Bulletin of the *Transilvania* University of Braşov
Series V: Economic Sciences • Vol. 11 (60) No. 2 – 2018

EVALUATION OF ICT PROJECTS IMPLEMENTED BY PUBLIC INSTITUTIONS AND PRIVATE ORGANIZATIONS IN ROMANIA

Laurian Gabriel TĂNĂSESCU[1]

Abstract: *The assessment of an ICT project impact should consider not only the benefits but also their relevance for the beneficiaries. Such a system is likely to reduce the time needed to perform certain operations, reduce the cash need, increase the transparency, etc.; yet these benefits should be analyzed and calibrated with their relevance for the beneficiaries. Increased cloud and grid usage are also supported by falling prices for this type of service, increased reliability and interoperability (it is not difficult to change the provider of such services in order to avoid a potential dependence between the customer and supplier). As it is mostly the case, the adoption of new solutions is faster for private organizations (for which the share of the acquisition of tangible assets in the analyzed operational projects accounted for only 11% of the value of the project compared to 31% for public institutions).*

Key words: *evaluation projects, impact indicators, results / outcome indicators, European structural and cohesion Funds*

1. Introduction

The main effects of implementing ICT projects in the public administration should be, first of all, the effects of any ICT projects on any organization:

- increasing the efficiency of the organizational processes
- a performant management system able to monitor and evaluate the activity within the organization, at a global level, as well as at the department and even personal level.
- enhancing the efficiency and quality of the internal and external communication processes
- decreasing the negative impact of the staff turnover
- increasing the quality of the services/products

When the project is implemented by a public institution, there are additional benefits, specific to the public sector, such as the increased transparency of the activity. Maintaining information in databases (especially financial data, as well as other type of

[1] "Ștefan cel Mare" University of Suceava, laur@euromg.ro

information, for instance information related to the communication with the citizens), facilitates the rapid access to information for the public administration and other categories (civil society, media, control bodies, etc.). Comparative analyses - of different organizations or within the same organization - are also possible.

The assessment of an e-government project impact should consider not only the benefits but also their relevance for the beneficiaries. Such a system is likely to reduce the time needed to perform certain operations, reduce the cash need, increase the transparency, etc.; yet these benefits should be analyzed and calibrated with their relevance for the beneficiaries (Mahmoodi & Nojed, 2016)

2. Evaluating ICT projects implemented by public administration

2.1. Analysis of the international experience

The degree of accessibility of ICT investment in e-government for special categories (for example, people with disabilities) or range of mobile applications available (Serra, et al., 2015) and (Haryaka, et al., 2017) – represent an important set of criteria we should take into account when evaluating the impact of the project.

As expected, the result of international research (Nam, 2018) shows that the implementation of e-government projects has a beneficial influence on decreasing corruption. However, the impact varies from country to country, according to the local cultural models, so that a project can influence more or less the processes and routines of a certain institution.

Facilitating the e-participation processes is another benefit of an ICT investment project implemented by a public administration institution (Zheng, et al., 2014). International research shows that the e-government projects regarding citizens' civic participation is stronger in institutions whose leaders have been elected (such as city halls). Such institutions have a high interest in fostering active civic participation in the decision-making process.

As we have previously shown, ICT projects have a very strong impact on communication. In a private company, it is the market and the company benefit that determine the size of the various project components; as for the public entities, the prioritization is based on other factors. For example, communication via social media represents a special component of an e-government project (Gao & Lee, 2017). Research confirms the expectations again, showing that the use of social media represents one of the main advantages the implementation of an e-government system brings to a public institution.

The clients' satisfaction is a key element when evaluating any project. In case of an e-government project, it is the citizens' satisfaction. Though apparently it is easy to evaluate it, it is actually a complicated operation as there are no practices and methods unanimously accepted (Sharma, et al., 2018). The citizens' satisfaction with regard to the implementation of an e-government project should be measured by means of the incremental method (the degree of satisfaction after the implementation of the project vs. the degree of satisfaction had the project not been implemented at all). However, one can only estimate, with a large margin of error, the citizens' degree of satisfaction in

the absence of such a programme, therefore the incremental method cannot be accurate in this case.

