GUIDELINES FOR IMPLEMENTATION OF E-GOVERNMENT AT INSTITUTIONS OF BOSNIA AND HERZEGOVINA

Muharem Redžibašić, MA dipl. ing., email: r.muharem@gmail.com
Prof. dr. Mladen Radivojević; email: radivojevicmladen60@gmail.com
International University Travnik in Travnik

Abstract: *Most of the information systems that are introduced to e-government bring with them many inovations and many complications. Each system is introduced individually by use of heterogeneous information technologies, which almost immediately disable quality data exchange (G2G) and reduce the usability of existing data in the system. By combining traditional business habits and new information systems, instead of making business easier for users, many things become slower and repetitive processes through the information system and paper processing. In fact, the IS are an addition for the traditional way of doing business, not theirs replacement as it should be. Theis paper will contain a new concept that should be followed by institutions that introduce e-government as well as software companies that implement such systems in order to increasse data usability, security and accessibility to those for which they are intended.*
Key words: *E-government, data, G2G, information system*

1. Fundamentals of Public Administration and eGovernment

In this chapter, the characteristics of public administration will be discussed and key concepts relevant to the introduction of eGovernment will be presented.

1.1. Public administration

- Since the concept of public administration is very important for this work, we will describe it in more detail and present the basic elements for defining the concept of public administration:Public administration is based on the Constitution, laws, decrees, orders, ordinances and other general acts. The lower legal acts interpret the Constitution and laws. This enables management to adapt to tasks and tasks, understanding and multidisciplinary interpretation.
- Public administration is the structure of bodies and organizations and at the same time a set of tasks and tasks whose function is to interpret and apply the law, ie. application of general rules to individual cases with judicial review.
- Public administration is focused on the public system.
- The administration has not only, or even the accompanying control and function, but is focused on providing services to users and supporting and facilitating economic development - the administration is in the service of citizens and the economy.
- Public administration rests on the information base, the communication system, the relationships that arise under the conditions of use of modern information technology. New methods of management and management are being developed in public administration, such as goal management, result management, quality management, process management.

Of the many definitions of public administration, we will single out:

"Public administration is a set of bodies, organizations, bodies, an interdependent set of competences of tasks and tasks, specifically linked and guided with the aim of applying legal norms, organizational instruments, methods of managing processes and procedures to fulfill the mandate of the elected government. Its basic functions are: service, regulatory, organizational and executive. "(Caravan D., 2003)

1.2. eGovernment

eGovernment can be viewed from "online access to services" to "tools for building and rebuilding democracy." (Gonnet P., 2001) The view of eGovernment depends first and foremost on the interests of the person who describes it. To a business person, it is a quick electronic registration of a business, an organized, electronically maintained cadastre or online public procurement. Citizens are most interested in checking and paying taxes online, an electoral system that has no theft, the results of enrollment in schools and colleges on the Internet. The journalist is primarily interested in unrestricted, fast and free access to public information. Human rights

defenders have a significant system of monitoring the work of the authorities, etc.

Technology is transforming the traditional view of development, opening up new horizons for people and creating the potential to bring about the progress that has lasted for generations in a decade.

Analyzing the definitions given so far, and knowing the relevant issues, we will propose one definition that we believe would best describe the term eGovernment: *"eGovernment is a web based technology used by local, cantonal, entity and state government (public administration) as a communication channel offered to visitors, citizens, business partners, other administrations and employees. "(Latinović B, 2007)*

2. Governance Model in B&H and the World

2.1. Management model in B&H

The role of the state of public administration in Bosnia and Herzegovina plays an important role in the tradition, the cultural environment, the history of the relationship between politics and administration, and external influences. In addition to these factors, there is the transition process, the state and level of development of the private sector, the relationship between society and government.

The basic specificity of the transition in B&H is the slowness that is not only caused by the consequences of the war or institutional post-war ambiguities, but also by the fact that it is a threefold transition: from war to peace, from the recipient of great international aid to sustainable development, from the socialist economy and political monopoly to market economy, democracy and civil society. The fourth transition process is yet to come, namely the transition from the current (traditional) model of public administration work to the new eGovernment model. It is now very difficult to exert any influence on the first three transition processes. The transition process of traditional eGovernment can be influenced and that influence and desire for success must be felt by everyone.

