

# IT Governance and Security of Web Services at Bosnia and Herzegovina Local Level

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**Abstract.** *Management of any organization, company, or even the government must ensure that management knows the role that information plays in their organization and needs to know what kind of IT support must have. A problem that frequently occurs in organizations is too high expectations from IT. Many organizations consider IT as a driver for economic prosperity that helps growth and employment, and that IT must create new value. Administration of such companies often look only global company strategy without going too much into the "details" such as information technology and information systems in the organization or company. Management simply does not interfere too much in IT due to the nature and complexity of jobs, but also because of the view that IT is a "black box". In this paper authors will introduce the term "IT Governance" and it will be presented the results of research conducted at the local level in BiH, in terms of IT-governance through the maturity model of web pages. It will also be analyzed security level of the web portal through which people access the G2C services. The authors will also try to explore and "quality" of IT personnel who are employed in the municipalities through the level of education, and the type of graduating from the University employees. Results will be compared with results from previous research.*

**Keywords:** eGovernance, eGovernment, eMaturity, Security

## 1 Introduction

The definition of the term "IT Governance" has greatly depending from which point of view is considered. „IT Governance“ is the responsibility of management, directors and managers. It is an integral part of corporate governance and consists of leadership, organizational structures and processes that ensure that IT organizations to support organizational strategy [1]. IT Governance is a subset discipline of Corporate governance-governance that is most focused on Information Technology Systems (IT Systems), their performance and risk management. When we say IT, usually refers to the ICT (Information Communication Technology).

Weill and Rose are focused on "Specification of a framework for the facilitation of decision-making and responsibilities of the desired behavior with the use of IT".

Australian Standard defines Corporate Governance ICT (AS8015) as "a system that controls and manages ICT now and in the future". Core of the theme "IT Governance" and the discussion that leads to this subject, at various conferences and forums, that IT is not a black box. Administration, management, directors, managers, organizations

must understand the overall architecture of their IT, and that management must ensure that management knows what information / data available, and the role that information plays in their organization [2]. The goals that were set before the IT governance are:

- Ensure that investments in IT generate business ideas
- To mitigate the risks associated with IT

Ensure that investment in IT generate business ideas mean that IT investments are "smart" and that investment gets a new value, not to be a purpose in itself. For example, it is a mistake to buy a few hundred computers and say that enough has been invested in the development of ICT in the organization. In addition, the computers must be wisely used, must obtain the appropriate software for specific purposes, must obtain the LAN, server etc. To mitigate the risks associated with IT implementation involves organizational structure with well defined roles with responsibility for information, business processes, applications, infrastructure etc.

A problem that frequently occurs in organizations is that of IT's plenty to be driving force of economic prosperity that helps growth and

employment, and that creates new value. Administration of such companies often look only global strategy companies are not going too much into "details" such as information technology and information systems in the enterprise. Management simply does not introduce too much in IT for several reasons:

- IT requires a lot of technical and specific knowledge which color management and hesitate
- IT is often seen and treated separately from business processes
- IT is very complex, even for IT staff

## 2 Municipality and eMunicipality at B&H

Unlike the government, which is characteristic for hierarchical relationships, subordination of the lower organs of higher and centralization of activities, the primary features of the local government autonomy and independence, decentralization and democratization. Behind the actions of state authorities always have, at least potentially, the use of force, and after local authorities have volunteerism. Organization management creates the opposite direction from the citizens themselves. Her organs permit from citizens in direct elections, rather than the state. For the administration of the characteristic performance of the power conferred on the binding mode, while the local government is based primarily on voluntary regulation and exercise of local needs and local businesses that have a public significance. And when the local government authorities carry out certain tasks which are transferred to their jurisdiction, authority and supervised by state authorities - and then they act autonomously, with the possibility that the mode of execution of the power adopt its concrete conditions.

Local government is the type of decentralization in which its bodies are appointed by higher authority, but, in general, directly elected by the citizens of a particular locality. It represents the successful combination of power decentralization and democratization of social relations, in which the large number of public affairs for the citizens of the respective localities.

Local government is the right of citizens to directly and through democratically elected representatives participate in the realization of common interests of the local community, and the right and ability of local governments to regulate and manage, within the limits of the law, public affairs that are under their jurisdiction, in the interest of the local population. Concerning the criteria of citizen participation in local government, are its two forms: direct participation of citizens in the management of the local community (direct

local government), indirect participation of citizens in performing activities of local governments, through their elected representatives (indirect local government). According to data from the Identification Documents and Data Exchange Agency (IDDEEA) in BiH registered 131 municipalities [3].

