

Managing e-service development: comparing two e-government case studies

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MANAGING E-SERVICE DEVELOPMENT – COMPARING TWO E-GOVERNMENT CASE STUDIES¹

Abstract

Purpose – To contribute to a better understanding of the progress and the success vs. failure in e-government development, based on case studies of two inter-organizational e-service projects.

Design/Methodology/Approach – The analysis in the paper is made from a) an e-government systems development life-cycle perspective and b) a challenge and success factor perspective. The point of departure is theory and a comparative analysis of two e-government projects.

Findings – The main results in this paper are 1) a combination of perspectives (in a project stage and analysis grid) that can serve as a support when managing e-service development and 2) a set of identified crucial success factors within an inter-organizational e-government project including project manager skills and position in the agency organization as well as when and how systems maintenance issues are introduced into a project. Existing theory and perspectives are also criticised based on the present study.

Practical implications – Lessons to learn from a challenge and success factors perspective in two different e-government projects, and suggestions to revise an e-government development life-cycle in order to perform a better practice in the field. The revised/developed project stage and analysis grid presented in the paper is one way to deal with the challenges related to the management of e-service development in the public sector.

Originality/value – This paper addresses a number of challenges of complexity and risk that e-government initiatives face. It is not an easy matter to realize such initiatives' potential. A key research issue for the e-government field, as well as the information systems field in general, is to understand why some projects progress to success while others end in failure. This is the niche for the present paper.

Keywords – project, e-government, public e-service, inter-organizational, one-stop government, case study.

Paper type Research paper.

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1 Introduction

E-government initiatives have a large potential in developing and delivering better services for citizens and to provide possibilities to interact more openly with agency constituents as well as a potential to transform government structures and processes (i.e. the way in which governments offer their services) (Allen et al., 2001; Irani Love & Montazemi, 2007). However, several e-government initiatives face a number of challenges of complexity and risk – and are not easy to manage (Andersen et al., 2007; Irani Love & Montazemi, 2007; Gil-García & Pardo, 2005; Rosacker & Olson, 2008). The embedded complexity and risk in e-government initiatives can be considered as one explanation to why reports on project failures are common. Heeks (2006, p. 3) for example states that: “Most e-government projects fail”. Complexity and risk factors are also common in information system development (ISD) projects or other development projects in general, but public managers find themselves making decisions about IT for which they are often unprepared or even ill-equipped (Gil-García & Pardo, 2005). This issue demands more knowledge and are therefore addressed in this paper. A key research issue for the e-government field is to understand why some projects progress to success while others end in failure (Heeks & Stanforth, 2007). This research issue is also interesting in the IS field regarding other domains and sectors. The main objective in this paper is to contribute to a better understanding of the progress and the success vs. failure in e-government development, based on case studies of two inter-organizational (IO) e-service projects. Learning from the past and from the experiences of other development initiatives is essential for improving the development of public e-services (Irani, Love & Montazemi, 2007).

IO dimensions are central in e-government development, when understanding public sector actions, restrictions and potentials. Within the e-government research area there are some topics that deal with IO dimensions of e-service development. The most obvious areas are the research that pivots on one-stop government e-services (Gouscos et al., 2007; Tambouris & Wimmer, 2004; Kubicek & Hagen, 2000) and studies that relate to the reconstruction of IO case processes from the client point of view (Andersen, 2004). The two cases targeted in this paper are examples of IO development initiatives of one-stop government e-services delivering extended services for Swedish citizens. In e-government research normative statements can be identified concerning the management of challenges associated with e-government development. Some of these normative statements are, as in development projects in other areas, expressed in terms of critical success factors (CSF) (Reel, 1999). Ho and Pardo (2004), for example, mention: top management commitment, linkage to business, technical alignment, knowledgeable personnel, and user involvement.

