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Abstract. Contemporary governments are expected to find ways to utilize ICT to facilitate their daily administration and to provide better services to citizens, businesses, and government agencies, in the form of what is referred to as E-Government. In this paper, we argue that everything in government boils down to processes, and that a better understanding of business process management concepts and tools is much needed. The empirical setting of our study is based on a single case, in which we investigate an E-Government implementation project in the city of Oulu. Six critical issues that require special attention were identified: change management, top management support, business process mindset, process rethinking not automating, stakeholders’ involvement, and the use of financial assessment.

Keywords: E-Government, Business Process Management, Open Source Software

1. Introduction

Electronic Government or E-Government has been described as “ways to utilize ICT to help governments to facilitate their daily administration and to provide better services to consumers, businesses, and government agencies” [1].

Public service provisioning is a basic government task, and providing them electronically (i.e. over the Internet) has been a major requirement for a contemporary government. In order to establish a robust service imbedded in an E-Government solution, the governmental organization should have a clear understanding of the underlying concepts and technologies involved. ‘Like in business, everything in government boils down to processes’ [2], therefore, offering public services in a process-form is one major way of managing the relationship between the customers and the governmental organization as the service producer. This research draws an explicit connection between E-Government and business process management (BPM) as a method for managing the relationship between government, citizens and companies.

Despite its roots in the work of Adam Smith (1776) and Frederick Taylor (1911), BPM as an identified management approach first arose in the mid 1990s [3]. Advances in IT have made available business process management systems (BPMS), that is, tools that automate and control organizations’ business processes life cycle ([3] and [4]). Just like in business, everything in government boils down to processes[2]. In other words, the core of E-Government is the execution of administrative processes[5], therefore, we argue that a better understanding of the mechanisms that govern the implementation of BPMS in E-Government is critical and timely.

The objective of this study is to highlight the importance of BPM in governmental context, as an alternative to the traditional functional department approach. In the empirical setting, we aim at identifying the critical issues arising during the implementation of an E-Government project, and to present a set of recommendations when implementing similar projects. To this end, the paper is organized in the following fashion: in section 2, we present several perspectives that are believed to be essential in the E-Government literature; section 3 portrays the empirical setting; in section 4, we present our findings and analysis; and finally we conclude and summarize the paper in section 5.

2. E-Government

2.1 Definition

There is a great number of definitions for electronic Government, or E-Government, depending slightly on the perspective taken. What is common, however, for all the available definitions (e.g. [6], [1], [5], and [7]) is the central role of ICT, and the Internet in particular, to facilitating and enhancing the access to and delivery of different kinds of government services and operations for the benefit of consumers, businesses, employees, and other stakeholders. Nevertheless, E-Government is not just about making existing forms and services available online; it provides the opportunity to rethink how the government should provide its services to its customers and employees, as well as businesses, in a way that is tailored to the users’ needs[8].

ICT used by E-Government can be viewed from a dimensional perspective. Two ways of amalgamating E-Governments are: horizontally by integrating multiple Web applications across government agencies; and vertically by combining multiple levels within the same agency[9].

E-Government is typically understood to cover four different categories: Government-to-Consumers (G2C) is a category that includes all types of interactions between a government and its consumers; Government-to-Business (G2B) refers to E-Commerce in which government sells products/services to businesses and vice versa; Government-to-Government (G2G) covers the activities that take place between units of governments including those within one governmental body; and finally Government-to-Employee (G2E) is a model that is intended to improve the efficiency and effectiveness of the relationship between the government as an employer and its employees (e.g. [6], [10], and [11]).

From a corporate governance viewpoint the principles of stakeholders’ management in corporate governance calls for, first of all, the identification and inclusion of all stakeholders in developing the E-Government solution. Of great importance is also weighing the technological development choice against broader social cost, as well as developing governmental strategies to align stakeholders’ interests, replacing the failure attempts to integrate every stakeholder’s expectations[12].
Heeks and Stanforth [13] adopt a view of the actor-network (ANT) theory in an attempt to explain E-Government projects trajectory, and they argue that any E-Government project trajectory—whether success or failure—is determined by the project’s capacity to maintain both a local and a global network, and to impose itself as obligatory point of passage between the two networks.