### E-Municipality – G2C services in the municipalities

G2C (Government to Citizen) - the act of government (public administration) and citizens. In this, the most typical relations it performs its basic role of "public service". It covers everything from issuing identity cards to citizens' participation in decision-making in the field of public policy (e.g. in the process of adapting regulations in the field of urban planning and environmental protection). What distinguishes e-Government from the "ordinary government" in this regard is the fact that citizen can access information and receive services quickly, using a wide range of mechanisms, any time and anywhere. The increasing spread of the Internet as the communication media and its accessibility has led to public administration in a position to exploit its capabilities and improve its relationship with citizens, its services more accessible and transparent, and the administration response to requests from citizens to make faster. New technologies based on Internet allows:

- the user to easily access public administration and get the service required;
- a service that is available to everyone 24 hours a day, and disabled persons who are not able to easily change the location;
- Public Administration to find out what people think about its services and on the basis that they document;
- Single touch point - access to all necessary information from any place and at any time [4]

It is necessary to establish and maintain communication channels with citizens, through which collected information about their needs and desires. Priority implementation of the new e-services need to be adopted to these needs. In this way, and citizens are involved in decision-making process of the orientations of e-Administration. Citizens need to inform you about new e-services across various media. e-Administration will achieve its purpose only if citizens are actually using e-services, a lot can be achieved even with the correct implementation of the portal e-government on which way to systematically put new e-services and encourages their use. In a G2C and C2G services needed specifically include the identification of citizens through the introduction of electronic, so called electronic identity cards or "smart" electronic cards to protect privacy and data security. C2G and

G2C services need to enable citizens to the Internet performs all tasks related to paying taxes, taking personal documents declarations birth and death, scheduling weddings, etc. and the availability of various service information and participation in democratic processes. G2C and C2G services must be available to citizens 24 hours a day [4].

Plans for the development of e-administration to the priority should have the following 12 services for citizens as defined by the European Union [5]:

1. Sales Tax (tax returns, notice of assessment)
2. Services seeking employment with the Department of Employment,
3. Social Insurance
4. Personal documents (passport, identity card and driving license)
5. Car registration (new, used and imported)
6. Obtaining a building permit,
7. Police reporting (eg. in case of theft)
8. Public libraries (availability of catalog and search tools publications)
9. Birth certificates (birth, marriage, death)
10. Sign in competition for higher education faculties,
11. Notice of moving (change of address)
12. Services related to health (interactive advice regarding the availability of services in different hospitals; scheduling examinations at hospitals).

### 3 Maturity models

The European Commission is to monitor development indicators of information society in EU member states adopted a standard list of indicators. These indicators provide insight into development, and provide a basis for planning priorities and making recommendations. In October 2004, the research was carried out, which was published in March 2005, and included all 25 EU member states: Iceland, Norway and Switzerland. Measured by the degree of availability of 20 public services that are identified as basic. Services are divided into 12 by which the target groups of citizens: taxes on income, job search, social security, personal documents, car registration, building permits, reporting to the police, public libraries, birth certificates and marriage certificate, secondary school enrollment, change of residence and services related to health care and eight (8) more services in which the economy is the target group contributions for employees, taxes on corporate income, VAT, company registration, submission of statistical data services, customs declarations, permits related to environmental protection and public procurement. For the degree of accessibility were used two different criteria - On-line access to public services (availability of public services online), which set the e-Europe

2002 action plan and complete on-line access (full online availability), which introduced an action plan for e- Europe 2005th. When it comes to "simple" On-line availability of services, made the difference between 4 levels:

- The available information necessary for starting the procedure;
- One-way interaction - ability to download the document in non-electronic, paper form;
- Two-way interaction - starting with the official procedures of the electronic document;
- Full electronic processing of cases.

