STEPS TO BE FOLLOWED FOR EGOVERNMENT IMPLEMENTATION

BOGDAN CALIN VELICU, MARIA-CRISTIANA MUNTHIU, MIHAELA TUTA, IULIA-ADINA ZARA
ACADEMY OF ECONOMIC STUDIES, Bucharest, bogdan.velicu@gmail.com

Abstract:
eGovernment, or computerization of administration in order to improve access to public services, for the benefit of citizens, institutions and last but not least for the benefit of the administration employees, represents a field able to propel our country closer to the desideratum of being part of the European Information Society. In this context, a quantitative research was conducted and following this research, the replies of 342 employees from four public institutions were corroborated. The results revealed that despite the satisfactory degree of technical equipment, official communication is traditionally performed in a physical format. The main scope of the software used by employees is editing different documents. Public sector institutions still have difficulties in considering that organizing training sessions in the field of information and communication technologies is highly important, since only 25% of the employees participated to specific training sessions over the last 2 years.

Key words: *eGovernment, public employees, information and communication technologies, competence and knowledge*

JEL classification: H5, M1, M38, M53

Introduction

At the same time with the rapid development of information technology, the use of information systems for the performance improvement of employees is in a continuous evolution. The organizations introduce new computerized technologies and develop their own information systems necessary for a more efficient management. The eGovernment (eGov) concept is referring to the use of information and communication technologies (ICT) by the public sector administration in order to provide citizens and organizations convenient access to services. The main goal is to build a ubiquitous public sector administration ready to serve at any moment. Entering into force, some new and innovative policies must achieve consensus among most part of personnel within the organization. Therefore, employees' performance is found in a reciprocity relation with the result of eGov implementation. The factors influencing the employees' performance within the context of using IT systems, consequently become an important subject in the process of eGov adoption.

Over the last few years, the interoperability of electronic systems developed by the public sector administrative institutions caused a major interest for research aiming at the continuous exchange of information between governmental departments. The specific architecture may be defined as the representation of a set of standards and guidelines necessary to adopt a universal language ensuring a coherent flux of information between systems (UNDP, 2007). Still, a common technical standard represents only the first step in implementing the interoperability (Guijarro, 2007). Challenges and obstacles, generally bureaucratic, met by governments include (1) significant differences at the responsibility level of each institution; (2) ensuring conformity and entering into force of adopted standards; (3) development abilities; (4) use of proper indicators for result measurement (UNDP, 2007). In fact, the more

complex the bureaucracy, the more difficult the implementation will be. A lot of institutions developed a behavior in avoiding openness and cooperation. Furthermore, approval of architecture offers no guarantee of observance, implementation or extension.

An efficient eGov aims at improving citizens' access to public sector services, a superior Government communication and, at the same time, the diminution of document volume (Hans, 2005). In order to achieve these objectives, eGov needs interoperability mechanisms which will allow different institutions to offer online access to services they provide and to participate in orchestrated processes involving services provided by several agencies (John, 2004). At present, eGov interoperability was emphasized in the context of strategies covering the following dimensions: business process, semantics and technique (Saekow, 2009).

Theory and hypotheses

At European level, in 2010 Romania occupied the last place (8%, as the EU average is 41%) in accordance with the survey performed by Eurostat as referring to the population of over 16 which interacted with the public sector administration by means of internet. The survey aimed at using at least one of the following services: obtaining services by means of the institution portal, downloading official forms or sending filled in forms. A defining component of the administrative computerization process is represented by the extent in which the institution succeeded in developing an electronic interaction both at interdepartmental level and at the level of private persons or other organizations claims.

eGov interoperability has as main obstacles technical, semantic and behavior limitations. The technical ones refer to a great variety of obsolete systems, systems which have been already installed and function at the level of the involved institutions (Benamou, 2006). Semantic obstacles refer to the differences between informational standards used within institutions. Understanding the semantics of every service represents a challenge in itself. The identified boundaries on the way to interoperability also include aspects such as trust, synchronization collaboration between agencies, level of education of the employees, technical support and financing (Archmann, 2003).