The challenges in developing e-government can also be related to factors covering: information and data, the information technology (IT) as an artefact, organizational and managerial issues, legal and regulatory preconditions, and overall institutional and environmental (Gil-García & Pardo, 2005). Other challenges are related to the fact that e-government initiatives (for example one-stop government solutions) often involve several government agencies (i.e., the IO dimension introduced above). One important identified barrier that needs to be overcome is the delaying factor of the lack of organizational cooperation (Kubicek & Hagen, 2000) in IO projects – a barrier that IO e-government shares with other IO system development projects. Agencies tend to act too independently, since the initiatives tend to be poorly coordinated (Irani, Love & Montazemi, 2007). These challenges are further discussed and analyzed in Sections Two and Four, below.

One way of structuring and organizing e-government development is to understand the process of development in terms of different phases; like any system development project or process (according to for example Avison & Shah, 1997 or Avison & Fitzgerald, 2003). Typical system development methods tend to have more or less four core stages covering analysis, design, construction, and implementation (Heeks, 2006). To these generic stages, project assessment can also be added explicitly (ibid.). Tsai et al. (2009) reports that government agencies tend to use traditional system development life cycles like this. In the analysis below, five generic stages are used to structure,

understand and analyze two e-government development projects. The two cases are “the provisional driving licence application project” and the “the driving licence web portal project”. Both these initiatives are, as mentioned above, e-government initiatives of a one-stop-government character. The two e-service development projects are described more thoroughly in Section Four.

Based on the reported fact that e-government initiatives, and especially IO projects, face a number of challenges of complexity and risk, are complex to manage and have a high failure rate, the paper argue for a more thorough understanding of e-government development. The challenges and the identified need for more knowledge in the area motivate the following purpose and research questions.

1.1 Purpose and Research Questions

The purpose of this paper is to analyze the two e-government development projects from: a) an e-government systems development life-cycle perspective and b) a challenge and success factor perspective. The two perspectives are mainly based on: a) Heeks (2006) and b) Gil-García and Pardo (2005). The analysis is made in order to reach a more thorough understanding of e-government development, using a comparative case study approach, and to explore and evaluate a development life-cycle model. E-government projects are regarded as a special case of an ISD project; performed under, for example, a certain set of laws and regulations, and therefore interesting to learn from.

Research questions addressed in this paper are the following:

- What challenges and success factors are represented in the two e-government development projects?
- Which differences and similarities do the two cases show and why do they occur?
- How is the e-government systems development life-cycle organized?

After this introduction, the paper is organized in the following way: in Section Two theories on managing e-government development projects are addressed; the research design is reported in Section Three, followed by the introduction of the empirical cases in Section Four; the empirical findings from the two case studies are discussed and analyzed, based on two major perspectives and put into a context of other studies and theories, in Section Five; and finally, the paper is concluded in Section Six where some statements about the need for further research efforts in this area also are made.

2 Managing E-government Development

This section of the paper presents theories in the area of managing e-government development in particular and ISD projects in general. The section is focused on a development life-cycle as well as challenges and success factors in this area that are used as two main perspectives when performing the comparative analysis below. At the end of Section Five the results are also put in the context of related theories and studies.

2.1 An E-government Systems Development Life-cycle

Heeks (2006) claims that an e-government development project typically consists of five stages; (1) project assessment, (2) analysis of current reality, (3) design of the new system, (4) system construction, and (5) implementation and beyond. The e-government systems development model by Heeks (2006) is illustrated in Figure 1, below. The five stages are illustrated in the model. The development model for e-government suggested by Heeks (*ibid.*) has several similarities with several traditional systems development life cycles or so called waterfall models. One general structure presented by for example Avison and Shah (1997) and Avison and Fitzgerald (2003) consists of the following stages: feasibility study, system investigation, systems analysis, systems design, implementation, and review and maintenance.

Tsai et al. (2009) reports that the primary systems analysis and design methodology in use by many government agencies is the traditional systems development life cycle, following the general structure presented above. The development of public e-services then takes place in a certain context. The tasks performed in each stage, however, seem to be more or less the same. Tsai et al. (ibid.) has identified that the planning phase can differ from the private sector regarding the identification of systems objectives, constraints and scope. The objective for the public e-service for example has to be aligned with the overall non profit objectives with high quality information and communication service oriented goals set by a government agency.