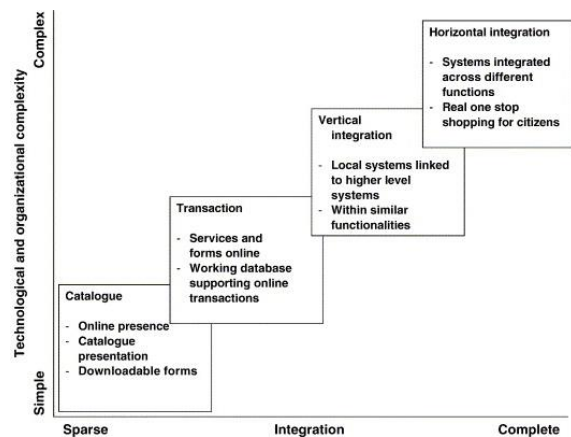


Figure 1: Layne and Lee Model [6]

In many publications on the topic of E-Government-a [7], often to explain the development of e-Government's model takes the following Baum and Di Maio [8], better known as "the Gartner model".

### 4 The research

The research problem which, the authors deal with, is aimed at e-Municipality and services provided to citizens, particularly the safety of web service through which they offer their services. The subject of research concerning the safety and e-Services (G2C services). The object of research by local communities in BiH - Municipality. The purpose and objective of the research is to show at what level of maturity are web portals of municipalities, and the willingness of municipalities to eCommunication (e-Rediness). The study was based on several items:

- Testing e-Readiness municipalities to communicate
- Testing the level of service (e-Maturity) offered through a web service
- Testing of technologies that are the basis for the implementation of web portals
- Testing safety for on-line system

The sample, on which the research was done, is 71 of the total number of 131 municipalities, representing 54%. The study was conducted of the public part of the community information system (web portal), through surveys and e-mail.

### Analysis of the community's readiness to communicate with citizens

This study is an attempt to reach a conclusion whether the local community is ready to electronic communication with citizens, and what is the general index of readiness for this type of communication (communicating via e-mail). For this purpose, select a sample of 71/131, which makes up 54% of the total number of municipalities, and is the official e-mail address of the municipality (addresses that could be found on the official web portal) sent e-mail the following contents:

Greatly respected,

I am pleased to see that on your web site there are services for our citizens who are unable to come to the counter for the exercise of our civic condition.

I am specifically interested in obligations for the procedure about obtaining zoning approval to build a smaller facility for the purpose of opening the "fast food" shop. If you could send me information by email I would be grateful.

With respect!

Of 71 municipalities, 13 e-mail addresses that were on official web sites were non-existent (mail server returned mail), 32 municipalities were not responded to the mail within 15 days, and 26 municipalities gave a concrete answer in a relatively rapid time (2-3 days).

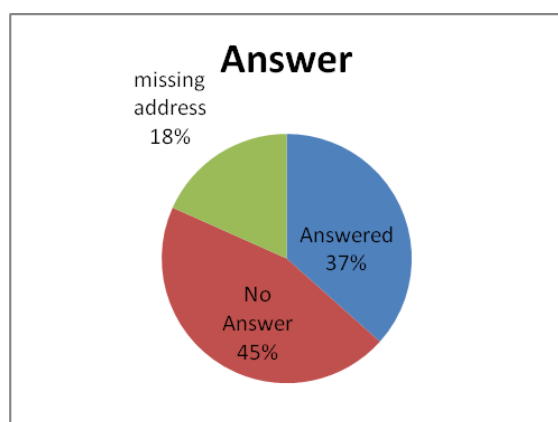


Figure 2: Answered e-mail

Fig. 2 shows the number of graphs with indicators - only 37% of municipalities have responded to an e-

mail with a request and is ready for one such means of communication.

### Web site analysis

Analysis of the municipalities via a web page (web site) was done for several reasons. The primary objective was to demonstrate the following:

- Whether all municipalities have a web site?
- If there is, whether the site is indexed and how is indexed within the search engines?
- Does the site there is the possibility of contact with the Municipalities and in what way (e-mail/e-form)?
- Which domain is the community web page (top level domains, subdomains, etc.)?
- Which technology has made web page (web portal)?
- What is the safety factor of the web portal?
- Is the e-mail domain is registered to a municipality or "third pary servers"?
- At what level are services (web services) municipalities – e-Maturity model community?

### Whether municipality own a Web site

This research was conducted by the list of web address that was found on <http://www.iddeea.gov.ba>; official list of all municipalities in BiH – there are 131, and via search engines (Google, Yahoo or Bingo) tried to find whether any of the municipalities has a registered domain name, and whether there is a web site on that domain. The study was conducted for all 131 municipalities. Key words that were used were: općina, opcina, opština, opstina, local community, and the name of each municipality. Total number of municipalities is 131: 99 municipalities has a web site (portal), 23 of them doesn't have a web site, while nine (9) has a reserved domain, but not designed web page, Fig. 3.