Together with factors such as financial resources, organizational conditions, leadership or communication infrastructure, the reserve of highly educated human resource demonstrating good learning abilities are also an essential factor for eGov (Italian Ministry for Innovation and Technology). This aspect is the foundation of a general accepted opinion, according to which employees represent a key chapter which will make all the difference between the success and failure of an informatics application (Schelin, 2004). In fact, the research made by the World Bank in the field of eGov projects emphasized the fact that successful projects allocated at least 10% of the available budget for the training of the employees (World Bank, 2004).

The hypotheses were defined as follows:

H_1: The activity of the public sector employees is exclusively developed by means of computerization;

H_2: Use of computerized programs are generally limited to drafting documents, documents which are sent by traditional means in a physical format;

H_3: Institutions offer internet access but such service is not used for the activity development;

H_4: Employees consider that accumulating competences and knowledge in the ICT field is useful but they failed to benefit from specific training sessions over the last few years;

H_5: Employees are aware of the necessity of accumulating competences and knowledge in the ICT field and they are generally willing to participate in training sessions organized outside the working hours.

Research Design and Methodology

A quantitative analysis was performed in December 2011, in order to test the hypotheses advanced for this study. A questionnaire was drafted in order to gather the necessary information. Questions were attributed to every relevant aspect. 342 valid questionnaires were corroborated from as many public sector employees, working in the following institutions:

- 3rd district City Hall, Bucharest – 153;
- Pension House Bucharest – 78;
- Managing Authority for Operational Programme for Fisheries – 84;
- Agency of State Domains – 27.

Results

The personnel is distributed in almost equal proportions in age groups between 31 – 45 and the age groups of over 45 cumulated (42,11%, respectively 42,98%). The personnel included in the age group of between 18 – 30 represents a percentage smaller than 15% of the total.

45% of the interviewed subjects declared that they acquired an accumulated professional experience in the public sector activity of between 3 and 10 years. This group of subjects is followed by the one having a professional experience of 11-20 years in a percentage of 29%, fact which reflects a tendency of the employees towards a career in the public sector activity. As those having over 10 years of professional experience represent over 50%, one can appreciate that, on one hand the tendency of the employees to keep working in the field of public service which is considered stable and on the other hand, the tendency of the administration to make the personnel permanent the moment they acquired a significant experience. As it was expected, taking into consideration the public policies implemented with regards to diminution of personnel in the public sector field, following the difficult economic period that Romania is experiencing at present, the percentage of those entering the system in less than three years has the most reduced value. Also interesting is the fact that in the public sector institutions where the research was made the female personnel was preponderant.

Table no. 1 - Demographic profile

Measure	Item	Frequency	Percentage
Gender	Male	111	32,46%
	Female	231	67,54%
Age	18-30	12	3,51%
	31-45	51	14,91%
	46-60	144	42,11%
	>60	135	39,47%
Education	High School	27	7,89%
	Vocational School	12	3,51%
	University	189	55,26%
	Postgaduate	114	33,33%
Years of public service	<3	18	5,26%
	3-10	153	44,74%
	11-20	99	28,95%
	21-30	45	13,16%
	>30	27	7,89%

The interviewed subjects were asked ***to estimate the use weight of computerization (working hours spent in front of a computer) as percentage from the total of working hours per year***, the answers showed that more than a half (55,26%) spend over 67% of the time spent at work in front of a computer. Also, it is significant to mention the level ***of the computerization use percentage exclusively for job description activities,*** which was estimated as very high (31,58%), high (34,21%), and respectively average (32,46%) by an approximately equal number of subjects which cumulatively represent approximately 99% of the total of the questioned subjects.

From the point of view of the equipment with internet access, the answer to the question referring to ***the existence of internet access at the employment location*** is positive in an overwhelming proportion (97,37%), as compared to the subjects that do not benefit from this facility (2,63%).