2.2 E-Government development Level Model

A lot of effort has been devoted in E-Government literature to finding a way of measuring the E-Government development level. These include Deloitte’s six-stage model, UN’s five-stage model, Moon’s five-stage model, Layne & Lee’s four-stage model, and Gartner’s four-stage model. The Five-Stage Development Level Model[1, 14] can be used as a guideline for evaluating the E-Government development or maturity by examining the presence or absence of online services in each of the five stages of emerging, enhanced, interactive, transactional and seamless presence (see Fig1).

In Emerging Presence a single or a few independent government web sites provide formal but limited and static information. With Enhanced Presence government web sites provide dynamic, specialized, and regularly updated information, and with Interactive Presence the government web sites act as a portal to connect users and service providers, and the interaction takes place at a more sophisticated level. With Transactional Presence the users have the capability to conduct complete and secure transactions, such as renewing visas, obtaining passports, and updating birth and death records through a single government web site; and finally, with Fully Integrated or Seamless Presence, the governments utilize a single and universal web site to provide a one-stop portal in which users can immediately and conveniently access all kinds of available services[14].

While the three first stages are mostly dealing with automation of existing processes, the last two are more about comprehensive transformation of government services as a whole. The most challenging steps, or leaps, that governments face are the cultural leap from interactive to transactional presence, and the political leap from transactional to seamless presence. The political leap is expected to require a great deal of financial and human resources, but on the other hand, to also result in greatest benefits of integration. E-Government is largely coupled with the complexities associated with the public sector context [15], and also this complexity is expected to increase with development from one stage to the next. Consequently, as earlier studies have pointed out, a large number of E-Government initiatives - in some estimates 85% of them - have failed [13].
2.3 Business Process Management in E-Government

A process has been defined as 'a coordinated and standardized flow of activities performed by people or machines, which can traverse functional or departmental boundaries to achieve a business objective that creates value for internal or external customers' ([3]; p.3). A business process is viewed as a set of logically related tasks performed to achieve a defined business outcome[16], or 'a set of activities within an enterprise with a structure describing their logical order and dependence whose objective is to produce a desired result'[17].

Business processes may be classified in different categories depending on the perspective. One perspective[18] views them as functional vs. cross-functional, customer vs. administrative; and manufacturing vs. service. Another perspective[19] categorizes them as core (central to business operations), support (e.g. accounting, IT, etc.), management (concerned with organizing and controlling business resources), and business network processes (with scope beyond organizational boundaries).

There is a large body of literature (e.g. [2], [5]) investigating E-Government with a particular emphasis on process management. Some[8]studied E-Government projects as an organizational change initiative, and stress that importance of top management and their role in communicating a vision for change. While others [20]suggest that E-Government is, simply, a form of enterprise modernization effort, and that in this area
Business Process Management System (BPMS) is an information system that provides a set of tools and services needed to manage the business process of an organization[4]. Generally speaking, IT implementations typically go through four development stages: they start by gathering the business requirements, which is usually the business analysts' task. Then the requirements are passed over to the functional analysts who would draft functional specifications to determine what functions each system would perform, after which the technical analysts configure the systems according to the data collected from the previous stage. Finally, the programmers start developing the solution. At each layer, the business requirements have to be communicated, discussed, and potentially changed. Thus, by the time the requirements are implemented in the system, they usually do not satisfy the original requirements[3]. BPMS solves such problems by allowing business process owners, or business analysts, to be directly involved in designing the IT solution. With the help of BPMS, business analysts can design highly detailed business processes using a visual modeling tool, which automatically generates code that sometimes can be deployed without IT development help. And if IT development is needed, IT developers can work on the same processes that were designed by the business people and embed any required logic using a scripting language that is also included in the BPMS packages.