Project assessment (1), illustrated as the first stage (Figure 1), in the development model is the identification of possible e-government projects. At this stage the outline of basic project parameters is completed, with the assessment of whether or not to proceed with a project. New e-government projects are typically initiated based on: “a problem that needs to be solved” or “identification of an opportunity which could be seized” (Heeks, 2006, p. 162). That kind of opportunity can arise from several different sources, such as from internal sources or external (environmental) sources. Examples of external sources are: complaints from the media, politicians or citizens, new legislations or directives, technological innovation, and economic crises. Examples of internal sources are: strategic planning, staff problems, and the individual’s desire to give his/her career a boost (ibid.). Analysis of current reality (2) means that descriptions of information, technology, processes, objectives and values, staffing and skills, management systems and structures, and other resources such as money and time are created. This stage consists of a mixture of hard and soft techniques such as an information systems audit, an information systems analysis, a problem analysis, a context analysis, etc., in order to build an overall picture. A SWOT-analysis can, for example, be performed (ibid.).

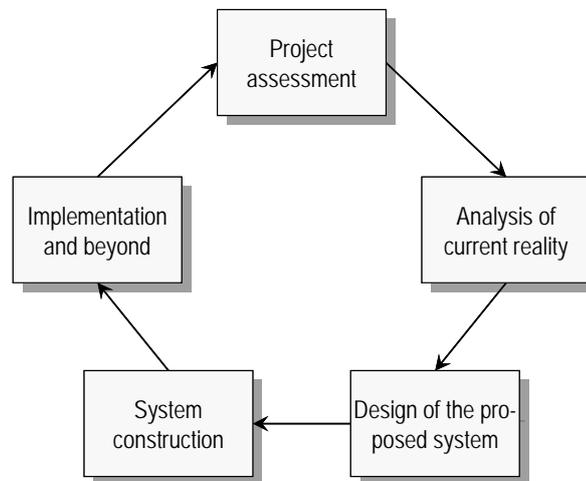


Figure 1 An e-government systems development life-cycle (Heeks, 2006, p. 159)

The design stage of the proposed new situation (3) consists of setting objectives related to the above mentioned dimensions of the new system – putting together the different objectives for the new system to meet. In this stage issues of software and hardware need to be dealt with. Work processes are also necessary to take into account from a design perspective, and not just the front-end processes, but also the underlying processes (ibid.; Jupp, 2003). System construction (4) consists of the process and activities in acquiring any new IT, undertaking detailed design of the new e-government system (for example a system installation), building it, testing it, and documenting it.

Implementation and beyond (5) is represented by the planning of implementation processes, for example: training users to use the new information system; converting data from old to new formats;

systems maintenance activities; introducing the new e-government system; monitoring and evaluating its performance and context; and undertaking necessary activities (Heeks, 2006). The efforts concerning post implementation tasks such as marketing and support, in order to avoid the common “build it and they will come” (Jupp, 2003, p. 135) strategy, are also important (Heeks, 2006).

In the next section challenges and success factors will be focused. These factors will be used in the analysis together with the steps from the e-government systems development life-cycle described in the present section.