Bosnia and Herzegovina is still burdened with the burden of a socialist-era legacy when the private sector was very weak. It was therefore necessary to carry out a large number of reforms in the short term. The desire to form a professional administration was approached empirically. Appropriate regulations were enacted. There is some doubt as to whether the efforts made have come from a clear understanding of the objectives set and what are the means that must be invested to achieve them. The need to try to achieve the neutrality, stability and efficiency of the administration was accepted.

Public administration in B&H includes state, entity, cantonal, local self-government and the administration of the Brcko District. Public administration institutions are ministries, local administrative services and other administrative institutions that perform administrative and professional tasks.

GOVERNMENT LEVELS	STATE OF B&H	ENTITIES		DISTRICT BRČKO	**TOTAL**
		FB&H	RS		
CENTRAL	1				**1**

ENTITY		1	1		**2**
CANTON		10			**10**
MUNICIPALITY		79	62	1	**142**
DISTRICT				1	**1**
TOTAL	**1**	**90**	**63**	**2**	**156**

Table: 1 - Administrative Structure of Bosnia and Herzegovina [4, page 67]

According to the latest available WEF[73] report in 2018 and the Global Competitiveness Index (GCI) 2015/16, B&H is at 111th place out of 140, which certainly indicates that there is a lot of room for improvement and improvement in all areas.

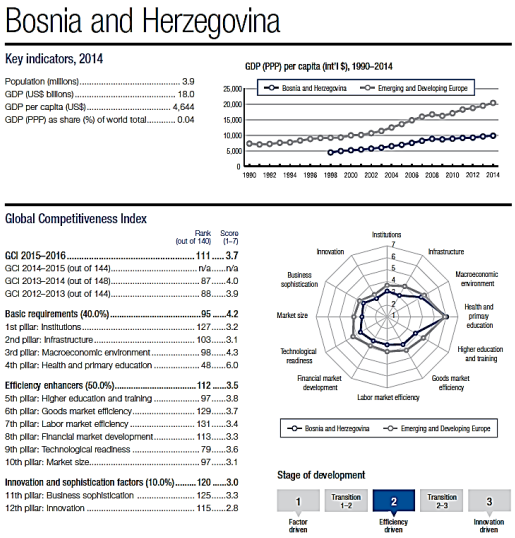

Figure 1: GCI [5]

This report also lists the data and factors that are responsible for this country's "poor" position in the world. This is said to be an inefficient Government bureaucracy. Although many people think it is irrelevant, this research clearly shows that it is the cause of many problems, and if public administration reform is undertaken, it is certainly through this act and steps towards the introduction of quality eGovernment that we can indirectly make improvements in all fields.

It is high time to do so, as compared to 2012-13 data, we notice that our index is increasing, which means that the situation is getting worse. If we compare the countries of the region, this may indicate that the reform is urgently needed because the GCI in the Republic of Croatia is 77, in Serbia it is 94, in Montenegro 70, and in Slovenia 59. In Estonia, which is often taken as an example of a well-off country GCI has 30 regulated ecosystems and 12 in Denmark.

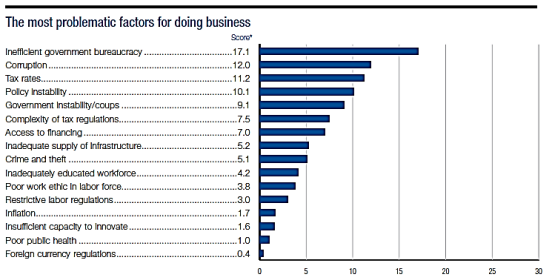

Figure 2: Critical factors for doing the job [5]

According to a 2018 United Nations (UN) survey, statistics are not that bad. According to the EPI[74], Bosnia and Herzegovina is one of the high index countries.