Benchmarking is another method that may be considered when assessing the citizens' satisfaction following the implementation of an e-government programme. Thus, we compare the results of the implementing institutions with the results of a similar institution which did not implement such a programme. Yet it is very difficult to identify a similar institution. The bigger the project and the stronger its impact, the more difficult it is to identify similarities with other institutions.

When assessing the impact of an e-government project one should consider that the implementation of such project changes the environment profoundly. For example, an e-government project changes the citizens' behavior during their interaction with the respective institution: some communication barriers disappear (i.e.: the working hours), the institution offers support and immediate feedback to the citizens that have to fill in forms; however, the human interaction, with all its benefits, is absent (Kumar, et al., 2017).

The implementation of an e-government project should also consider other stakeholders, besides the citizens: companies / other public (government) institutions the implementing institution interact with. Theories and methods of analysis and assessment of the stakeholders' expectations, with regard to e-government projects, have been developed (Kumar, et al., 2017).

The extent to which a project operates on the specific areas mentioned above may define the project maturity; it is considered that the more complex and sophisticated areas a project covers, the more mature it is. Here is a four-level suggested classification of the e-government projects (Sangki, 2017):

- ” Bureaucratic model”
- ” Information management model”
- ” Participatory model”
- ” Governance model”

Noteworthy that the classification considers the capabilities of the e-government platform and not the level of technology or other technical data (such as the level of security, interaction, etc.).

As with any computer system, the implementation of an e-government project should take into consideration the satisfaction of the employees, the everyday users of the platform (Darko Stefanovic, 2016). The employees represent a” critical stakeholder”; certainly, the success or the failure of a project depend on the support of the future users, notably the employees. Strong resistance on their part may cause failure, even if the project is perfect as far as the stakeholders are concerned.

Analyzing and considering the expectations of the employees does not necessarily lead to organizational changes in the HR department. Studies show that the maturity of an e-government project and the speed of reaching such maturity depend on the level of development of the area/country (GDP) and the ICT infrastructure available in the community; at the same time, the human resources and the quality of governance have little or no influence (Amit Das, 2017).

2.2. The analysis of the main projects implemented in Romania

Lately most major ICT investment projects implemented by public institutions have included an EU-funded component. Unfortunately, there is no information regarding the impact or the results of the projects financed from national resources. Consequently, it is impossible to have an analysis of all projects, irrespective of their financing.

Our analysis is limited to the information offered by the database of the operational programmes implemented in Romania from the 2007-2013 EU budget. However, the programmes include most of the ICT investment projects developed in Romania, and the results can be extrapolated at a national level, irrespective of the project's source of funding.

According to the public information available (Ministry of Communication and Information Society, 2018) SOP IEC Priority Axis III included several areas of intervention:

1. Supporting the use of IT
2. Developing and enhancing the efficiency of modern electronic services
3. Developing E-economy

The first intervention area funded infrastructure projects (creating broadband networks, small investment in companies and NGOs, etc.). This type of projects is of no interest to the analysis carried out in the present chapter,

The area of intervention No 3. funded solely investment projects implemented by companies.

Consequently, for the analyses in this section, we have only selected the projects financed under Priority Axis 3/ Key Area of intervention 3.2

In the previous chapter we presented the analysis of the geographic distribution of the projects funded under SOP IEC Priority Axis III, which distinguishes between projects implemented by public institutions and those implemented by private entities (Figure 2 Geographic distribution of the projects funded for private institutions and Figure 3 Geographic distribution of projects implemented by public institutions outside Bucharest)

The types of eligible expenses are crucial in order to understand the approach of those who initiated the projects. The eligible value for each type of expense is illustrated in the table below.