2.2 Challenges and Success Factors in E-government Development

The literature in the area of e-government development and e-government projects as well as other ISD projects reports on several sets of success factors. Gil-García and Pardo (2005) as well as Ho and Pardo (2004), have carried out extensive literature reviews of key success strategies of government ISD initiatives. Success factors mentioned are, for example, top management commitment, linkage to business, technical alignment, knowledgeable personnel, and user involvement (Ho & Pardo, 2004). The need to involve users in a sustainable way is also pointed out as a key issue by Carter and Belanger (2005) and Chan and Pan (2008). CSF, independently of source and context, tend to be of this kind. If one, for example, analyze critical success factors in software projects in general several factors like the ones mentioned by Ho and Pardo (2004) will be identified. Reports of information system project failures are also found, which the CSFs tend to be the inverse of. In Reel (1999), for example, ten signs of a project failure are reported. Project managers do not understand users’ needs, the project scope is ill-defined, project changes are managed poorly, the chosen IT changes, business needs change, deadlines are unrealistic, users are resistant, sponsorship is lost, the project lacks people with suitable skills, and managers ignore best practice and previous lessons learned (ibid.). Kubicek and Hagen (2000) have also identified challenges in the area of e-government development. They present six key areas of barriers with a clear IO focus to be overcome for fewer delays, failures and obstacles in one-stop government development. The first key area is summarized in the lack of organizational cooperation, the second key area is the deficiency of legal regulations, and the third key area is the necessary area of pre-conditions in regard to technology and, fourth, in regard to human factors. The last barriers are the lack of appropriate funding and political support (ibid.).

Gil-García and Pardo (2005) report that challenges to e-government initiatives are cross disciplinary and can be grouped into five categories: (1) information and data, (2) IT, (3) organizational and managerial, (4) legal and regulatory, and (5) institutional and environmental. The categories covering challenges are presented in Table 1 where different aspects of each category are described.

Table 1 e-government challenges² – categories and examples

Challenge categories	Aspects, examples
Information and data	The capture, management, use and dissemination of information and data. Sharing information, data quality and data accuracy. Dynamic information needs.
Information technology (IT)	Usability and security issues, technological incompatibility, technological complexity, technical skills and experience, and technological innovation.
Organizational and managerial	The size of project, the diversity of users and organizations involved. Alignment between organizational goals and an ISD project, IO perspective, the existence of multiple, and partially conflicting goals.
Legal and regulatory	The formal rules, laws and regulations that government organizations operate upon.
Institutional and environmental	The institutional framework in which governments operate; the policy environment. Norms, actions, or individual behaviours. Autonomy of agencies.

² Adapted from Gil-García and Pardo (2005, p. 191-192), partially based on a source covering software development risks to project effectiveness (Jiang & Klein, 2000).

The category concerning information and data (1) covers the capture, management, use, dissemination, and sharing of information (ibid.). There are also aspects of data quality and data accuracy as well as dynamic information needs in this category which are important in e-government initiatives. In the IT category (2) technology related aspects are present. Usability and security issues, technological incompatibility, technological complexity, technical skills and experience, and technological innovation are also issues in this category. Organizational and managerial challenges (3) are the main challenges to ISD initiatives according to Gil-García and Pardo (ibid.). The size of project and the diversity of users and organizations involved are two major factors here. The lack of alignment between organizational goals and an ISD project is also put forward as a major factor in the set of organizational and managerial challenges. Dawes and Pardo (2002) also address, from an IO perspective, the existence of multiple, and partially conflicting goals in the public sector. Legal and regulatory changes (4) represent the specific formal rules or groups of rules that government organizations operate upon. Restrictive laws and regulations must be taken into account when developing e-government. The institutional and environmental challenges (5) are the institutional framework in which governments operate (ibid.). This also includes the policy environment. Norms, actions, or behaviours that people accept as good or taken for granted in the context of government “daily life”, are examples of the policy environment which is important for the success or failure of e-government development initiatives (Gil-García & Pardo, 2005). Success in e-government initiatives is not only a question of choosing the appropriate IT, it is also a question of managing capabilities in organizations, and regulatory and environmental conditions. In order to obtain successful e-government, development managers have to deal with all these aspects (ibid.).

3 Research Design

The empirical base used in this paper was generated within a research project concerning e-service development in the public sector in Sweden. The research project is financially supported by the Swedish Agency for Innovation Systems (VINNOVA), through the VINNOVA programme “Innovative development of cross-boundary public e-services”. The research project studied and contributed to two IO e-service development projects during three years. The research project’s main aim was to contribute to the theoretical knowledge on public e-service development and to develop method components for development of IO e-services in the public sector. The understanding articulated in this paper is part of this theoretical knowledge development. The purpose of the two development projects was to develop (1) a one-stop government e-service for driving license matters and (2) a web portal where e-services and information about the driving license process is easily accessible. The two cases also represent an interesting contrast regarding the degree of success vs. failure (for example how actors within the two projects handled existing challenges). This makes the two cases suitable to study within this paper’s research focus.