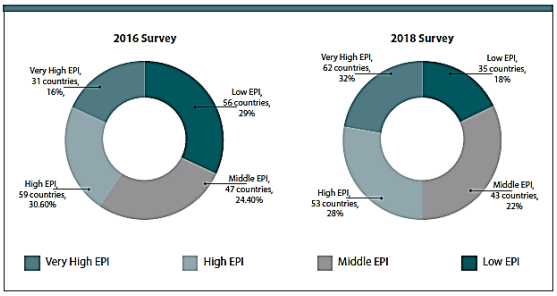

Figure 3: EPI [6]

2.2. The need for public administration reform

[73] World Economic Forum

[74] e-Participation Index (It can be Low, Middle, High, Very High)

Public administration reform is one of the priority goals in Bosnia and Herzegovina. The system of governance and management must be reorganized, a substantially new position, organization and affairs of public services must be established, in order to ensure constitutionality and legality, as well as the rule of law as a whole. The reform process is very slow. Most of the reason for this was the reluctance of local political actors and authorities to implement the reforms decisively. Legislative regulation of public administration should, above all, promote these commitments by consistently implementing the principles of depoliticisation, transparency, professionalisation and efficiency in its operation.

The most important existing laws in this area:

- Law on Communications (Official Gazette of B&H No. 31/03; last amended in 2012)
- Law on Freedom of Access to Information in B&H (SI B&H Gazette 28/00; last amended 2011)
- Law on Copyright and Related Rights in B&H (SI B&H Gazette No. 63/10)
- Law on Industrial Property in B&H (Official Gazette of B&H No. 3/02)
- Law on Consumer Protection of B&H (Official Gazette of B&H No.25/06; last amended in 2015)
- Law on Electronic Signature (Official Gazette of B&H No. 91/06)
- Law on Electronic Legal and Business Traffic (Official Gazette of B&H No. 88/07)
- Electronic Document Law (FB&H Official Gazette 55/13) [7]

What will be the reform of the administration?

- Reform should enable professional and professional, ethically and politically independent work. Management should consist of a team of professionals who will be hired and promoted based on their professional skills and performance.
- The organization and decision-making system will be simplified to avoid the problems of duplication and the emergence of bureaucratic tendencies, and to allow concentrating on providing services to citizens as well as developing a market economy.
- Cost-effective, efficient and effective management of human, technical, financial and other resources will be achieved.
- A flexible management and decision-making system will be provided to meet the challenge of concrete social change.
- Transparency of the work of public administration, which will enable the employees of the administration to be held accountable for their decision-making and action, as well as to make the information available to the general public.
- The newly created administration will operate in accordance with European values and standards,
- There will be a clear distinction between the roles and responsibilities of appointees in political processes and the responsibilities of officials in administrative bodies who are not involved in political processes.

Bosnia and Herzegovina is 17.07.2013. published in the Official Gazette of the Federation of B&H, No. 55/13 / Law on Electronic Document, which was a very significant step towards the implementation of eGovernment in Bosnia and Herzegovina, but unfortunately to this day that Law has not received its amendments and no it is applied in its entirety. [8]

3. Guidelines for the introduction of eGovernment

This chapter should provide brief guidelines that should be followed by eGovernment institutions as well as software companies implementing such systems to address data usability, security and accessibility.

3.1. Digital (electronic) signature

Handwritten signatures have long been accepted as an element of identifying people and authenticating a document. Transactions of electronic (digital) documents and electronic (digital) money would lose their meaning if they had to be signed manually, so the introduction of a digital (electronic) signature must be avoided. Regulations governing their implementation have already been adopted in many developed countries of the world. It is now possible, in most developed countries of the world, to send documents signed electronically to government authorities and businesses. A Digital Signature Directive has been adopted in the European Union, which requires all Member States to adopt local national laws related to this topic. Most Member States have enacted these laws, but they have proven to be inconsistent, so certification institutions have evolved only in areas where legal solutions are more appropriate.

Definition from the Law on Electronic Signature of B&H: *"Electronic signature is data in electronic form that accompanies other data in electronic form or is logically related to them and enables identification of signatories" (JP NIO Official Gazette of B&H, 2018).*

A digital signature on a digital document ensures the authenticity of data and information. Sender identity verification is achieved through the use of digital signatures and digital certificates.
The purpose of the digital signature is to authenticate the content of the message (proof that the message has not been changed on the way from the sender to the recipient), as well as to guarantee the identity of the sender of the message (makes a substitute for a handwritten signature). The basis of the digital signature is the content of the message itself.

