Statistical Assumption as a Basis for Implementing e-Government Services in Romania

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Abstract: - The study set sights on Romanian public administrations which have implemented an e-Government service, and were collected in 2012 year. In the virtue of the questionnaire we achieved the results and we were able to formulate and validate research hypothesis. The instruments used for collecting data is a quantitative questionnaire. The research based on the quantitative questionnaire was structured on 55 questions focused on hardware and software (5 questions), implementation of the Enterprise Resource Planning (ERP) business software for five business function such as manufacturing, SCM, financial, HRM and CRM (16 questions), other 12 questions were dedicated to Geographic Information Systems (GIS) implementation, other 10 to Quality Management Systems (QMS) and the last 12 questions were dedicated to connections between ERP, GIS and QMS.

Key-Words: - E-Government, Public Administration, Information Systems, Quality Management Systems, Hypothesis Testing, Management Decision

1 Introduction

Theoretical Framework of e-Government

1.1 History of e-Government.

The term electronic government was first used in September 1993 in the United States in the National Performance Review (NPR) [6]. An interagency task force created on March 3, 1993, to reform and streamline the U.S. Federal Government, the aim of the NPR in the United States in Clinton-Gore administration was to create a government that "works better, costs less."

Today's local government organizations are turning to on-line service in order to improve access and reduce costs. Web-based services can make interactions with public agencies smoother, easier, and more efficient. Web-based applications provide the opportunity to allow government services to be organized in a way that fit the needs of citizens and eliminates "dead moments" in bureaucratic processes.

Moving services on-line can eliminate many of the problems associated with distance and time. Specifically, as governments interact with citizens, businesses, and other public agencies, on-line services may stimulate five overarching benefits[8]. Public administration organizations that employ the on-line services may register benefits in responsiveness, visibility, efficiency, performance, and integration.

The European Union (EU) defines e-government as "the use of Information and Communication Technologies (ICT) in public administrations combined with organizational change and new skills in order to improve public services and democratic

processes and strengthen support to public policies" [8].

In the present context the economic crisis has heavily affected the IT industry and so e-Government projects have been in danger of running out of budget, one of the major risks of such type of investments. According to the last measurement of e-Government in Europe "the sector has invested heavily in technology over the last decade. It is time to reap returns from these investments**.** Leaders and decision makers seek proof that these investments were wise. They need confidence in the ability of technology to make evidence-based gains. It is time for the digital assets that have been created to be *used* and to *add value"*.

e-Government services offer a cost-effective route to better services for every citizen and business and participatory, open and transparent government. A number of initiatives in the Single Market Act, the Digital Agenda and the dedicated e-Government Action Plan 2011-2015 aim to open up the possibility for businesses and citizens to interact with public administrations fully by electronic means and across borders.

1.2 The Romanian context: e-Governance is challenging e-Government

As the public administration assumes the diversity, scale and constraints of the supporting mission of community prosperity, the challenge of organizing and distributing information becomes obvious. Public Administration needs to achieve this objective in an efficient manner of managing, reliability of internal and external information and compliance with laws, regulations and internal policies. [4]

It is necessary to have certain consistent capacities for having access, analyzing and exchanging information inside and outside the organization, in order to work out strategies and predictions as well as performing monitoring, evaluation and reporting. The complexity of the managerial process, which should effectively harmonize the economic, social, administrative, environmental and political elements, requires that the managers place a decision in the given context. [4]

Specifically related to e-Government, this would imply a capacity to use powerful *databases* that offer the opportunity not only to provide information regarding one sector of activity but manage information in an aggregate manner so that it allows them to predict implication on entire community/administrative process.

In the area of e-Government Romania is lagging behind, especially in take-up, being at the lowest place in the EU for both citizens (at 8%) and businesses (at 50%). In online service provision, Romania is greatly below EU average in both services for citizens (at 50%) and businesses (at 75%).

The proportion of citizens using the Internet to interact with public authorities has risen by 3 points to 41% over the last year. Better yet, the share of e-Government users filling in forms has also increased, to 50%. Eleven Member States already achieve the first target (up from five last year), and six already reach both. Continuing progress at the current rate would result in both targets being achieved well ahead of 2015.