The eligible value for each type of expenses Table 1

Type of expenses	Eligible value (euro)	Percentage out of the total expenses
Expenses for the major investment – intangible assets	208.762.439	50,17%
Expenses for the major investment - facilities	100.197.107	24,08%
Eligible VAT	50.088.685	12,04%
Expense for the purchase of fixed assets	30.418.602	7,31%
Expenses for specialized training	6.554.906	1,58%
Expenses for project consultancy and technical assistance	5.561.205	1,34%

Type of expenses	Eligible value (euro)	Percentage out of the total expenses
SOP IEC Project management -related expenses	4.398.567	1,06%
Expenses for LAN network which is needed for the implementation of the project	3.399.617	0,82%
Audit related expenses	2.661.048	0,64%
Connection to Internet broadband expenses	2.017.089	0,48%
Project communication, dissemination and advertising, as part of the beneficiary's obligations	1.940.319	0,47%
Expenses related to the preparation, organization and development of the public procurement procedures	128.201	0,03%
Expenses for licenses, approvals and authorizations	2.273	0,00%

It is obvious that more than half of the total funds was spent for the purchase of computer applications, compared to only 31,39% of the budget spent on fixed tangible assets (lines 2 and 4 in the table above).

The result is not surprising, it is in accordance with the current world trends in technology, e.g.: the use of cloud technology, unifying the hardware resources of several entities for easier management and maintenance. Such methods bring an additional benefit: the institutions reduce the need to have highly specialized expertise on-site, which is difficult to keep and is very expensive.

3. The Impact of Implementing an ICT Investment Project in a Company

As shown in Chapter 1.3 Case Study: Situation of ICT investment projects carried out in Romania by European non-reimbursable funds, projects carried out by private organizations in Priority Axis III of SOP IEC represent a large majority in terms of number (90%) and a small minority in terms of eligible value (20%). The figures clearly show the priority of the donor (Ministry of Communications and Information Technology) targeted projects developed by public institutions at the expense of those developed by private organizations.

An equally important analysis for these projects is that of the eligible expenditure types covered by the non-reimbursable grant. These categories are listed in the following table.

Type of expenses in projects developed by private organizations Table 2

Type of expense	Eligible value (euro)	Percentage of the total expenses
Expenses for the major investment – intangible assets	78.137.693	65,10%
Expenses for the major investment - facilities	13.509.280	11,26%
Expense for the purchase of fixed assets	11.547.425	9,62%

Type of expense	Eligible value (euro)	Percentage of the total expenses
Project consultancy and technical assistance expenses	6.915.431	5,76%
Specialized training expenses	4.361.785	3,63%
Project audit related expenses	2.275.680	1,90%
Expenses for the Internet broadband access	988.124	0,82%
Expenses for project communication, dissemination and advertising as part of the beneficiary's obligations	761.299	0,63%
Expenses for a company/NGO website purchase	453.917	0,38%
Purchase of specific computer applications	399.555	0,33%
Expenses for LAN network which is needed for the implementation of the project	396.389	0,33%
Connection to the Internet broadband	142.400	0,12%
Purchase of electronic signature solutions	55.749	0,05%
SPO IEC project management related expenses	33.154	0,03%
Acquiring a new "ro" domain	14.669	0,01%
Expenses related to the preparation and implementation of the bidding and procurement procedures	14.132	0,01%
Eligible VAT	12.308	0,01%

We note that for the private beneficiaries the acquisition of intangible assets is also a priority: the expenditures are similar to those of the public institutions (65% for private beneficiaries as compared to 60% for e-learning projects and 50 % for ICT investment projects carried out by public institutions in general).

A major difference is registered by the share of expenditures for the acquisition of tangible assets, much lower for the private beneficiaries (11%) compared to the public institutions' shares in the e-learning projects (24%) or in general ICT investment projects of the public institutions (31%). This result confirms the general trend of those implementing ICT investment projects to show greater importance to the acquisition of intangible assets compared to the acquisition of tangible assets.

