Formative evaluation and user engagement: A model to ensure value from e-government

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Abstract. Governments are investing in e-government to enhance public sector efficiency. It has been argued by e-government scholars that citizens' demand for e-government does not meet expectations; hence governments might not achieve the expected benefits. This study investigates formative evaluation as a method to ensure e-government benefits realization. The case is ex-post evaluation of value from digital communication in a citizen service center at a Danish municipality and was conducted as Action Research. Barriers to adoption were revealed, addressed and eliminated during the formative evaluation process. Clear expectations from top management, assessments and disclosure of workers' behavior and commitment from managers proved pivotal in the benefits realization process. Further research into the internal e-government adoption processes and the impact from external factors is needed in order to understand more profoundly the challenges for realizing benefits from e-government.

Keywords: e-government, evaluation, adoption, local government, value, benefits, action research

1. Introduction

The challenges of realizing value from IS are widely recognized. Ward et al. [1] conducted a survey of perceived satisfaction with IS projects among 102 private and public organizations. Only 45% claimed success with more than half or more of their IS projects. Analysis of U.S. local governments surveys concluded that 'few governments reported any changes that are attributable to e-Government, especially changes involving cost impacts' [2]. Goldfinch [3] argues, that one should be pessimistic about value from e-government. There is a need to address the organizational changes and desired value along with implementing IT systems. The Danish Government and the local governments agreed on an ambitious e-government strategy [4]. During the five year period, 70+ public e-services will be mandated; 80% of communication with citizens and companies will be also be mandatory digital.

E-government is described as multivariate and complex, covering a wide range of areas, actors and applications [5]. It is commonly accepted that e-government research needs to be multidisciplinary to meet this challenge. From a comprehensive e-

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government literature review, Heeks and Bailur [6] do not find much evidence of a multidisciplinary approach. They find a predominance of information systems' research influence, no inheritance of critical views and only scarce studies based on solid empirical work offering practical recommendations. Yıldız [7] states that e-government evaluation 'only focus on the measurement of the availability and development of web sites and on line services'. It misses the organizational and cultural change that is necessary for e-government to succeed.

This study will apply a multidisciplinary approach through empirical work and direct contact with data to address the organizational and cultural change. A formative evaluation model of e-government adoption in local government in an Action Research approach was applied. **Research question:** How can formative evaluation impact value from e-government? Can this evaluation model reveal generic factors that support or hamper e-government value realization?

2. Related work

E-government, understood as the services, delivered to citizens etc. through the internet, can be measured in many different ways (as IS implementation, against anticipated objectives or in terms of efficiency), considering different phases of the e-government initiative (implementation or operation) and with different objectives (e.g. comparison, supporting decisions or understanding phenomena) [8]. Even though this e-government evaluation ontology is convenient, it leaves a gap between anticipated and actual e-government as it only defines one phase after implementation; 'operation'. I will add the technology adoption processes to close this gap.

Public sector has an obligation to deliver accountability, transparency, equality and reliability in the services towards citizens and businesses [9]. Concluding, that there is a lack of consistencies in terms of value metrics and stakeholders included in evaluation research, the author presents a unified multidimensional framework that covers all value dimensions and stakeholders [9]. Luna-Reyes et al. [8] suggest an evaluation model composed of not only output but also technological characteristics, organizational form, institutional arrangements and contextual variables. Luna-Reyes et al. add value dimensions that extend the e-government perspective. Both models build on a positivist philosophy that perceives value dimensions as objective, value free and measurable. Other scholars are opposed to a unified model view. Carbo and Williams [10] note the diverse subject matter areas that e-government is applied to and state that there is no one model for local government evaluation.