The intentions of the two development projects were two-fold; (1) the projects should facilitate citizens’ authority contacts in driving license matters and (2) the projects should make the internal processes in the agencies concerning these errands more efficient. An important objective was that the results from the two development projects should have a distinct service focus of an IO nature, in order to decrease the unclear responsibility division between authorities. Three Swedish agencies were involved in the development projects; Sweden’s County Administrations (SCoA) (which organizes the 21 county administrative boards of Sweden), the County Administrative Board of Stockholm and the Swedish Road Administration (SRoA).

The overall e-service research project can be characterized as action research and had the dual purpose of both developing and evaluating e-services. This is anchored in objectives from the VINNOVA programme “Innovative development of cross-boundary public e-services”. Action research is a qualitative research method that is often used within the information systems field (Baskerville & Myers, 2004). However, the empirical data generated and analyzed in this paper has not been explicitly collected during action research activities such as modelling seminars or project meetings,

but through semi-structured interviews with significant actors within the two development projects. This way of action can be related to reflexive research (Van de Ven, 2007) and its two dimensions of careful interpretation and reflection. The fact that researchers in this project have had the role of reflective observers when performing the present part of the study puts the piece of research presented in this paper more in line with a general qualitative, interpretative, approach. A qualitative and interpretative approach was chosen because the research questions and purpose in this paper needed a close look into the two development projects, studying and interviewing people, and their thoughts, interpretations, insights etc. The role of a change agent is present in the overall e-service research project, but as stated above, not in this paper. The fact that the overall research project (the context of this part of the study) is based on an action research approach has made it easier to gain access to empirical data and build trust when generating empirical data for this paper.

Initially, when the research project started in 2005, six persons were interviewed who were involved in the development projects. The interviewees had the following roles in the three agencies: an IT strategist, a development project manager, a systems manager, an internal investigator, a case officer and an IT development manager. In 2007 seven persons were interviewed in order to evaluate the progress and results in the two development projects. Five of these interviewees are within the public sector; four of them are case officers and one of them is a local project manager at a County Administrative Board (CoA). Two interviewees are external consultants working for the public sector related to the e-government initiatives reported in this paper. One of the consultants was acting as a project manager supporter and the other person was acting as a systems development project manager delivering e-government applications. The interviewees have been selected in order to reach a broad view of apprehensions in the studied development projects. Based on an interview guide with themes, open questions were asked about how they understand the notion of e-service, what opportunities and threats they apprehend, interpretations, success and failure stories, lessons to be learnt from the projects, and what kind of cooperation and coordination they regard as necessary for the development projects. The interviews had a semi-structured and semi-standardized design and were audio recorded. The empirical data has been analyzed in a qualitative, interpretive way (Walsham, 2006). Figure 2, below, illustrates the research design with its different stages and processes, related both to the development project studied and the research project.