2.4 Open Source Software (OSS) in E-Government

General understanding of Free/Open Source Software (FOSS) and its role in the public sector is poor, and as well as under-researched[21]. By definition, OSS must comply with the following criteria: (1)Free redistribution; (2) Access to source code; (3) Allowing the distribution of derived works; (4) Integrity of the author's source code; (5) No discrimination against persons or groups; (6) No discrimination against fields of endeavor; (7) Distribution of license; (8) License must not be specific to a product; (9) License must not restrict other software; (10) License must be technology-neutral1. Both European Interoperability Framework (EIF) version 1.0 (2004 release)2 and version 2.0 (2010 release)3 are built on the principles of Openness, Reusability and Interoperability, and advocate the consideration of OSS when/if possible.

In their investigation on eight UK E-Government instances migrating from proprietary software to OSS, Waring and Maddocks [22] looked at the major reasons for migration. The identified reasons included cost savings (short-term savings from licensing and implementation costs, and long-term savings from maintenance and upgrade costs); reliability; scalability, that is, the ability to test systems at pilot sites, and when proved trouble-free, roll it out to a larger group, was found to be important; customizability, meaning the ability to customize software by allowing access the

1 http://www.opensource.org/docs/osd
2 http://ec.europa.eu/idabc/servlets/Docd552.pdf?id=19529
source code and tailor the applications to their specific need; and finally freedom from vendor lock-in, denoting an obligation to commit one and only one software provider were identified as essential reasons to adopt OSS. In another study [23], it was found the major benefits could be easily realized through interoperability between all governmental constituents and stakeholders, by avoiding vendor lock-in, and through flexibility, especially with the increased use of Internet. Aligned with those findings are those of Cassell’s [21] study on the four European cities of Vienna, Munich, Schwäbisch Hall, and Treuchtlingen.

On a more general note, policymakers who require that governmental procurement officials give preference to OSS were criticized [24] based on two levels: technological and legal. Technologically, software procurement preferences can impede the benefits of choice, competition, and innovation that flow from technical solutions based on multiple interoperable sources, especially that contemporary IT eco-system permits consumers to combine the best proprietary with the best open source products to forge a tailored ideal solution. Legally the software procurement preferences contravene well-established principles of equal protection and non-discrimination set out in most federal or state law, constitutions, and governing Electronic Commerce laws.

3. Empirical Study

3.1 Research Method

This study is an exploratory single case study, investigating an on-going project in the Finnish Public Sector: the E-Government implementation in the Finnish city of Oulu. A case study is a research strategy comprises an all-encompassing method covering the logic of design, data collection techniques, and specific approaches to data analysis[25]. It is not the intention of this study to judge whether the implementation was a success or a failure, since this research is but a snapshot in the project lifecycle, based on the notion that an E-Government project trajectory is a long and ever-winding journey that should not be judged as successful or failure based on a single point in time[13]. The purpose of this research, however, is to reveal some of the problems related to such implementations in the Finnish Public Sector, and to provide a guideline for future implementations. To this end, data collection methods included a semi-structured case protocol, multiple documents, as well as individual personal interviews with identified key persons in the project, including the project manager of the city of Oulu, and the Chief Project Officer of the IT-partner. Interviews acted as the primary source of data, while other sources like the Internet was a rich source for secondary data. The use of multiple sources of evidence provided depth and richness and enhanced the construct validity of the study[25]. Construct validity was further supported by having key informants review draft case study reports and give their confirmation on its content. To ensure reliability a thorough case study protocol was prepared, and all procedures followed in this study were documented.
3.2 Research setting

The city of Oulu is, in general, a technology-oriented city: it has one of the biggest technology universities in the Nordic countries, the main Nokia mobile phones have been designed in Oulu and a number of high-tech companies operate there. Oulu is the biggest city in Northern Finland, with population of 131,585 in 2008.

In this study, we investigate the implementation of an open source BPM solution that was adopted by the city of Oulu. However, this implementation is but a small fragment of an ongoing E-Government project that is aimed at creating an electronic city portal which provides a communication point between the city and its customers. The principal aim of this project of Oulu is to produce municipal online services in one place, under one login and uniform in use.