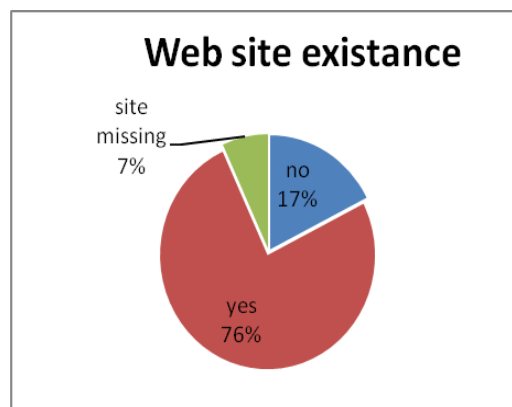


Figure 3: Web presentation of municipalities

### Is there any possibility of eContact on the web site

Figure 4 presents the analysis of opportunities contact the municipality some of the ways:

- Through e-mail
- Using Web e-Forms
- Through e-mail and e-form

According to the data, 13 municipalities have the possibility of contact through e-mail addresses and through on-line e-forms, 43 municipalities have the possibility of contact through e-mail, 21 municipalities have the possibility of contact via online form (e-form), while as many as 22 municipalities (22/99) do not have the possibility of contact with officers in the municipality.

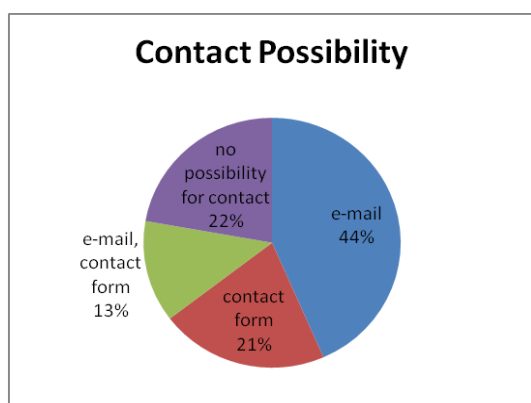


Figure 4: Possibility for contact through web

### Municipality Web site domain

Next the authors interested in the domain where the registered web site of the Municipality. We wanted to know whether the site is registered to a so-called. "Top-level" public domain, or perhaps subdomains. State is as follows:

- 43 municipalities were registered in the national top domain. Ba
- 14 municipalities were registered to. Org domains
- 13 municipalities were registered. Com domains (???)
- 9 municipalities were registered to. Rs.ba subdomains
- 7 municipalities were registered in. Net domains
- The municipality has been registered. Info domains
- 3 municipalities were registered to. Com.ba subdomains
- 3 municipalities were registered. Gov.ba subdomains
- 1 municipalities were registered rs.net subdomains, a municipality has been registered on. Rs domain (domain of another state) (???)

Fig. 5 shows the structure of registered domains in relation to the total number.

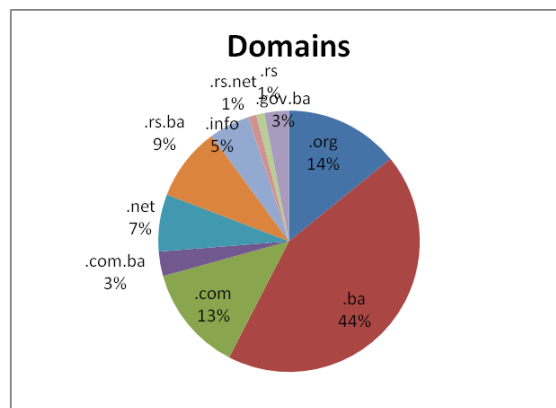


Figure 5: Domain that is Web site registered

### Technology that is basis for Web site

The next thing that was important in terms of accessibility, quality and safety of services offered to citizens via the web portal is a technology that is based web portal. Today, the world's most popular system of "Open-source" CMS (Content Management Systems) - content management system, and such a situation in BiH, however, here arises the problem of safety because they are all in the open-source systems are vulnerable, and essential daily viewing and patching „security vulnerabilities“.

In Fig. 6 we see the technology, according to which are web portals carried out. Evidently, the most used "global popular" Joomla CMS "with as many as 41% of the total participation.