The dynamics of the private organizations and the attractiveness of ICT investment projects clearly stem from the share of each type of private beneficiary in the total funding attracted by the sector. This is shown in the following table

The share of projects developed by various types of private entities out of the total projects developed in the private sector

Table 3

The share of projects developed by various types of private entities out of the total projects developed in the private sector

Type of beneficiary	Number of projects implemented	The value of eligible costs (euro)
Small enterprise	677	43.168.043,71
Medium enterprise	316	34.155.011,70
Microenterprise	640	32.218.049,27
Non-government nonprofit organizations	151	5.124.936

Type of beneficiary	Number of projects implemented	The value of eligible costs (euro)
Other	37	2.512.898
Total	**1.821**	**117.178.938,53**

For a correct interpretation of these results, it should be noted that for all private funding lines in SOP IEC, there were no differences in the eligibility or score for project evaluation between micro, small- and medium-sized enterprises. Large enterprises always represent a special category in state aid schemes and NGOs were eligible under a single call for projects, the one for Operation 3.1.1., where the value of the financed projects was very low, up to 100,000 lei.

Under these circumstances, we notice that the number of projects carried out by medium-sized enterprises is lower than half of the projects carried out by micro-enterprises or small enterprises, while the total eligible value of these projects may be compared to projects developed by the entities included in the other two categories. This result indicates that the bigger an enterprise is the more it is willing and able to run a larger investment project. It also shows that, from this point of view, differences between a micro-enterprise and a small enterprise are not considerable, while transition from a small to a medium-sized enterprise is a very high leap.

4. Conclusions and Recommendations

Recently, the general trend has shown that organizations implementing ICT investment projects attach greater importance to intangible assets, compared to tangible assets. This trend is justified by the increased use of cloud, grid technologies, and other technologies scaling down the importance of the existing hardware in the organization (tangible assets). Organizations are less and less willing to invest in equipment, which also involves maintenance and service costs (whether secured internally or externally, such services extremely complex, they require advanced knowledge and generate some dependence of the recipient on the maintenance provider).

Increased cloud and grid usage are also supported by falling prices for this type of service, increased reliability and interoperability (it is not difficult to change the provider of such services in order to avoid a potential dependence between the customer and supplier). As it is mostly the case, the adoption of new solutions is faster for private organizations (for which the share of the acquisition of tangible assets in the analyzed operational projects accounted for only 11% of the value of the project compared to 31% for public institutions).

In terms of ICT investments made by companies, analysis of available data has shown that more active firms operating in a "higher geographic density of firms" are more open to new technologies. The result can be justified by the fact that technology in general has to be promoted in order to be adopted. The technology does not have a natural propagation mechanism focused on satisfying an easily identifiable need. As far as technology is concerned, such need must be created / generated.

As for companies' capacity to carry out investment projects in ICT, the result of the analysis indicates that large enterprises are more willing and able to carry out a large investment project. At the same time, we note that, from this point of view, differences between a microenterprise and a small enterprise are not substantial while transition from a small to a medium-sized enterprise is a very high leap.

References

Alkhalaf, S., Drew, S. and Alhussain, T., 2012. Assessing the impact of e-learning systems on learners: a survey study in the KSA. *Procedia - Social and Behavioral Sciences,* 47(2012), pp. 98-104. doi:10.1016/j.sbspro.2012.06.620.

Bhattacherjee, A. & Shrivastava, U., 2018. The effects of ICT use and ICT Laws on corruption: A general deterrence theory perspective. *In Press, Corrected Proof,* pp. 1-30. https://doi.org/10.1016/j.giq.2018.07.006.

Cattaneo, M., Malighetti, P. and Spinelli, D., 2016. The impact of University of the Third Age courses on ICT adoption. *Computers in Human Behavior 63,* 63(2016), pp. 613e619. http://dx.doi.org/10.1016/j.chb.2016.05.087 .

Cidral, W.A., Oliveira, T., Di Felice, M. and Aparicio, M., 2018. E-learning success determinants: Brazilian empirical study. *Computers & Education,* 122(2018), pp. 273-290. https://doi.org/10.1016/j.compedu.2017.12.001.