3.3 Implementation project

The project started with the City of Oulu realizing that serving its customers the conventional old-fashioned way is a waste of resources and leads to customer dissatisfaction. The project manager stated: ‘Transacting one's business with a city or municipality is often considered awkward, frustrating and time-consuming, especially when it comes to completing various forms and applications’. The city of Oulu, in cooperation with its private sector IT-partner, have decided to adopt a fully fledged BPM-focused E-Government that is completely based on OSS technologies (e.g. Intalio BPM suite, Liferay Portal application, Red Hat GNU/Linux platform, the Jboss application server, the Apache web server, and the MySQL database). The implementation took the following form:

**Phase 1: OmaOulu Portal (July 2007 – May 2008).** The aim of this phase was the launch of the website “www.OmaOulu.fi” (“MyOulu.fi”). This phase was a basic implementation, and it took ten month to complete. The purpose of that phase was to create a technical platform for the city of Oulu (i.e. E-Government Portal), and to produce municipal online services in a uniform fashion. On top of that platform all other electronic services would be built. At its early launch stage, it provided Oulu citizens with a customizable personal page, email, calendar and social networking capabilities, all based on strong user identification.

**Phase 2: Portlet / Content Creation (May 2008 – November 2008).** The second phase was to create the content of that city portal, and the biggest content was “electronic forms”. The portlet is a technical platform which enables end users to list and view these stored electronic forms. By August 2008, discussions had been made on the most suitable business solution. By November 2008 the BPM tool was chosen.

**Phase 3: Automating Processes (January 2009 – January 2010).** Once the technical platform and requirements were in place, forms and processes have been ready to be modelled and automated. By the end of the research investigation, there have been two ready processes that were developed by IT-partner. In addition, three
more processes were under development internally (i.e. by the IT department of the city of Oulu).

### 3.4 Pilot Process

The first process (i.e. pilot process) was ready by March 2009, and it was tested by a selected group of users. This process is meant to automate the processing of “road-advertisement-permission” application, where customers, typically SME’s, request a permission from the city to use a road banner to advertise a product. Usually this sort of processes was handled manually: customers would print the required form from city’s official website, complete the form, and then mail it or hand it to the city officials. After treatment, the City of Oulu would mail the decision to the customer. If a customer wanted to inquire about the status of his or her application, (s)he would do so by telephone.

After launching the new e-service, the scenario would change so that the customer would logon to his or her account and initiate the process by applying for a road-advertisement-permission. (S)He fills out the electronic form, specifies the decision receiving method (i.e. electronically, by mail, etc.), and then submits the form.

The employees of the city of Oulu receive a notification on their ‘Task List’ on their electronic desktops that a new application has been submitted and waiting for processing. They look into the application and perform the required checks and make their decision. Once the decision has been made and the application forwarded to the next step of the process, the instance disappears from the employees’ task list.

In his/her ‘Status Report’ the customer can monitor the current status and location of his/her application. When the final decision is made, a notification is sent to the customer’s own account. Assuming that the permission is to be granted, the customer receives it in a PDF-format file in his/her ‘Document Bank’.

The project team in Oulu drew the first process draft using pen and paper. This draft is based on discussions and interviews with end-users to capture their opinion on what needs to be done (i.e. how the work should flow in the business process). Then this hand-made drawing was transformed into a Microsoft Word template, and more discussions and interviews with end-users were made. Several iterations were made, and suggestions from the user’s side were taken into account before the process was ready to model in the BPM tool. Finally the draft process was used as a guide for modeling the process on the BPM tool and in accordance to the Business Process Modeling Notation (BPMN) standards. Complying with the BPMN standards, the process model was made up of four pools representing all the participants of the permit application process:

1. **Customer**(e.g. SME, citizen), who applies for the permission, and whose role after applying for the permit is to simply access his/her account and check for the municipal response.
2. **The Actual Process**, which starts by receiving the permit-application and which connects the participants together.
3) **Handler, or the municipal employee(s)**, representing who is/are in charge of looking into the application and deciding whether or not a customer is eligible to getting the permission.

4) **Stakeholder**, who may be considered as third party, specifically those are in charge with keeping roads in order (i.e. Road Chief, and Maintenance Guy). The only role they have from our process viewpoint is to receive information about the permit decision, in case a customer is granted a permission to plant an advertisement on the road.

It is worth noting that this implementation was rather simple from the technical perspective, yet it was one of the most difficult one to complete, as it involved a lot political discussions and justifications. The project manager explains that it was such a tough task to bear the responsibility of explaining to the city employees why this change is needed, and that he considers it as a big achievement to explain to them that they are not going to lose their jobs.