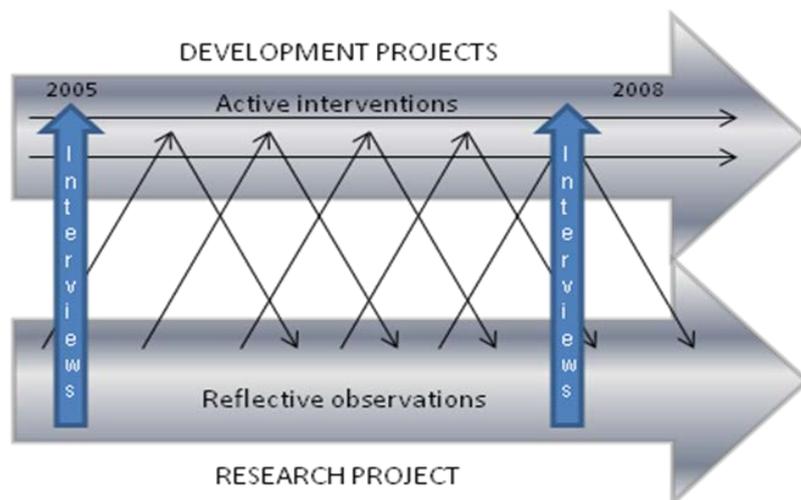


Figure 2 The research design

In Figure 2 the arrows between the processes for the two projects shows the interaction and the flow of for example empirical data generated, interventions etc. The arrows labelled “interviews” show examples of explicit evaluating acts as an important part the reflective research approach.

The main part of the analysis below is structured based on the different stages in an e-government system life-cycle by Heeks (2006), and on challenges to e-government identified by Gil-García and Pardo (2005), introduced in the previous section. These theories have been used as guides for analyzing (Walsham, 2006) the interviewees' interpretations of the development project studied and analyzed. The aim of explicitly using the concepts from Heeks (2006) and Gil-García and Pardo (2005) is also to contribute to that body of knowledge. In Section Five the results will also be put in the context of related theories and studies.

4 Two E-service Development Projects

The two studied e-service development projects that ended in 2008 are called (1) “the provisional driving licence application project” and (2) “the driving licence web portal project”.

The overall process and background to the initiatives above is that everyone in Sweden who wants to get a driving license, first has to apply for a provisional driving license from the regional CoA. The provisional driving license is approved if the applicant is judged by the regional CoA to be able to drive a vehicle in a responsible way. Thus, the permit is an important aspect of traffic safety. Until the e-service was implemented, the permit application was a paper form that was filled in, signed and sent by mail to the regional agency. The application has to be complemented with a health declaration, a certificate of good eyesight, and maybe also an application that, for example, a parent is permitted to act as a private instructor. These documents are received and reviewed by a case officer at the agency. The case officer also checks if the applicant has been punished for any crimes (such as being drunk in public places, drug possession, or any traffic misdemeanour). This information is registered in a database operated by the police and the case officer has access to this information through one of SRoA's IT systems. When the provisional driving license has been granted, the CoA reports this to SRoA through this IO IT system. When the applicant has passed the driving test and the theoretical test, he or she receives the permanent driving license from the SRoA. The mix of different responsibilities and contacts in the whole driving licence life-cycle was regarded as a main reason for developing this e-service.

4.1 The Provisional Driving Licence Application Project

The provisional driving licence application project aimed at developing an e-service that makes an automated decision in “green cases” (i.e., applications that do not call for any extensive handling process) and supports case officers handling such cases. By achieving this, the agency will, in the long run, try to save and reallocate resources from handling “green cases” to more complex errands. An e-service like this also provides an opportunity to standardise the application handling processes across the nation and the 21 county administrative boards. This part of the e-service can be classified as *internal e-government* using Beynon-Davies (2007) and Millars' (2003) categories. The agencies had high expectations concerning the quality of data provided by citizens through the e-service interface; the *G2C* part of the e-service, using the categories introduced above. The use of an e-service when filling in the driving licence application form makes it possible to automatically check the quality and the completeness of data. Another advantage with the e-service is that the underlying IT system directs the citizen to the appropriate CoA – instead of having citizens wondering which board is the appropriate one for them (the *G2G* part of the e-service, using a joint solution). The handling of provisional driving licences and the development of an e-service to support this is one part of the empirical context in this paper. The provisional driving licence application project was hosted by SCoA, but consisted of members from SRoA and several external IT consultancy firms delivering project services and IT applications.