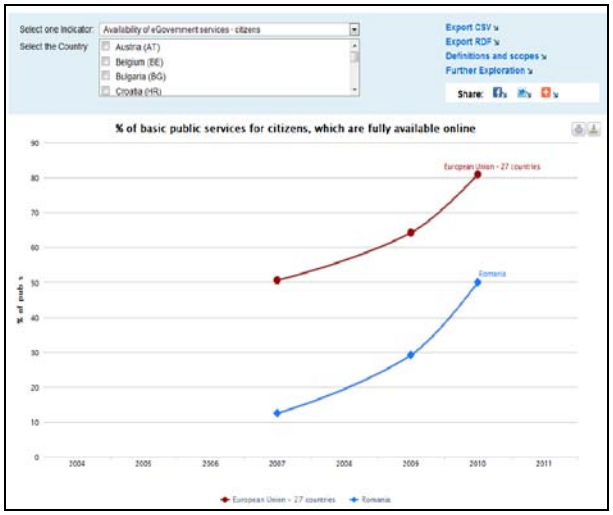

Fig. 1 On line public services European Union versus Romania

Source: Euro-stat, Community survey on ICT usage in households and by individuals, 2010; percentage of citizen between 16 and 74 using e-Government services in the last 12 months; horizontal lines represent target.

1.3 e-Government in Romania is e-Romania

Cohesion Funds are the main source of public projects in most countries in the south east Europe region. The funds obtained is huge and the impact over the IT markets is also important. European funds have ensured in 2011 the main source required for Romanian public administration, affected by the 2008-2011 prolonged economic crisis. The authorities have invested these money in online applications ranging from travel portals to online petitions or planned marriages. Through e-Romania strategy, the authorities estimate that it will be allocated over 500 billion euro in the period 2010-2013, for the connection of all systems of

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public administration and for offering over 600 electronic services by 2013.The result for 2010-2013 will be represented by 600 electronic services. Most used e-services such as the national system for paying all local taxes and also for all other taxes will be implemented. Each citizen will see what are his state debt, will be able to pay them online and taxes such as building tax on car traffic fines will be offered in online services also. A second direction will represent the flux of approval of the public institutions, that will be standardized.

There are three types of services that will be offered by e-Romania:

• electronic (eg. start-ups for companies, construction approval, change of address, paying taxes);
• on-line information (eg. transport, justice, agriculture, tourism);
• support (eg. interoperability, authentication, single point contact, electronic invoicing)

Since 2001, measures have been taken to create the legislative framework and supported development for e-Government. Steps have been made, for instance the National Electronic

System - the one-stop shop portal for electronic access to public administration or the National e-Procurement System. The operation concerning the support granted to public administration for setting up e-Government applications is correlated with the supply of general training for the e-Government field in the OP "Administrative Capacity Development".

Fig. 2 e-guvernare

Public administration will probably be the only vertical from the market, that will have a projected growth in the 2012-2015. Pierre Audoin Consultants (PAC) predicts a change, voluntary or forced, in the mode of acquisition and adoption of information systems in public sector in Romania over the next five years, which is expected to lead to increased demand and budgets for implementation of ERP solutions dedicated to the needs of government, and that have already became standard in most EU states. Thus, PAC predicts an average increase of over 20% for ERP in the public sector between 2011 and 2015.

2. Problem formulation

Research over the use of ERP and QMS Systems in Romanian Organizations Research methodology

2.1 Methodology. Questionnaire, the research instrument

The study set sights on Romanian organizations which implemented an e-Government service, and were collected in 2012 year. The instruments used for collecting data is a quantitative questionnaire. The research based on the quantitative questionnaire was structured on 55 questions focused on hardware and software (5 questions), implementation of the ERP business software for five business function such as manufacturing, SCM, financial, HRM and CRM (16 questions), other 12 questions were dedicated to Geographic Information Systems GIS implementation, other 10 to Quality Management Systems QMS and the last 12 questions were dedicated to connections between ERP, GIS and QMS.

The collecting method was an online survey called CheckMarket (a Belgian company specialized in survey solutions). Its core product is a web-based survey tool that after 10 years of development offers extensive functionality, security and stability. CheckMarket is not only a survey tool and what really sets it apart are the wide range of services it offers: scanning, panels, analysis, design, programming and consulting by their market research experts. CheckMarket's platform is used by many government agencies, large corporations, small business and individuals all over the world for everything from customer satisfaction and employee climate surveys to event registration and course evaluations. CheckMaket offers 19 question types.