### 4. Analysis and Findings

Six critical issues were identified in during the implementation under study. Next, we will present those issues as observed from the data, relate them to literature, and suggest how each issue could be dealt with.

#### 1.1 Change Management

**Case:** Change management has been identified as a very influential problem in city of Oulu case, and resistance to change led to several implementation difficulties. It is noted that because employees’ resistance was so fierce, the IT implementation had been utilized to mere automation (at least in the current stage). The chief project officer at the IT-partner explains: “Oulu, at the moment, is still feeling the pain of how IT can affect the other governmental silos inside the city. They are now in the beginning of doing the change, and they are not yet half way”.

**Literature:** Change management is one of the most highly reported critical issues in technology implementations [3, 8, 26-29]. By change in this context, we mean technology-driven organizational (or technochange) as suggested in the work of[30].

**Solution:** The literature provides a plethora of recommendations to deal with resistance to change. Just to mention a few, the use of *IT change facilitators* (i.e. team members who should be neutral to any proposed solution and serve to empower both business and IT people to arrive at a solution); and *IT change advocates* (i.e. charismatic people who know how to affect people to change)[26]. Another suggested solution [31] is to build a comprehensive business case that describes the current situation and the conceived benefits from change provides a meaningful tool to mitigate resistance.
1.2 Top Management Support

Case: It was noted that the project team had hoped his team could have received more commitment from the top management, which would have made their job a lot easier. It is obvious that the message was clear on the strategic level (e.g. Oulu aims at remaining in the technological forefront of the region, and it wants to achieve the highest level of customer satisfaction) however, on the execution level things were not as clear. In several occasions the implementation team was left alone to solve issues that arise without proper support from the top management. The project manager believes that top management support could/should have been better. In his own words, he describes his experience: ‘The problem is that top management gives too much freedom to the users in designing the processes. If users say "we can do this", only then management would say "ok, we can do it". If we go to the top management and say we "will do something this way" they would tell us to go and discuss it with the users”.

Literature/Solution: The lack of top management support is a recipe for failure. Without top management support, progress in any project will be very difficult [8, 15, 29]. Thus it is suggested that a Chief Executive Officer (CEO), President, or any executive manager of the corporation be the project champion. Also it is recommended for project management to have a direct connection with the project champion[3]. That speeds up the project and reduces any resentment that might arise.

1.3 Business Process Management Mindset

Case: Oulu’s main objective is the creation of in-house Web-based services without the need for technical vendor support. Although such objective is believed to be achievable, it was noted that it was not going to be an easy job. Technicalities aside, the employees in the city of Oulu needed more understanding of the concept of BPM, as the functional department was the dominating mindset. Also, we observed that the lack/or low understanding of business process modeling was a major problem in the project. Although, the management have had some processes modelled, they did not actually represent the reality. The chief project officer at the IT-partner explained that BPM was such a young issue in Finland, and that he did not recall any company doing a full blown BPM.

Literature/Solution: BPM needs to be understood as a different approach to management, that is, as a shift from traditional vertical department-based approach towards a horizontal process-based approach[32]. Just like in enterprise system (e.g. ERP), BPMS requires a clear understanding of the organization’s processes, and acquiring a different mindset which views the organization as a system of interlinked processes, the management of which requires concerted efforts to map, improve, and adhere to organizational processes[3]. Regardless of the selected BPM technology, process mapping (i.e. modeling) is a fundamental step, and makes all the difference. Some studies4 show that participants with business process modeling knowledge...

4 http://education.gsu.edu/ctl/FLC/Borthick-InstrEffect06.htm#summary
outperformed their peers who did not possess that knowledge, in every single audit task.

1.4 Process Rethinking instead of Automation

Case: Although a BPMS solution is meant to be a key enabler for process improvement, the implementation under study was a mere process automation project. When the project manager was asked about any potential process improvements that were included in the project, he expressed his dismay with the objective being service process automation, and explained that he had wished if top management would have suggested performing some process improvements rather than just digitalization.