Consoli, D., 2012. Literature analysis on determinant factors and the impact of ICT in SMEs,. *Procedia - Social and Behavioral Sciences,* 62(2012), pp. 93-97. doi:10.1016/j.sbspro.2012.09.016.

Das, A., Singh, H. and Joseph, D., 2017. A longitudinal study of e-government maturity. *Information & Management,* 54(2017), pp. 415-426. http://dx.doi.org/ 10.1016/j. im.2016.09.006.

Drozdova, A.A. and Guseva, A. I., 2017. *Modern technologies of e-learning and its evaluation of efficiency.* Almeria, Spain, 7th International Conference on Intercultural Education "Education, Health and ICT for a Transcultural World", EDUHEM 2016, 15-17 June 2016, , p. 1032 – 1038.

Gao, X. and Lee, J., 2017. E-government services and social media adoption: Experience of small local governments in Nebraska state. *Government Information Quarterly,* 34(2017), pp. 627-634. http://dx.doi.org/10.1016/j.giq.2017.09.005.

Grossman, G., Platas, M. R. and Rodden, J., 2018. Crowdsourcing accountability: ICT for service delivery. *World Development,* 112(2018), pp. 74-87. https://doi. org/ 10.1016/j. worlddev.2018.07.001.

Haryaka, U., Agus, F., Ramadiani & Azainil, 2017. *User Satisfaction Model for e-Learning Using Smartphone.* In: the 2nd International Conference on Computer Science and Computational Intelligence 2017, ICCSCI 2017, Bali, Indonesia, pp. 373–380.

Hubalovsky, S., Hubalovska, M. and Musilek, M., 2018. Assessment of the influence of adaptive E-learning on learning effectiveness of primary school pupils. *Computers in Human Behavior,* XXX(XXX), pp. XXX - XXX. https://doi.org/ 10.1016/j. chb. 2018.05.033.

Kumar, R., Sachan, A. and Mukherjee, A., 2017. Qualitative approach to determine user experience of e-government services. *Computers in Human Behavior,* 71(2017), pp. 299-306. http://dx.doi.org/10.1016/j.chb.2017.02.023.

Mahmoodi, R. K. and Nojed, S. H., 2016. *Investigating the Effectiveness of E-government Establishment in Government Organizations.* 3rd International Conference on New Challenges in Management and Organization: Organization and Leadership, 2 May 2016, Dubai, UAE, pp. 136-141. Available online at www.sciencedirect.com.

March, H., 2018. The Smart City and other ICT-led techno-imaginaries: Any room for dialogue with Degrowth?. *Journal of Cleaner Production,* 197(2018), pp. 1694-1703. http://dx.doi.org/10.1016/j.jclepro.2016.09.154.

Nam, T., 2018. Examining the anti-corruption effect of e-government and the moderating effect of national culture: A cross-country study. *Government Information Quarterly,* 35(2018), pp. 273-282. https://doi.org/10.1016/ j.giq.2018.01.005.

Navimipour, N. J. & Zareie, B., 2015. A model for assessing the impact of e-learning systems on employees' satisfaction. *Computers in Human Behavior,* 57(2015), pp. 475-485. http://dx.doi.org/10.1016/j.chb.2015.07.026.

Nikolić, V. et al., 2018. Survey of quality models of e-learning systems. *Physica A,* 511(2018), pp. 324-330. https://doi.org/10.1016/j.physa.2018.07.058.

Palvia, P., Baqir, N. & Nematia, H., 2018. ICT for socio-economic development: A citizens' perspective. *Information & Management,* 55(2018), pp. 160-176. http://dx.doi.org/10.1016/j.im.2017.05.003 .

Qureshi, A. A., 2013. *Impact of Leadership on Meaningful Use of ICT.* Brussels, Belgium, 3rd World Conference on Learning, Teaching and Educational Leadership - WCLTA 2012, pp. 1744 - 1748.