As referring to the ***software***, the analysis revealed the fact that the most used software's are the *Office* type ones (42,13%) and on the second place is the *internet* (25,20%). Significant percentage were also observed for applications like *email client dedicated application* (13,39%) and *special software for online petition/request settlement* (11,02%). Other applications are strictly linked to the internal management of the institutions and therefore the weight of answers for those is situated at minimum level.

Table no. 2 - Software used in current activities

Software	Percentage
Office (Word, Excel, Power Point, Access)	42,13%
Email Client (specialized software for electronic mail)	13,39%
Integrated control software for the activities developed within institutions (Enterprise Resource Planning)	3,15%
Special software for: accountancy, human resources, wage system, etc.	3,54%
Internet	25,20%
Special software for online petition/request settlement	11,02%
Other	1,57%

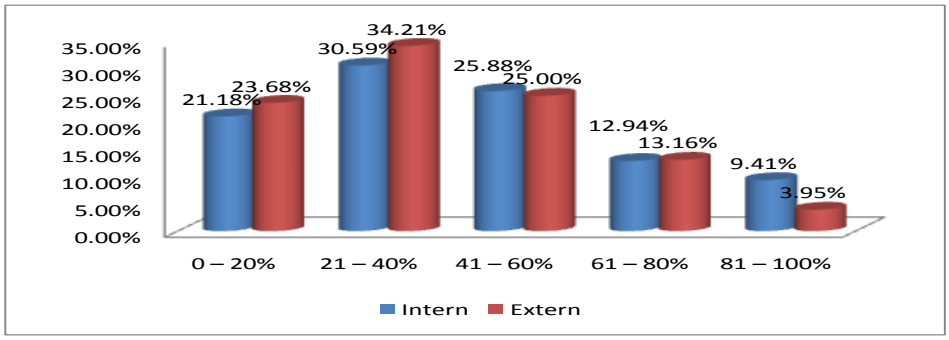
We can formulate conclusions for the first three hypotheses namely that each one is partially verified up to present. In this respect the assertions according to which *public sector employees use almost exclusively computerization* in their activity is mostly true (H_1), *use of informatics programs generally limited to drafting documents* (H_2) aspect which was revealed by the preponderance of office type applications usage, and *access to the Internet is directly ensured for almost all public sector employees (97,37%)* (H_3).

In order to determine the usage level of informatics and electronic communication technologies of the investigated structures, two directions were followed. One aimed at the manner of completion of ***internal communication*** within institutions, ***respectively if this is achieved by traditional systems (on paper) or electronically.*** Results showed that despite of existence of corresponding computerized equipment for official communication, traditional methods are preferred (57,29%) within institutions, as compared to 42,71% using electronic means. Those using electronic systems were asked to estimate the usage percentage. We can estimate that the usage degree for the electronic means is rather low.

A similar situation with regards to the configuration of results is found when referring to ***official communication with other institutions, persons or petitioners, etc***. From this point of view the situation is more unfavorable, as the percentages are even more inclining towards the traditional version (60%). Taking into account that the appreciation of the usage level considers only the percentage of 40%, when referring to the communications by means of electronic systems and the values for the first three positions described in the figure below, one can assert that the hypothesis H_2 is entirely

verified taking into consideration the fact that *the great majority of information circulates both within institutions and also in the exterior, preponderantly by traditional means or doubled by these systems.*

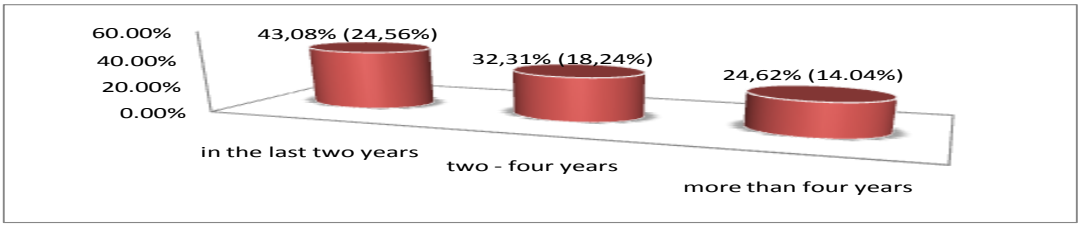
Figure no. 1 – % of use of inter-departmental and external communication by electronic means



The majority of employees (60,53%) declared that ***they were required to have knowledge in the ICT field at the moment of their employment***. It is not known however if this aspect was a criteria itself, or if the institution organized tests in order to verify the knowledge of future employees or it was just a differentiating criteria or a condition that needed to be proven on documents attesting a certain level of education.