2.2 Respondents

In the virtue of the questionnaire we achieved the results and we were able to formulate and validate hypothesis. We have analyzed the data using SPSS 17.0, and the respective response rates, excluding

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the unusable questionnaires received. There are, according to the territorial administrative organization of Romania 104 municipalities having over 40,000 inhabitants and 320 cities having over 10,000 inhabitants. We chose a sample of 45 local public administration that represent 10% of the total number of cities and municipalities. The number is greater than 30 for which it is accepted that the distribution is normal. Also for descriptive research a total of 20% of the population is sufficiently investigated, and in our case from 424 local governments of cities and towns only half have a form of e-Government, so 45 respondents represent a sample of 20%. Currently the study is based on 8 organizations.

Through e-Romania strategy, the authorities estimate that it will be allocated over 500 billion euro in the period 2010-2013, for the connection of all systems of public administration and for offering over 600 electronic services by 2013. In future besides the 424 cities and towns, some villages will be computerized. The first computerized local governments in rural areas of Romania are Ciugud and Berghin. Citizens of these two cities can afford to pay taxes online, starting from the second half of 2011.

3 Problem Solution

The Analysis. Selection of Cases

3.1 Global overview

The 8 public organizations selected for the moment are: Timisoara City Hall, Brasov County Council, Arad City Hall, Petrila City Hall, Emergency County Hospital Resita, Hunedoara County Council, Veterinary and Food Safety Service of Buzau County and Vulcan City Hall.

	Company	Employee	Computers	ERP_users	ERP_computers
1	Timisoara City Hall	500	400	400	250
2	Brasov County Council	190	150	150	150
3	Arad City Hall	531	531	80	80
4	Petrila City Hall	135	50	70	70
5	County Emergency Hospital Resita	1000	250	800	250
6	Hunedoara County Council	133	95	0	0
7	Veterinary and Food Safety Service of Buzau County	120	81	0	0
8	Vulcan City Hall	251	79	15	15

Table 1. Raw data collected through the questionnaire, used as variable for testing the hypothesis

We have selected 5 relevant questions from the questionnaire and the responses.

Response	Total	% of responses	%
1 yes	5		62 %
2 in implementation	1		13 %
3 no, but it will be implemented	2		25 %
4 no	0		0 %
Total respondents: 8 **Skipped question: 0**		0% 20% 40% 60% 80%	

Table 2. **Question 6. ERP System Implementation?**
(Each respondent could choose only ONE of the following responses.)

Response	Total	% of responses	%
1 ERP accounting	6		75 %
2 ERP budgets	3		38 %
3 SCM, CRM – supply and sales	0		0 %
4 HRM human resources	3		38 %
5 ERP manufacturing	0		0 %
6 maintenance	1		13 %
7 document management	4		50 %
8 Business Intelligence	1		13 %
9 other	0		13 %
Total respondents: 6 **Skipped question: 2**		0% 20% 40% 60% 80%	

Table 3. **Question 10. ERP Module Implementation?**
(Each respondent could choose MULTIPLE responses.)

Response	Total	% of responses	%
1 Unsatisfactory	0		0 %
2 Satisfactory	1		17 %
3 Good	3		50 %
4 Excellent	2		33 %
Total respondents: 6 **Skipped question: 2**		0% 20% 40% 60% 80%	

Table 4. **Question 20.3. Give a rating for these issues in the context of ERP implementation:** Employee perception regarding the benefits of implementing (Each respondent could choose only ONE response per sub-question.)

Response	Total	% of responses	%
1 Unsatisfactory	0		0 %
2 Satisfactory	0		0 %
3 Good	3		50 %
4 Excellent	3		50 %
Total respondents: 6 **Skipped question: 2**		0% 20% 40% 60% 80%	

Table 5. **Question 20.5. Give a rating for these issues in the context of ERP implementation:** Top management involvement in implementation (Each respondent could choose only ONE response per sub-question.)

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Response	Total	% of responses	%
1 the desire of top management for the efficiency of company	4		57%
2 the need of improving the company image	0		0%
3 external reasons (eg. demand of one or more partners / customers to have a QMS)	3		43%
4 other	0		0%
Total respondents: 7 Skipped question: 1		0% 20% 40% 60% 80%	

Table 6. **Question 38. What was the reason of QMS implementation?**
(Each respondent could choose only ONE of the following responses.)