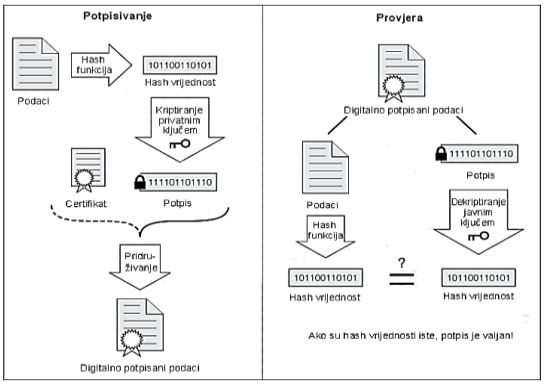

Figure 4: Using digital signatures [9, page 8]

3.2. PKI infrastructure (public key infrastructure)

With the advent of the ability to communicate over the Internet, the problem of secure communication has also arisen. The Internet is different from traditional communication media - there is no physical contact between the interviewees and it is not easy to determine the identity of the person on the other side of the communication channel. Messages can be easily intercepted and the identity of the sender can be forged if no security mechanisms are used. For this reason, it is necessary to implement system security by appropriate cryptographic methods (encryption). Cryptography[75] has developed mechanisms that allow the digital signature of messages (by function equivalent to a traditional signature) and the creation of digital certificates, and mechanisms such as public key[76] infrastructure should ensure their transparent use. PKI is a combination of software, encryption technology and services that enable legal and natural persons to protect the security of their communications and business transactions over the Internet. PKI[77] integrates digital certificates, public key encryption and certification centers into a complete system. Public Key Infrastructure (PKI) does not provide certain business functions but is the basis for other security services. In this paper, the primary role of the PKI would be to facilitate the distribution of public keys and certificates with a high level of security and integrity.

A certificate is a collection of information digitally tagged by its publisher and consists of pieces of information that it contains. An identity certificate is an electronic document used to identify an individual, server, company or other entity (ministry) and associates that entity with a public key.

CAs are entities[78] that authenticate and issue a certificate. The certification center is the basic building component of the PKI mechanism. The term "certification center" has two basic meanings. It may refer to an institution providing a digital certification service or a set of required computer hardware and software. The primary task of the certification center, as an institution, is to be a trusted third party trusted by the communication participants. There may also be organizations that run their own certificate server. The methods used to verify your identity depend on the CA policy, ie who is issuing the certificate and to whom it is intended. Basically, before issuing a certificate, the CA must use the published verification procedures for that type of certificate in order to verify the entity that required the certificate to be the one it should be. The CA-issued certificate binds a special public key with the name of the entity (eg MINISTRY 1 and MINISTRY 2), and may in practice be the name of an employee or server. Certificates

[75]Encryption - The process of transforming readable text into a form that is unreadable to those who are not intended for it

[76]Key - The initial value of the encryption algorithm

[77] *Public Key Infrastructure – infrastruktura javnog ključa*

[78]Entities involved in PKI management include end entities (eg entities whose name is listed in the "entity" of the certificate) as well as certification centers (eg, entity whose name is listed in the "issuer" field of the certificate).

help protect against the use of a fake public key. Only a CA-certified public key (in this example, ONE AND TWO MINISTRY) will function with a corresponding private key owned by the CA-identified entity.

In actual implementation (future implementation), participants in the PKI submit a certificate authority (CA) certification request for a public key. The Certification Body - CA then verifies the accuracy of the information provided in the application and, in accordance with the certification policy (CP) and the certificate practice statement (CPS)[79], accepts or rejects the application. If the request is accepted, the CA signs the public key and the request information with its private key. The signed public key together with the information from the request (MINISTRY, legal or natural person, name of the person, name of the computer on the network) is called a certificate. The CA certificate associates the key with the identity of the entity (s). The certificate is then placed in the certificate store and distributed with distribution protocols (e.g. SSL[80])
In addition to issuing certificates, the Certification Center (CA) must also enable the revocation of certificates (certificates that compromise private key confidentiality are revoked). To this end, the CA maintains a certificate revocation list (CRL).