Next, we wanted to determine ***whether the questioned subjects benefited from training sessions in the ICT field organized by the institutions that employed them***, and the answers reveled the fact that 57,02% of the interviewed subjects participated in training sessions in this field. For those participating in such training sessions two supplementary questions were asked one of these referring to the ***period in which these training sessions took place***, situation described in figure no. 2, where the figures between brackets reflect the percentage of the total number of questioned subjects as compared to the percentage of those who answered favorably:

Figure no. 2 – Period in which employees participated in training sessions

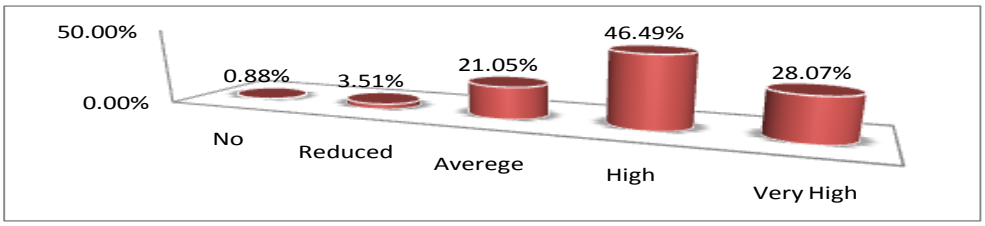


The second assertion of the analyzed question is referring to ***the type of program subject to the training session***. Given answers clearly reveal the predominance of the *office* type applications as compared to any other types of software:

Table no. 3 – Subject of training sessions	Type of program		
	Office	Web design	Other
% of the total YES answers	61,54%	3,08%	6,15%
% of the total of questioned subjects	35,09%	1,75%	3,51%

In order to thoroughly study the data referring to this objective, the questionnaire was composed of questions regarding the opinion on the perspective of training in the ICT field. Thus, the questioned subjects were asked to assess ***the extent to which the continuous training in this field is useful and necessary.*** The results arranged on a scale of five levels were preponderantly favorable.

Figure no. 3 – Necessity of continuous training in the ICT field



At the same time ***the high availability to participate in training sessions organized outside the working hours*** is to be remarked, as 61,40% of the questioned subjects were open to this opportunity. Once again, the questioned subjects that answered favorably were asked to specify the type of application that they considered useful during these presumptive training sessions and 44% offered answers that were included in the following table:

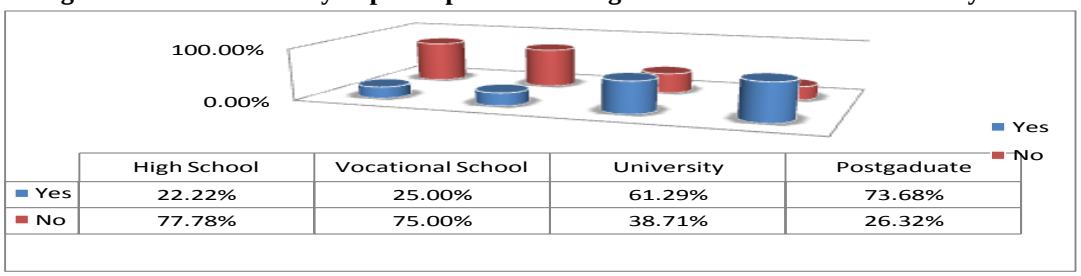
Table no. 4 – Types of software considered useful for the future

Type	Percentage
Programming	6 %
Office	49 %
Email Client	12 %
Web design	6 %
Accountancy	9 %
Assisted design	6 %
Information security	3 %
Petition settlement	9 %

We have to mention that the percentages from the table were calculated referring strictly to those who specified the types of applications they are interested in, more exactly 44% of the 61,40% open to a future training session in this field, respectively 27% of the total questioned subjects. This time also, one can observe that half of the answers have as an option *office* type applications which demonstrates a favorable perception in the perspective of the predominance of this type of application aimed at preparing and drafting documents of different types or data base administration.