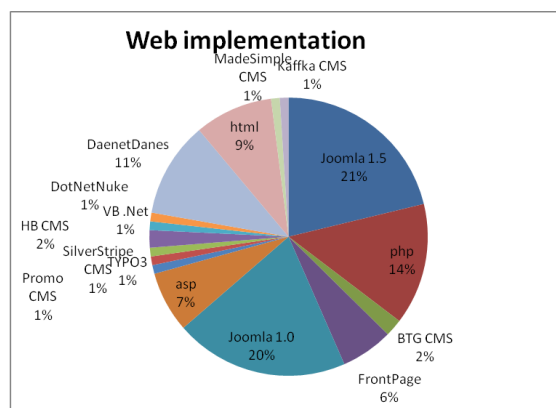


Figure 6: Web Site Implementation Technology

The second part of the research was based on the checking of the CMS is used, and based on that finding a "hole" that is the same vulnerability in the official portals author CMS. Method of checking was legal, without any "penetration" tests and was based on a review of the original sites ("view page source") through the browser Internet

Explorer / Firefox. Even 72% of the web portal (71/99) had a "default" configuration, which includes basic settings of the portal that arises during the initial configuration. 28% of the portal has been configured so that it can be said that they were safe. It should be noted that the "default" configuration of friendly Web 2.0 application and „un-patched“ systems are the biggest security problems for every information system [9]. The results of the research is shown on Fig. 7

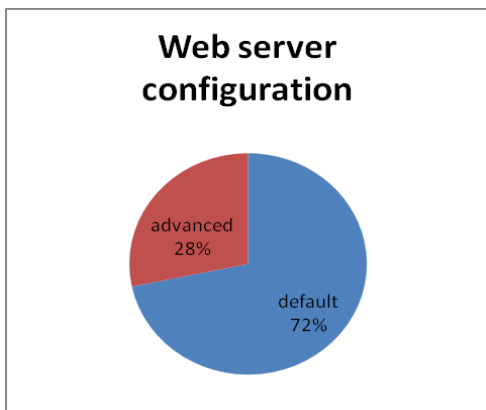


Figure 7: Web Site Security

**Is the e-mail registered to a registered municipality domain or "third party" domain**

This study tries to show how "seriously" the local community understood aspect of electronic communication with citizens, and that you are all aware of the essentials of communication. The results were as follow:

- 21 municipalities (46%) have e-mail address registered on a regular state. Com domain
- 15% have e-mail address. Org or. Com domain
- The municipality has a registered e-mail address in a domain other states (RS)???

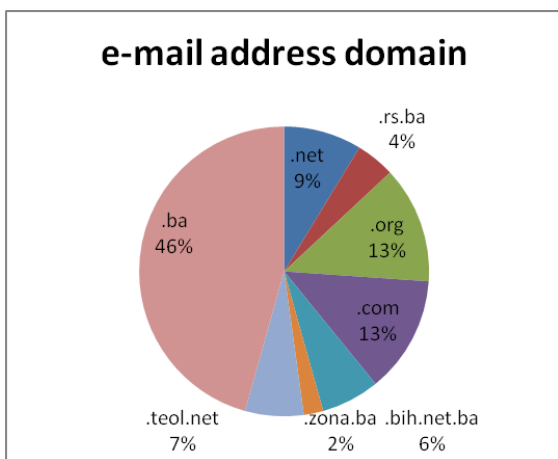


Figure 8: E-mail address domains

**The structure of the personnel employed in the ICT sector?**

Viewed on the structure of employees in the ICT sector in the municipalities, 62% of employees in the ICT sector has a high degree-VSS, 29% had a secondary school education-secondary education, 0% having a higher degree-school education, while even 9% of municipalities does not have a employee in the ICT sector. The results are presented graphically in Fig. 9.

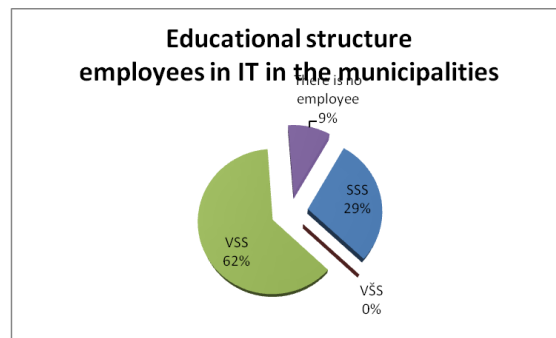


Figure 9: Educational structure employees in IT

Occupations of employees with university degree in ICT are:

- Informatics 16
- Elektrotechnics 1
- Economics 3
- Others 1

By percentage, it might appear as in Fig.10. Even 76% of highly educated are from the IT industry, 14% of the Economic industry, 5% from the Electrical and 5% from other sectors.