Response	Total	% of responses	%
1 Unsatisfactory	0		0%
2 Satisfactory	2		33%
3 Good	4		67%
4 Excellent	0		0%
Total respondents: 6 Skipped question: 2		0% 20% 40% 60% 80%	

Table 7. **Question 43.3. Give a rating for these issues in the context of QMS implementation:** Employee perception regarding the benefits of implementing (Each respondent could choose only ONE response per sub-question.)

Response	Total	% of responses	%
1 Unsatisfactory	0		0%
2 Satisfactory	5		83%
3 Good	1		17%
4 Excellent	0		0%
Total respondents: 6 Skipped question: 2		0% 20% 40% 60% 80%	

Table 8. **Question 43.5. Give a rating for these issues in the context of QMS implementation:** Top management involvement in implementation (Each respondent could choose only ONE response per sub-question.)

3.2 Statistical Assumptions on Testing Links Between Management Decision and Information Technology

H_{01} *The number of employees in an organization influences the role of the ERP applications within the respective organizations. The organization dimension is directly connected with the role of the ERP applications within the respective organization.*

We have demonstrate this hypothesis using the number of ERP users, in the context of the total number of the employees of the organization.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,904[a]	,817	,786	129,319

a. Predictors: (Constant), Employee

Table 9 Linear regression analysis between employees and ERP users

We have conducted a regression analysis to determine the link between the level of use of ERP applications by the employee, and we noticed that there is a good link (with a significance of correlation R = 0.904 > 0.63 for 7 degrees of freedom). F-test also has a high enough value (26.716), and the Sig. corresponding F statistics is slightly less than 0.05 (0.02) which gives significant linear relationship between two variables. Because both F that has a high level, and significance Sig. is reduced, can be concluded that the results are not coincidental.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	446781,231	1	446781,231	26,716	,002[a]
	Residual	100340,644	6	16723,441		
	Total	547121,875	7			

a. Predictors: (Constant), Employee

b. Dependent Variable: ERP_users

Table 10 Linear regression analysis between employees and ERP users

With this analysis tool we have performed a linear regression analysis using the method of the least square in order to plot a line by a set of observations. Thus we have performed the analysis of the dependence and we have appreciated the extent to which the independent variable influence the dependent. With linear regression we output the regression coefficients necessary to predict one variable ERP_users from the other Employee. The model has been confirmed to be valid because the F test value were 26,716, with significant sig. <0,05 (0,02). The regression coefficient R=0,904 shows a very strong link between the variable ERP_users given to the level of ERP implementation through the number of current users, and the independent variable employee showing the size of the organization. The model explains 81,7% from the total variation of the variable personal (R^2= 0,817). The rest of 18,3% is influenced by other residual factors not included in the model.

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Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,594[a]	,353	,245	152,873

a. Predictors: (Constant), Employee

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76505,519	1	76505,519	3,274	,120[a]
	Residual	140220,481	6	23370,080		
	Total	216726,000	7			

a. Predictors: (Constant), Employee

b. Dependent Variable: Computers

Table 11 Linear regression analysis between an independent variable called Employee and a dependent variable called Computers

So in number of employees – number of computers we found a weak link (R=0,597) R=0593<063. This regression coefficient R=0,597 shows an intermediate link in these case.

But in conclusion for Hypothesis H_{01} we have found out that between the dimension of the organization and the number of ERP users there is a good link. In conclusion hypothesis H_{01} has been confirmed.

4. Conclusions

The research has revealed the global IT and specific ERP, GIS and QMS implementing level, as management methods in public administrations, in 2012 Romanian organizations, and has a high level of originality.

The questionnaire sets the current stage of the level of implementation of information and management systems in the 2012 Romanian local public administration. Data obtained through this questionnaire will be used in writing an application for funding a project on structural funds focused on the Romanian e-Government strategy.

In the area of e-Government Romania is lagging behind, especially in take-up, being at the lowest place in the EU for both citizens (at 8%) and businesses (at 50%). According to the 7th Measurement of Online Service in EU, Romania is the last out of 27 members in terms of sophistication of services and online availability of services to citizens. This clearly indicates that there is an urgent need for public management reform in what regards governments' role as service providers towards clients.

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