A vast majority of e-government evaluation studies concern only stakeholders outside of the practitioners setting, primarily citizens [9]. Evaluation of citizens' adoption of e-government applying behavioral models such as TAM, TRA or TPB [11-13] provide understanding of the citizen adoption process. Content evaluation of public websites and surveys of managers' perception of e-government value and barriers [14, 15] constitute other models of evaluating e-Government. Jones et al. [16] claim, with support from many researchers, that most organizations 'have no ICT evaluation processes in place' Yildiz [17] addresses the oversimplification of e-government and recommends to evaluate 'the processes that shape the management of e-Government'. Luna-Reyes et al. [8] state that 'we still know little about the impacts and results associated with e-government'. According to Ndou [18], 'one of the reasons why many e-government initiatives fail is related to the poor understanding of the e-government

concept, processes and functions'. Carbo and Williams [10] underpin that without appropriate evaluation models, e-government may be costly and include political, operational and technology risks. These studies provide useful knowledge in regards to comparison of e-government output but are of limited use for understanding e-government adoption. Ndou [18] acknowledges the employees as an important actor; she states that 'the relationships, interactions and transactions between government and employees in fact constitute another large e-government block, which requires a separate and very careful handling'.

A constructivist evaluation approach, opposed to the positivist approach, can provide a more extensive understanding of e-government [e.g. 16, 19]. Applying an action-based grounded theory approach [20] in collaboration with two local governments in the UK, they aimed at 'seeking to increase the understanding and knowledge of e-government evaluation' [16]. This was done in an interpretive and inductive process leading to an understanding of 'social and human aspects of e-government evaluation'. The studies led to important themes for evaluating e-government, namely decision making, evaluation methods, what and how to assess and how the practitioners perceive the evaluation process. Moreover, the dilemma of agency was stated to dominate e-government. A grounded approach was applied by Irani et al. [21] with a series of workshops in the UK with e-government practitioners. The workshops inductively revealed the practitioners' perception of challenges in e-government of technological, social and organizational themes, e.g. lack of interoperability, shared services, legal issues and inter-governmental coordination and collaboration.

The degree of adoption of a new technology is argued to be dependent on the information decision process of an individual thus on relative advantages, compatibility, complexity, trialability and observability [22]. Gallivan [23] argues that adoption can be understood as primary adoption at the organizational level and subsequent adoption at the individual level. He finds from an empirical study that managerial intervention and captive use facilitated the adoption process. From an empirical study Braun et al. [24] state the importance of also considering the contextual factors at the organization level, i.e. value management capabilities, integration into managerial processes and support from top management. Tyre and Orlikowski [25] saw, that technology use congeals after a short time and that further adoption requires interventions into the organization.

3. Method

This study was conducted as Action research (AR) to explore the implementation of Digital Post in a Danish municipality. AR is based on a certain action in a particular setting that creates a response where the social action can be connected to a causal model [26]. It has the ability to create knowledge about deficiencies in the practitioners' world 'that research of a more positivist nature fails to do' [27]. AR is an appropriate methodology to investigate IS in organizations with its 'explorative yet rigorous nature, grounding in principles and methods' [28]. AR is conducted in this study as a cyclical process with five phases, namely diagnosing, planning, action, evaluating and specifying learning [26].

Digital Post constitutes a major cornerstone in the Danish 2011-2015 e-government strategy [4]. The system is basically an e-mail system in which identified actors can communicate encrypted. The empirical setting constituted the Citizen Ser-

vice Centre department in the municipality of Assens (ACS). ACS implemented Digital Post in 2010. After two years they had a suspicion that Digital Post was not used by the staff and they had not seen any drop in postal costs. ACS had two managers, and the department of 40+ employees was divided into 8 teams. The teams worked within a range of different public sector administrative services.

Data collection covered postal costs, number of transactions, staff surveys, focus groups [29], interviews with staff, managers and head of department together with notes from researcher's observations and diary from the two managers to reflect on their own learning [30].

4. Results

The number of messages through the OM went from 8 in March to around 1000 in June and July, performed by 5 workers in March and nearly all workers through July. Diagnosis was done by analyzing transaction data. Diagnosis revealed a very low adoption rate of the OM after the initial technical implementation. This worked as the overall baseline. An evaluation report was elaborated on a monthly basis. The report was a recurrent evaluation of the adoption and included quantitative and qualitative evaluation on department, team and employee levels. The report also included a list of barriers to adoption, together with an action plan, stating responsibility for action towards barriers. The report stated advice to the managers to decide from.

The survey of office workers' e-government readiness and attitude showed skepticism and negativity towards digital post and a very low rate of workers' own use of digital post as a citizen. Managers observed a variety of 'bad excuses' (their expression) for not using digital post.