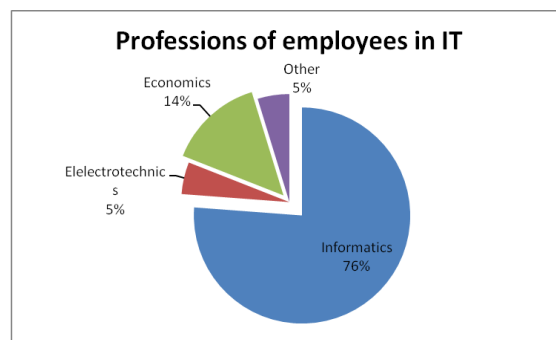


Figure 101: Professions of employees in IT

**At what level are services (web services) of municipalities - municipalities eMaturity model**

This study was the most complicated and require much effort and time. As we have previously stated, we analyzed the 131 local

governments. In the process of collecting data, which were relevant to set up research, we encountered many difficulties, but also interesting facts. Our goal was to get a complete picture (for this reason, we analyzed all municipalities in BiH) management of the ICT sector, but the front-end segment. This segment is of particular interest. As such, it participates in close communication with the user part of the services that has thought out and organized back-end background (ICT management). It is interesting that we can point out the fact that several web portals exist under the domain name .com, or the domain of another country .rs. We also have several portals that were created as a static presentation of figures, and along with it yet and literally mapped (portals were created under The European Commission, and, though financially supported, it is inaccessible and does not provide any information in the recent times, they are not updated since the time of activation in a public web space). Portals with this structure have such an ICT management, since none of these portals is provided giving feedback to the previously described e-mail request. In the sphere of problems include web presentations municipalities that have been infected by viruses and worms, which, possibly a protected computer, preventing access. While unprotected computers when connecting to these portals „infection“ and is used for transporting these „trojans and worms“, which directly affect the already shaken ICT structure, in general terms, at the state level.

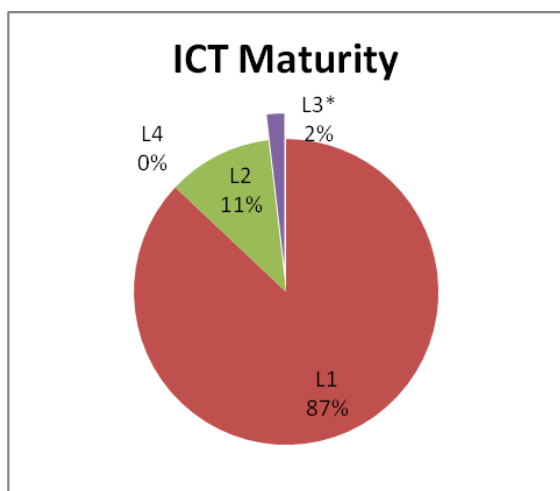


Figure 11: e-Maturity model

## 5 Conclusion and recommendation

Management of any organization, or companies and even government must ensure that management knows what information / data are available, and the role that information plays in their organization

and needs to know what kind of IT support there. A problem that frequently occurs in organizations is that of IT's plenty to be driving force of economic prosperity that helps growth and employment, and that creates new value. Administration of such companies often look only global company strategy without going too much into "details" such as information technology and information systems in the enterprise. Management simply does not introduce too much in IT due to the nature and complexity of operations and thinking that the IT is a "black box". The results show that the authors carried out, the situation is not much different even in the municipalities - the local level in Bosnia and Herzegovina. The results showed that IT is "left to himself," there is no general and systematic approach and investment in IT and that IT employees in the municipalities of "ad hoc" work on the computerization and introduction of new services for citizens. It is a common occurrence that they are not competent for such duties, and therefore things happen such as the appearance of malicious software on the web site which greatly endangers the safety of the users themselves who visit the site. It should be noted that this study covered only the outer part of the IS (Internet), and the situation would be probably much worse when it conducts research and analysis of the whole of the IS (internal audit). Here the general solution could be a revision of the entire information system through COBIT, ITIL or possibly ISO 17799th. In this way, would be defined by metrics followed the maturity of information systems (Warner Maturity Model). COBIT would be given the opportunity to optimize the management of information resources such as applications, information, infrastructure and people, and to give an answer too many open questions.

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