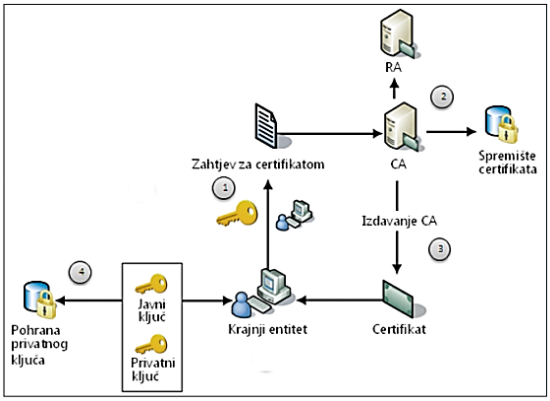

Figure 5: Certification [9, page 15]

3.3. Database

Given that different institutions introduce different information systems that are created mainly for each one from the standpoint of databases, this means that it is not uncommon for institutions that deal with almost the same business to use different types of databases. The concept of introducing eGovernment, among other things, implies a high degree of communication between public administration institutions (G2G). To enable this, it is necessary to find a way in which data from different data sources can be used and combined. One way to take a database solution proposal is to abstract database access through ODBC.

ODBC (Open Database Connectivity) provides a standard software interface for database management system access. The goal of ODBC was to separate it from programming languages, databases and operating systems, meaning that ODBC is supported by all programming languages, systems, databases, etc. Therefore, any

[79]In some forms of the PKI, the special Registration Center decides whether to accept the certification application

[80]Secure Socket Layer (SSL) - an application security protocol for transmitting data over the web. Developed by Netscape Communication. It is based on a digital server certificate mechanism issued by independent CAs.

application can use ODBC for SQL query from the database, regardless of the platform. The application only needs to know ODBC syntax, and DBMS (Database Management Systems) returns data that the application can use. [10]

It is important to mention that ODBC provides access to various databases through the ODBC API (Application Programming Interface) programming environment.

For a better understanding, we will present a diagram where we can see that we have two different applications with different databases in the infrastructure, a new web application was created for the needs of the business, which will have a relational DBMS for the database. That new web application should use data from the existing two. Data exchange will work through ODBC API functions and ODBC drivers.

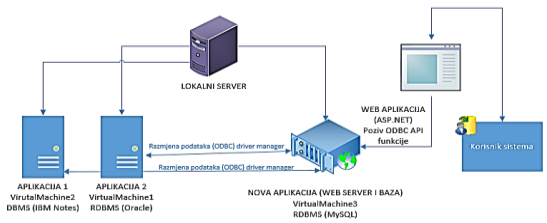

Figure 6: Example of using ODBC (source: authors of the paper)

4. CONCLUSION

Considering that almost every information system (IS) is introduced individually using heterogeneous information technologies, which later almost prevents quality data exchange (G2G) and reduces the usability of existing data in the system, and by combining traditional business and new information system instead of facilitating to users, this actually causes them difficulty in doing business because many things are done more slowly by repeating processes through the information system and paper processing. In fact, IS is a replacement for the traditional way of doing business, not its replacement as it should be. Through this work, we were able to get acquainted with the basic concepts related to public administration and eGovernment in order to be able to better understand the need for governance reform for better business. The survey showed that according to the latest information available on the Global Competitiveness Index (GCI) 2015/16, B&H is in 111th position out of 140, which certainly indicates that there is a lot of room for improvement and improvement in all areas. An inefficient Government bureaucracy stands out as the main cause of such a position. One way to put this in order is to introduce eGovernment. We all have a predisposition for it. This is evidenced by the EPI (e-Participation Index), where we belong to countries with a very high index. The survey also showed that we have many laws that are a prerequisite for implementing eGovernment. Many of them are outdated, but surely if we tend to work harder on projects aimed at introducing eGovernment, this will also imply that adequate changes and additions are made to existing "old" laws.

In addition to the legal framework, the technical realization of projects aimed at introducing eGovernment is also very important. This paper also provides guidance on the technical side of project implementation, where it is primarily proposed to use digital signatures on digital documents, thus ensuring the authenticity of data and information. Thus, sender

identity verification is achieved through the use of digital signatures and digital certificates. To protect the security of communications and business transactions over the Internet, it is proposed to use a public key infrastructure (PKI) that integrates digital certificates, public key encryption and certification centers into a single system. The security aspect is very important because information systems are generally designed to meet business functionality, less attention is paid to security. Due to the multitude of malicious users and the importance of data transmitted through the network, great emphasis must also be placed on data security. The third thing, no less important, is the use of data from different sources (databases). For this purpose, ODBC was proposed in this paper as a way of abstracting access to the database, since in practice almost every new information system that emerges with the aim of introducing eGovernment basically uses data from some other systems. To avoid the same data being manually moved and losing their integrity in this proposed way of connecting different databases, we can avoid this.

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