportunities for participation in public life (eDemocracy), for a continuous, flexible and personal development (eEducation), entertainment, etc. Similarly, one should bear in mind that today more than half of non-Internet users does not intend to start using it. In order to avoid creating of further digital divide between those who

have Internet access and electronic services and those who do not, the provision of public services should be provided and secured through a system with multiple channels.

Creating conditions for the Information Society are providing the essential conditions for Montenegro to continue to develop it, and to fully integrate itself into the global economy, much more intensive than using any other technology. Such an approach will create a favourable environment not only for the development of the ICT sector, but also for faster implementation of these arrangements in all other sectors, especially in the economy and civil society.

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