The Open-Source Alternative in E-Government

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Abstract: The last decade has changed again the face of electronic world: from Web 2.0 to open source software; from e-(electronic) to m-(mobile) and now to *touch*. For Web developers is a real challenge to make compatible interfaces to all existing Internet browsers. This proves to be even more expensive than the application itself (Softnet; 2012; SIVECO, 2012). From the point of view of the big software development companies these events are just new challenges because they afford to have many employees with different skills and by that being able to cope with market demands. But what happens with the e-government projects at the local level? Budgets are small, so hiring a company specialized in Web application development is sometimes too expensive, this responsibility usually falls in many cases on the employees of the IT department (Vrabie, 2011). If we add to this software component the hardware required for hosting the Web page inside, the budgets are already completely exceeded (or obviously they can choose some other cheap solution but whose reliability is very poor – reason for dissatisfaction among citizens). The importance of the Web platforms for interacting with citizens is very well known (Friedman, 2005; Craig; 2006; Baltac, 2011). In this context, this paper aims to examine in terms of costs, the investments in open-source applications in parallel with the use of social networks as used today. The research methodology is using for the first time an adapted version of cost-effectiveness analysis. Empirical research will be carried out on two platforms of e-Government – one of them developed inside on an open-source solution - used to support a complete interaction with the citizens. The working hypothesis starts from the fact that open source software is cheaper than those developed inside – but of course this is a question to debate at.

Keywords: e-Government; open source software; IT

1. Introduction

E-government has become extremely popular. Nowadays, it has become a viable alternative to traditional administration methods, so it has been adopted by many public institutions, especially because it is wide application in various organizations. Specialized studies, published in the last five years, show a

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continued increase in the use of e-Government in public organizations (Towards Maturity, 2012).

Today the term e-Government has come to be classified as:

- e-Government based on intranet (public institutions networks used for exchanging information inside the organization);
- e-Government based on Internet (used for interacting with citizens and business sector).

2. Cost-Effectiveness Analysis in Implementing Electronic Systems in Public Administration

The Web potential for e-Government platforms has reached an impressive configuration, with several prestigious institutions shifting to open source solutions for their Web sites.

2.1. Elements of analysis

In order to assess projects, institutions must appraise the efforts required and measure the expected impact. Efforts should be seen as the infrastructure costs associated with the particular project, its implementation and the running and management of it. On the other hand, the expected impact has two components: the benefits that are expected to arise from the project's implementation and the risks associated with achieving those benefits. To calculate the costs, benefits and risks, agencies can apply NPV methodology in project evaluation. Such an assessment will also show the strengths and weaknesses of the project, allowing the agency to make recommendations to improve project value. The analysis compares the costs related to the preparation, implementation and project management.

2.2. Costs

Most estimates take into account only the operational costs of e-Government portals. "*Few analysts consider infrastructure development costs or internal transfers. [...] This rigorous and objective analysis, [... is] rare*" (Brookings, 2001). This gives a distorted picture of cost-effectiveness, because it ignores the

costs of preparing and implementing the project. Since e-Government projects require a very high initial investment; this strongly affects the overall profitability of the project. It is therefore important to take into all costs into account, both initial investment and operating expenses.

There are three major categories of cost:

- Domestic investment to shift to computerized databases and information management;
- Costs of building an e-Government portal / implementation costs for open-source solutions;
- Management and maintenance costs of the portal.

2.2.1. Domestic investment is often ignored in analyses, although it is likely to be the biggest expense, as most governmental services today are still stored on paper (Schuppan, 2009).

As known, the main types of cost will be:

Hardware:

- Servers and workstations, peripherals, network and communications infrastructure.

Software:

- Computer operating systems, communications software and document management software;
- Software needed for executing a specific task: Database Management, ERP, CRM, etc.

Data digitization:

- The transfer of records to computerized databases, which can be a lengthy and costly process.

Staff:

- Training - employees will have to acquire operational skills. With newly created departments, some employees will have to transfer and acquire new skills (ECDL, 2012);

- Recruitment - in many cases, existing staff may not be ready to adapt to changes, so there will be a need to recruit new employees;
- Some existing employees, especially those performing routine tasks, may have to be offered compensation to take on new or additional tasks;
- There is a need to increase wages in order to motivate people to accept change.

2.2.2. The cost of building an e-Government portal is a capital investment, usually large (especially for complex portals), however, much lower than the domestic investment detailed above(Meijer, 2011).

Hardware and software to host the Web site:

- Servers, server operating software, data transmission / high bandwidth.