> When I'm around and ask about why mail is sent physically and not digitally, I can hear that there is opportunity for development both in attitude and in terms of skills. So there will be enough to deal with when you arrive (Karen, manager, e-mail, April 25, 2013).

On the basis of the survey, from the diagnosis phase, two focus groups were conducted, distributed on age and with different attitudes to e-government in each group. Both groups included workers with positive and negative attitudes and different skills. The focus groups were planned solely to contribute to the research purpose. However, the focus groups turned out to also release some of the insecurity and tension about digital post hence reduced the skepticism and negativity.

Knowledge about barriers could be extracted from the work practices where workers would use physical mail. In order to identify these we planned to have workers to register every physical mail with a type indication in one week.

Many of the barriers were external, of which the municipality only had very limited impact, if any. Of the internal barriers, the municipality had control, but had only limited capabilities regarding configuration of the various systems and the over-all internal interoperability.

The involvement of the workers and having them to reflect on their own behavior together with on-going follow-up from management turned out to be necessary to maintain momentum in the realization process. Moreover, the 'disturbance' of the researcher and my motivational and creative capabilities together with the ability to create good personal relationships with all levels was stated as pivotal, especially the ability to meet the workers with respect and curiosity. These competences are stated by Mumford [31] as a prerequisite for succeeding with action research. Removing the

first barriers within hours created a certain momentum. The high momentum and the agile decision making was stated by the head of department as very uncommon for the organization, thus it made a great impact on the engagement of the participants.

The specified learning, elicited from interviews with head of department and managers, focused on assessments, role of management and involvement of workers. Assessments were agreed upon as pivotal for the formative evaluation leading to eliminated barriers and subsequently enhanced value realization. Expectation clarity (in form of orders) both from head of department towards managers and managers towards workers had the department focus on the Digital Post value. The importance of the operational managers as being in charge of the change process (and not the IT department) was stated by all. The study revealed specific types of barriers to digital post, see Table 1.

Table 1. Types of barriers to digital communication

Barrier type	Explanation	Example
External work processes (mainly other public organizations)	Processes, based on physical documents, stamps, signatures etc. that involves the municipality, legislative issues and missing awareness from externals	Housing loans, where legal text must be on the back of the loan document (Ministry of housing), cannot be sent digitally.
External technical infrastructure issues	Subject matter systems not integrated with Digital Post and the complexity of the digital post system	The welfare aid system (vendor has monopoly), used by all municipalities. Configuration failure in the Digital Post system.
Internal technical infrastructure issues	Local systems interoperability and configuration issues	Case handling system was not configured correctly
Managerial decisions	Internal work processes involving physical documents or other communication channels	ACS sent physical tickets to elderly people to pay for therapy, workers promise costumers not to send digital letters

5. Discussion

According to survey, staff uses between 10 and 20 systems every day together with Digital Post. One type of barrier to adoption constitutes other systems being incompatible with Digital Post. Failure of interoperability has roots in the Weberian bureaucracy model and is recognized as a true barrier to e-government [32]. Trialability will stimulate adoption of new innovations [22]. Digital Post was designed without the opportunity for staff to experience use of the system without involving real citizens. Together with the technology illiteracy that may characterize many skilled staff, this will induce uncertainty, hence slower the adoption.

This case revealed several policy issues, including both failure from legal recognition of digital documents and privacy issues. Failure to acknowledge digital documents is obviously fatal to Digital Post. The trustworthiness of this e-government initiative is under strain when civil servants experience that other parts of public sector do not recognize digital documents. The most serious obstacle is the uncertainty about whether the civil servant may extract CPR from the Civil Registration System without committing a crime. The legal department of the Danish Digitization Agency confirms that civil servants may do this, but they have not gone public with this. The law abiding gene is very strong amongst administrative workers in the public sector, thus con-

firmation from the Danish Data Protection Agency would resolve this. Many researchers find legal barriers to e-government [18, 33, 34].