4.2 The Driving Licence Web Portal Project

The driving licence web portal project is the second e-service development project analyzed in this paper. The background of the web portal development is that driving license issues in Sweden are divided between several government agencies (the regional CoAs and the SROA as mentioned above). It is difficult for citizens to locate information quickly and easily and get in contact with the appropriate agency when having these kinds of errands. In order to make it easier for a citizen to locate information and interact with the appropriate agency, a national web portal has been developed (www.korkortsportalen.se). The portal covers relevant information needs along the driving licence life-cycle. The web portal provides the citizen with access to e-services and serves as a bridge between the involved government agencies and organizations. The web portal is an example of a one-stop e-government solution. The portal can be classified as a solution supporting internal government, G2G and G2C (Beynon-Davies, 2007; Millars, 2003). The driving licence web portal project aims to combine citizen benefits and agency efficiency. The portal development project was hosted by SROA, but consisted of members from CoAs as well. External IT consultants were also involved, but only to a minor extent when the SROA did not have sufficient internal resources or skills to perform a certain activity.

5 Analysis and Discussion

In the sections below the two e-government development projects are analyzed using the life-cycle perspective and the challenge and success factors perspective discussed above. The results of the analysis is also put in the context of other theories and studies

5.1 Managing E-government Development – A Life-cycle Perspective

The analysis below is structured based on the different stages in an e-government system life-cycle by Heeks (2006), introduced above. The findings regarding these core stages are summarised in Table 2.

Table 2 Project stages in the two e-government development projects

Project stage / E-government project	Provisional driving license application project	Web portal project
Project assessment	Driven by a government commission Implicit demand	Driven by an organizational problem Explicit demand
Analysis of current reality	Low project management experience Ad-hoc project management Unclear scope Ad-hoc staffing	High project management experience Project management model Clear scope Competence based, legitimate, staffing
Design of the new system	Outsourced development Complex outcome Extensive process change implications Legal challenges and changes needed	In-house development Simple outcome Some process change implications An early, joint, focus on solving legal challenges
System construction	Unclear/vague requirements A narrow focus on information technology	Precise requirements A combined focus on information technology, processes and end users
Implementation and beyond	No focus on systems maintenance Unclear responsibilities	Early focus on systems maintenance Clear responsibilities

5.1.1 The provisional driving licence application project – a life-cycle perspective

Project assessment – Prior to the start of the project the SCoA had received a special commission from the Swedish Government to develop four public e-services within their areas of responsibility. The SCoA was free to decide within which areas the e-services should be developed. This e-government

project was initiated as a direct response to this commission together with three other development projects (e-services for commercial traffic permissions, registers of private guardians, and registers of foundations). This can be classified as “identification of an opportunity which could be seized” (Heeks, 2006, p. 162). The process of applying for a provisional driving license was chosen because this process was apprehended as rather simple to automate. Another reason for choosing this process was the mix of involved agencies which might cause citizens problems. There was, however, no systematic assessment of citizens’ demands and public usefulness regarding this e-service before starting the project. The government’s commission, together with the notion of this area as an easy one to convert into e-government, were two main reasons for starting the project. No explicit objectives were initially formulated for the project, except that the deadline in the government’s commission should be met. The commission stipulated that the four e-services should be developed within one year. This time limit was, however, heavily overdrawn before the development project was completed.

Analysis of current reality – A project manager was appointed who had no prior experience of public e-service development and very limited experience of leading IT development projects. The project was staffed with persons from several of the 21 County Administrative Boards. The main criteria for selection of project members were personal interest in the project and unoccupied time in ordinary business to spend in the project. There was no explicit project management model concerning how different CoAs should handle resources when their employees took part in common projects like this one. The result of these vague and unclear routines was that people had to defend the project in their local organizations and fight for releasing resources to work in the project. Since the project members were not appointed because of their skills, their opportunities to contribute to the project’s results varied. It is part of the project tradition at SCoA to hire much of the necessary resources from external consultants. There is not enough internal competence to staff a project of this kind. Thus, the project had consultants hired from four organizations (external consultancy firms), responsible for the requirements regarding engineering, technical development, and project management support. In the late phases of the project, the internal project manager had external support for managing project activities.