Next we considered of interest to analyze the manner in which the answers of the employees were distributed with regards to the availability to participate to training sessions depending on their level of education. The results show the fact that the inclination towards accumulation of new competences and knowledge in the field of ICT decreases at the same time as the graduated level of education.

Figure no. 4 – Availability to participate in training sessions in relation to the study level



The H_4 hypothesis is confirmed in accordance with given answers with regards to *the usefulness of knowledge in ICT field.* On the other hand, *one cannot state that questioned subjects benefited by training sessions in the last two years*, but it can be observed that although the availability of subjects to participate in such training sessions is above the average, in the last two years only a quarter of the total of employees were

involved in training sessions in this field, which represents a very low percentage as opposed to the necessity.

Also, it can be asserted that H_5 hypothesis with regards to *the awareness of the necessity to accumulate knowledge and competences in the ICT field with regards to the employees as well as the existence of the availability to participate to training sessions after working hours*, is also verified.

Conclusions

The aim of the research was to determine the level of important factors in the context of computerization of public sector administration and implicitly of eGov adoption. Research was made on the level of computerized equipment of institutions, the software used by employees in performing their daily activity, the official communication methods, the employees' level of training, interest to personal development and accumulation of knowledge and competences.

This research aimed at no detailed analysis to exactly establish whether used hardware and software is updated or if the versions still used are obsolete, but 99% of the questioned persons use computers in daily activity on an average level at least, fact which allows us to claim that, from the point of view of computer equipment and internet access, the institutions have the capacity to implement eGov specific activities.

The degree of official communication using electronic means is low, the majority of answers to questions are found on reduced percentage area. The degree of external communication is far below the level of requirements of a computerized society to which Romania aspires. The great majority of information circulates both in the interior of institutions but also in relation with the exterior preponderantly by means of traditional systems or doubled by such systems.

Although figures reflect a constant growth of interest of institutions to train employees in ICT field, the percentage of employees involved in this sort of programs (25% in the last two years), attests a poor or inadequate training and emphasized the fact that this type of training is no essential criterion in the public sector activity just yet. The percentage of those who were required to have ICT knowledge at the moment of their employment is rather low, especially as compared to the fact that all employees use information techniques in performing their daily activity. At the same time, not all those who were required to have IT knowledge at the moment of their employment were included in the percentage of those who participated in training sessions organized by the employer, which leads to the conclusion that some of them acquired the necessary knowledge on their own or on their own expense on different types of training in order to meet the job description requirements.

Employees stated in a majority proportion that they use office applications in the development of their activity. At the same time, in case of training programs, they consider that it is necessary to accumulate additional knowledge and competences with regards to office applications. Taking into consideration the specificity of these applications, the use of IT is generally reduced at present to editing documents.

Awareness of the current level of knowledge as well as the direction of evolution of daily activity performance, determined the personnel employed in public sector institutions to consider the need for training in ICT as highly important (an average of 3,97).

The analysis of the availability to participate in training programs correlated with the study level, emphasized that public sector employees having minimum studies are the least open to participate in training programs which could represent a significant opportunity for development.

The objective of this study was to determine the degree of equipment and use of ICT in exercising attributions specific to public sector services, as well as the level of

training and preference of employees to acquire new knowledge and competences in this field. These conclusions may be used by interested governmental structures to facilitate the development of some components which may have an effect on the efficiency of the public sector services. Information determined on the course of these measures may be used to understand the behavior of people engaged in the public sector activity. The analysis of responses afferent to each criterion leads to accurately emphasize the intervention areas.

Limitations

Before drawing final conclusions following these results, it is important to specify the limitations of this study. Although quantitative, the survey method is not a subjectivity free method and intercepted opinions in a certain moment. Under the influences of the environment factors, the responses could be different in time.