The second issue lies with configuration of systems. Why is a system configured to send the expensive A-mail for three years without anyone noticing it? The economic constraints of the public sector lead to mere technical implementations. Systems are typically implemented by vendors and the local IT department from a default IS configuration scheme. It is pivotal for e-government initiatives that the business manager is in charge of system configuration and has the necessary capabilities.

Capability of producing the necessary and sufficient business intelligence (BI) is necessary to be able to document value and inform adoption process. In this case there were insufficient capabilities to extract, manipulate and present the BI data. The BI data revealed a potential major breakdown caused by workers omitting Digital Post. This led to an intervention that stopped this. Furthermore, the case revealed lack of project management and change management capabilities at the management level. The researcher acted like the 'visionary change agent' that Chircu and Lee [35] states as one of six e-government adoption key success factors. This is a challenge to local governments with busy work schedules.

It is vital for public institutions to adopt an e-government initiative when funding is reduced according to anticipated use from the initiative. Digital Post has existed since 2010 but only in 2013 was the state funding reduced, which have had an effect on local governments' CEOs. The municipality had to cut costs or reduce welfare service elsewhere. The CEO ordered the use of Digital Post and this was not questioned by managers or workers. This supports the response to authority claim as a major impact on adoption [36], which is also stated from a multiply case study by Chircu and Lee [35]. Secondly, the study shows how important it is to integrate the current follow-up into the managerial practice as stated by Braun et al. [24].

The skilled administrative worker in the local government carries a long and strong tradition of physical writing and serving the citizen. The focus groups in this study proved that making the mail digital conflicts with these values in many ways. Rogers [22] asserts that adopting a new value system is a very slow process. Captive use is also stressed as an important adoption factor [23], which was proven in this case by the mandated use of CPR. The two vendors in the market of the OM both declare that they will not enforce this feature on customers. The case of the Digital Post and use of the OM is characterized by a high degree of ease of use. A

This was confirmed by many workers throughout the project. The greater the perceived relative advantage is, the faster the adoption [22].

Partnership and collaboration are important elements of the e-government development process [18]. Collaboration with system vendor was important regarding support for configuration knowledge and export/interpretation of data. Collaboration with other public institutions was confirmed in this study as important for the adoption process. Several of the adoption barriers originated from lack of recognition of digital letters from other public institutions. This siloization is recognized by Bannister and Connolly [32] as a major barrier to e-government.

Leadership is necessary before, during and after project implementation' [18]. This study explicitly 'instructed' managers, head of department and head of division to act and perform management and leadership. Especially articulating the expectations towards staff and clearly 'giving orders' of how to perform work tasks was proven vital. This was explicitly mentioned by managers when specifying learning, i.e. addressing head of department and head of division. Staff also referred to 'the order'

many times, i.e. addressing the managers and head of department. The disclosure of measurements and status reports made it apparent to others, e.g. if one manager had not made a follow up on specific barriers. This integration of how to enhance value from e-government into the managerial processes was found to be key in e-government [24]. In the study, the managers exerted management, which was reflected upon both by managers themselves and staff, as a change, that enhanced perceived work satisfaction. This effort mitigated the role of agency, which is said to be significant in e-government [3, 16].

6. Conclusions

In this study, I show how a formative evaluation model of e-government adoption can enhance value from a specific e-government case: Adoption of Digital Post in a municipal citizen service center. Applying the evaluation framework in an AR approach revealed various barriers, within technical infrastructure (lack of interoperability), legal issues (unclear regulation and uncertainty about privacy issues), lack of human capabilities (project management, data management, systems configuration), change management issues (conflicts in value systems, resistance to change, vague and unclear management) and collaboration issues (other governmental institutions being opposed to digital post). To overcome barriers within the municipality, the study introduced interventions as clear leadership and management, authority based decisions, disclosure of individuals' behavior and clear e-government strategy, combining measurements with on-going changes in systems and work practices. This was overall done in a mutual collaboration between researcher and managers, but foremost with respectful involvement of staff.

The adoption of Digital Post increased to saturation, but postal costs only dropped one third. A number of e-government adoption barriers remained as unsolved. These barriers originated primarily from external factors. Interoperability problems (systems that could not integrate to digital post), unclear legal issues and governmental institutions, that did not acknowledge digital letters constituted remaining barriers.

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