Website design and creation:

- Even if the work is outsourced, the process requires mobilization of personnel designated to coordinate the development; staff members should also be involved in the testing phase (Baltac, 2008.). All this can lead to an increase in personnel and / or payroll.
- If open source systems are used, such costs are zero.

Data digitization and integration between systems off-line and on-line:

- Even if different departments (financial, educational, management) transfer all their information onto computer databases, the site will need many of these databases to be completely useful. In the first stage of implementation, both old and new systems (those on paper and databases) will be used together until all computer platforms can be migrated. Database migration and integration is a difficult and expensive process and often requires hiring external consultants (Janssen, Charalabibis, Kuk and Cresswell, 2011).

2.2.3. Management and maintenance costs are as follows:

Portal maintenance and support:

- The more complex the portal site, the more employees will be required to handle maintenance and support for the hardware and software used. If these functions are out-sourced, the additional costs must be accounted for (Webster, 2011).

Updating:

- Site users expect a much higher frequency of updates than used in traditional methods of service delivery. Information pages will also need to be updated often. This will require more people to work full-time to carry out the updates (Weill & Ross, 2000).

Modernization and upgrading:

- The development of IT and the Internet is fast: private companies are modernizing their Web sites every few years (some even faster, depending on the industry); users will have similar expectations from governmental portals (Musso, 2000). Public institutions will need to add bandwidth, new features and faster processing capabilities.

Security issues:

- These are more serious in developing countries than in developed countries because of higher rates of hacker activity (Tapscott, 2009). Public institutions will have to pay special attention to increased security features of web sites.

Marketing and Advertising:

- Given that public institutions have a high degree of media-interest; e-Government projects are likely to receive wide media coverage, reducing the need for marketing activities. However, if such projects launch several campaigns, PR will lose its efficacy and there will be a need to develop separate advertising campaigns (MacDermott, 2008). Costs for such campaigns can be quite large.

2.2.4. Case study: contracting an external Web developing company vs. an open source solution (Joomla)

Public Institution electronic platforms must, according to the current regulations to assure access to the interface for internal and external users, and assume the need for flexibility as a *sine qua non* condition for achieving success in the context of electronic governance dynamics. So, e-Governmentplatforms must have all the facilities for integrating the services used in their environment.

Looking at those aspects means that one of the most important issues is related to the cost of development, implementation and maintenance. We've used annual financial reports in order to find and calculate with the required accuracy, the costs for using two e-Governmentplatforms during 2006 – 2012 for two Web sites developed for Romanian municipalities, *Craiova* that used outsourced development based on a proprietary solution and *Vatra Dornei* that used in-house development based on an open-source solution. Below we present, in a shortened version, some aspects of these two software platforms:

Table 1. Proprietary vs. open source solution

System / Feature	Outsourced / Proprietary Source	In house / Open source
period	**2006 - 2012**	**2006 – 2012**
Print screen		
Access levels	2 (administrator, Internet users)	3 (administrator, power users, Internet users)
Features	Design/simplicity – 3 stars Navigability – 4 stars	Design/simplicity – 4 stars Navigability – 4 stars

Costs		
Inward investment		
Hardware	0 EURO	2500 EURO
Software	0 EURO	400 EURO
Digitizing data	1350 EURO	1350 EURO
Staff	525 EURO*12months*5years	525 EURO*12months*5years
Developing costs		
Hosting	25 EURO*12months*5years	0 EURO
Developing	6000 EURO	0 EURO
Digitization	1350 EURO	1350 EURO
Administration costs		
Maintenance and support	525 EURO*12months*5years	525 EURO*12months*5years
Updating	1000 EURO*2months*5years	0 EURO
Modernization	1000 EURO*2months*5years	0 EURO
Security	400 EURO*5years	400 EURO*5years
Marketing	10 EURO*12months*5years	10 EURO*12months*5years

3. Conclusions

We can observe from studying *Table 1. Proprietary vs. open source solution* that the differences are not significant, but they exist. We can see that the proprietary development hardware and software costs were zero, because it was the responsibility of the institution's developer but on the other hand open source solution incurred costs because it was necessary to purchase a server for information storage and an operating system, although this eliminated the cost of hosting.

The design also cost zero for the open source software and updating and upgrading are all free as well as the main package. All other costs were the same because they involved infrastructure investment or HR.

As assumed at the beginning of the analysis, we see that the cost savings are close to 25,000 Euros during the five years of operation of the open-source solution.

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