The utilized information was corroborated on the basis of 342 observations provided by employees operating in four public sector institutions. Although one can state that these results are representative for these institutions, an association to the entire public sector can be achieved only by extrapolation, but the statistic representation cannot be met.

Possible differences between the aggregate results for each public institution cannot be emphasized since the total number of the respondents afferent to each institution differs significantly.

Additional Suggestions for Further Research

The research had as a target the public sector employees, thus only the observations of the services providers were taken into consideration. A future analysis could corroborate determined aspects with those extracted from the beneficiaries of public services.

Acknowledgments

This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/107/1.5/S/77213 „Ph.D. for a career in interdisciplinary economic research at the European standards"

BIBLIOGRAPHY

1. Archmann, S., Kudlacek, I. 2003. *Interoperability and the exchange of good practice cases Recommendations*, European Institute of Public Administration.
2. Benamou, N. 2006. *The TERREGOV Toolset for Embedding Interoperability into Regional Infrastructures*, [online] available from: http://www.terregov.eupm.net/my_spip/images/Terregov-toolset.pdf
3. Cătoiu, I. et al., 1999. Metode şi tehnici utilizate în cercetările de marketing. Bucuresti: Uranus.
4. Cătoiu, I. et al., 2009. Cercetări de marketing – Tratat, Bucuresti: Uranus
5. Government of Italy Ministry for Innovation and Technologies, and United Nations Department of Economic and Social Affairs, 2002, Plan of Action for e-Government Development
6. Griffin, J., Schuppan, T., 2010. E-Government competencies: looking beyond technology. *WSIS Forum 2010, E-Government Expert Group Meeting*. 14.05.2010. The Potsdam eGovernment Competence Center

7. Guijarro L. 2007. *Interoperability Frameworks and Enterprise Architectures in e-Government Initiatives in Europe and the United States*, Government Information Quarterly, Vol. 24, no.1, pp.89-101.
8. Hacking, I., 1983. Representing and Intervening. Cambridge: Cambridge University Press
9. Hans, J.S. 2005. *Interoperability in e-Government: More than Just Smart Middleware*, System Sciences, HICSS apos:05, Proceedings of the 38th Annual Hawaii International Conference on Volume, Issue, Page(s): 123-123, IEEE volume.
10. Heeks, R. 2006. Implementing and Managing eGovernment. London: Sage Publications.
11. Ho, A. 2002. *Reinventing Local Government and the E-Government Initiative*, Public Administration Review, Vol.62, pp. 434-444
12. John B., 2004 *International Technical Standards for e-Government*, Electronic Journal of e-Government, Volume 2, pp.75-80.
13. Organization for Economic Cooperation and Development, 2003. The e-Government Imperative, OECD e-Government Studies, ISBN 92-64-10117-9
14. Saekow A. and Boonmee C. (2009) *Towards a Practical Approach for Electronic Government Interoperability Framework (e-GIF)*, Proceedings of the 42nd Annual Hawaii International Conference on IEEE volume.
15. Schelin, S.H., 2004. Training for Digital Government, Digital Government: Principles and Best Practices, Alexei Pavlichev and G. David Garson (Eds.), *Idea Group Publishing*, pp. 263-275
16. United Nations Development Programme (UNDP), 2007, e-Government Interoperability: A Review of Government Interoperability Frameworks in Selected Countries, [Online], Available: http://www.apdip.net/ projects/gif.
17. United Nation E-Government Survey, 2010. [online] available from: <http://www.unpan.org/ egovkb/global_reports/08report.htm> [Accessed 23 november 2011]
18. World Bank, 2004. Building Blocks of e-Governments: Lessons from Developing Countries, *Development Economics Vice Presidency and Poverty Reduction and Economic Management Network* (PREM Notes for Public Sector), No. 91
19. World Bank, 2002. The e-government handbook for developing countries. [online] Available from: <http://www.cdt.org/egov/handbook/2002-11-14 egovhandbook.pdf> [Accessed 21 november 2011]