Roman, A., Roman, A., Wang, X. & Liu, C., 2017. Integrating ICT adoption issues into (e-) leadership theory. *Telematics and Informatics,* 34(2017), p. 527–537. http://dx.doi.org/10.1016/j.tele.2016.11.003.

Rose, J., Flak, L. S. & Sæbø, Ø., 2018. Stakeholder theory for the E-government context: Framing a value-oriented T normative core. *Government Information Quarterly,* 35(2018), pp. 362-374. https://doi.org/10.1016/j.giq.2018.06.005.

Sangki, J., 2017. Vision of future e-government via new e-government maturity model: Based on Korea's e-government practices. *Telecommunications Policy,* xxx(2017), pp. 1-12. https://doi.org/10.1016/j.telpol.2017.12.002.

Serra, L. C. et al., 2015. *Accessibility Evaluation of E-Government Mobile Applications in Brazil.* 6th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Infoexclusion (DSAI 2015), Vila Real, Portugal, pp. 348 – 357.

Sharma, P. N., Morgeson, F. V., Mithasc, S. & Aljazzaf, S., 2018. An empirical and comparative analysis of E-government performance measurement models: Model selection via explanation, prediction, and parsimony. *Government Information Quarterly,* XXX(XXX), pp. XXX - XXX. https://doi.org/10.1016/j.giq.2018.07.003.

Stefanovic, D. et al., 2016. Assessing the success of e-government systems: An employee perspective. *Information & Management,* 53(2016), p. 717–726. http://dx.doi.org/10.1016/j.im.2016.02.007.

Tafidis, P. et al., 2017. *Exploring the impact of ICT on urban mobility in heterogenic regions.* 20th EURO Working Group on Transportation Meeting, EWGT 2017, 4-6 September 2017, Budapest, Hungary, pp. 309–316.

Tarutėa, A. and Gatautisa, R., 2014. ICT impact on SMEs performance. *Procedia - Social and Behavioral Sciences,* 110(2014), pp. 1218–1225. doi:10.1016/j.sbspro. 2013.12.968.

Weng, C., Otanga, S., Weng, A. and Cox, J., 2018. Effects of interactivity in E-textbooks on 7th graders science learning and cognitive load. *Computers & Education,* 120(2018), pp. 172-184. https://doi.org/10.1016/j.compedu.2018.02.008.

Zheng, Y., Schachter, H. L. & Holzer, M., 2014. The impact of government form on e-participation: A study of New Jersey municipalities. *Government Information Quarterly,* 31(2014), p. 653–659. http://dx.doi.org/10.1016/j.giq.2014.06.004.

*** Ministerul Cercetării și Inovării, 2018. *Organismul Intermediar pentru Cercetare.* [Online] Available at: http://www.poc.research.gov.ro [Accessed 20 07 2018].

*** Ministerul Comunicațiilor și Societății Informaționale, 2018. *Organismul Intermediar pentru Promovarea Societății Informaționale.* [Online] Available at: http://fonduri.mcsi.ro [Accessed 20 07 2018].

*** Ministerul Dezvoltării Regionale și Administrației Publice, 2018. *AM PODCA.* [Online] Available at: http://www.fonduriadministratie.ro/ro/ [Accessed 20 07 2018].

*** Ministerul Fondurilor Europene, 2018. *AM POS CCE.* [Online] Available at: http://www.fonduri-ue.ro/poscce-2007 [Accessed 20 07 2018].

*** Ministerul Fondurilor Europene, 2018. *AM POS CCE.* [Online] Available at: http://old.fonduri-ue.ro/poscce/ [Accessed 20 07 2018].

*** Ministerul Fondurilor Europene, 2018. *Ministerul Fondurilor Europene - POS DRU.* [Online] Available at: http://www.fonduri-ue.ro/posdru-2007 [Accessed 20 07 2018].

*** Programul Operațional Regional, 2018. *POR - Programul Operațional Regional 2014 - 2020.* [Online] Available at: http://www.inforegio.ro/ro/por-2014-2020.html [Accessed 20 07 2018].