Literature: In the large body of literature on BPR - be it in the form of radical rethinking [33], quick hits [34], or process improvement [20] - it is argued that BPR efforts are not/should not be about automation (i.e. moving from manual to electronic while doing the same thing), and BPR in E-Government is no exception. E-Government is not just about putting existing forms and services online; it provides the opportunity to rethink how the government should provide the services to its customers in a way that is tailored to users’ needs[8].

Solution: This was indeed a typical process automation instance. However, one could argue that for a pilot project things need not get complicated. This was such a large scale project, and that the first implementation was purposefully made simple acting as a proof of concept. Then, in a later stage step process improvement and engineering activities may be applied when the technology has proven solid and functional.

1.5 Stakeholders’ Involvement

Case: In terms of including employees and customers in the development of the E-Government project, we could find almost no involvement from the customer side (e.g. citizens, SME’s). Employees, on the other hand, have had too much influence – as was illustrated earlier - which at different occasion made the progress in the project difficult. However, it was noted - during one interview - that employees’ understanding of the customers’ requirements were sufficient to develop a solution that would meet customers’ expectations.

Literature: There has been several calls for attention with regard to this critical issue. Scholars’ [12, 13, 27-29, 35] common advice is that employees and customers should be closely involved in the process of developing E-Government services.

Solution: The solution to this problem lies within: governments must abandon the “build it and they will use it”[8] approach, and adopt a more sophisticated view of the people it is serving. It is recommended the governments adopt refined view of stakeholders’ management in E-Governments[12], which takes into account: the identification and inclusion of all stakeholders in developing the E-Government solution; weighing the technological development choice against broader social cost; and developing governmental strategies to align stakeholders’ interests.
Other scholars offer four general recommendations to managers with special focus on employees and customers: employees and customers should be closely involved in the process of developing E-Government services; employees and customers must be trained to make them effective co-producers of the new services/processes; managers should understand that, with the introduction of new e-services, certain customers will require more time and support from the employees; and finally the time saved as a result of the introduction of E-Government must be wisely utilized, otherwise, it will be occupied by other administrative tasks in an unplanned and disorganized fashion [35].

1.6 Financial Assessment

Case: No financial assessment efforts could be identified in the Oulu project. The only available financial information concerned the cost for development and training of the BPM software suite.

Literature/Solution: For organizations implementing BPM solutions, the main objective of process monitoring and controlling is to provide the necessary data basis for continuous process change management[3]. This information could be used to evaluate the business processes performance, and to measure the soundness of the IT investment. Cost/Benefit Analysis (CBA) is a common method [36] to measure the soundness of the IT investment. It aims at analyzing selected monetary effects such as: reduced processing times, reduced transport times and reduced storage costs (e.g. for paper archives) and comparing it with the investment costs. Another common method in the field of evaluating IT investments is Total Cost of Ownership (TCO), where several alternatives are compared and the optimal alternative is chosen [11]. Some suggest the use of an Activity Based Costing (ABC) model [34], which when combined with customer requirements; together allow planners a better picture.

5. Summary and Conclusions

Providing public services over the internet has been a major requirement for a contemporary government. In our study, we drew a direct link between E-Government and business process management as a method for managing the relationship between government and customers. The aim was to identify the critical issues that face Governments when implementing an E-Government project. From the Oulu case, we identified six critical issues that need to be seriously considered when implementing projects of similar nature. These critical are: change management, top management support, business process mindset, rethinking the work, involving all stakeholders and support the decision with some financial assessment techniques.

As always, also our study has its limitations. While some limitations are associated with case study as a research approach, other limitations are related to this particular instance of study. One major limitation of case study, in general, is its limitation in providing statistical extrapolation across the board. Nevertheless, the actual value of case-based research lies in the ability to provide analytical generalization as compared
with that of survey research, to present statistical generalization[25]. On the other hand, this particular instance of research represents a ‘snapshot’ view of the data and whilst the cases are recent they do not provide an ongoing analysis of the implementation in Oulu.

In our future research, we will aim at providing an insight into the role of public-private-partnership (P-P-P) in the decision making process, and how this type of cooperation could be utilized to benefit all parties involved.

6. References