Design of the new system – The project was expected to deliver two outcomes; a public e-service for provisional driving license applications and an internal IT system for handling the digital applications and supporting the case officers’ decision making process. These two expected results made the project complicated. The development of the internal IT system made an extensive reconstruction of internal processes necessary. Thus, the task turned out to be much more complex than expected when the project was initiated. The development of the public e-service also demanded that the 21 CoAs had to find common criteria for judging applications which was another complicated task to accomplish. Since the project manager and the project team did not possess all the necessary knowledge, some of these decisions were instead made by external consultants. In order to develop the e-service the legal regulations of driving license matters had to be reformulated, which was another time-consuming problem to solve in the beginning of the project.

System construction – A main problem for the consultants during the construction phase of the e-service and the internal IT system was that the systems requirements were formulated by the customer (i.e., the SCoA) in an unclear and imprecise way. The project team delivered a specification to the consultants that allowed several interpretations and different kinds of solutions. The consultants had to put much effort in redesigning these documents before starting the development, thereby also formulating requirements on their own in order to achieve progress in the project. Even though the project implied huge changes both in internal processes and external information to citizens, it had a severe focus on technology. The project team had early prototypes of the e-service and the internal IT system attracted a lot of their attention.

Implementation and beyond – There were problems when the project results should have been tested, since these tests were performed towards the real traffic register. This implied that real citizens’ identities had to be used. Since a citizen cannot get approval for several applications for the same type of provisional driving license the project needed many identities, which were difficult to create.

Employees at the 21 CoAs were trained in using the new internal IT system, but each CoA was responsible for the transition from the old to the new system and for their way of working. The speed and success of this transition was to a large extent dependent on local enthusiasts. System maintenance issues were not solved when the implementation started, which made responsibilities between the different actors unclear. It was not determined who should decide about changes in the system, whatever these changes were about (error corrections or new functionality, for example).

5.1.2 The driving licence web portal project – a life-cycle perspective

Project assessment – The project was formulated as a response to an experienced problem; that information about driving license matters was found in too many versions on too many websites developed by too many organizations. This can be classified as “a problem that needs to be solved” (Heeks, 2006, p. 162); a problem with internal and external sources. Each CoA as well as the SRoA had their own website where the life-cycle of driving licenses was described. Unfortunately, these descriptions were not identical or updated in a coordinated manner. The solution to this problem was to develop a web portal that should consist of all correct information. This should be the only place to find governmental information about driving licenses and the portal should be a joint agency responsibility. There were clearly formulated objectives for the project which were later fulfilled.

Analysis of current reality – The project was an IO effort but the project was hosted by the SRoA which appointed a project manager and formulated project directives. The project manager had experience of leading similar projects before. The project manager had good skills regarding project management, project management models and IT. This person had also near access to and good communication with decision makers within the SRoA, which made it easy to promote this project internally and also to get sufficient resources and in-house legitimacy. SRoA has a project tradition of performing much work in-house using structured project management models. The organization has solid competence in project management in different fields (not at least in large construction projects such as roads and bridges). The project followed an established project model.

Design of the new system – The project had a rather uncomplicated outcome; a web portal which should be filled with information and links to e-services. When the portal was developed all the information did not necessarily have to be published at the same time. Instead, the amount of information and the content of the portal evolve over time. The process of handling public information was heavily influenced by the project, but internal processes at the SRoA and the SCoA were not at all influenced. The project took the consequences of this fact seriously and used focus groups to gather citizens’ opinions in different project phases (early design phase as well as evaluation).

System construction – The web portal had been clearly described regarding its functionality and layout when the construction started. The requirements were precise, limited, realistic, and controlled by the project manager. The system construction was accomplished without any severe problems and the web portal was delivered ahead of deadline and below budget.

Implementation and beyond – Early in the project, a model for the future systems maintenance of the portal was formulated. This issue was focused and different models for responsibility of involved organizational actors were discussed. This was seen as an important issue to handle in order to succeed in developing the web portal. The portal was released and during a test period the portal existed together with the former websites for public information in this area. When the portal’s objectives were evaluated and found to be fulfilled all other websites were closed down. All case officers at the agencies instead deliver their information to the webmaster of the new portal.

5.2 Managing E-government Development – A Challenge and Success Factors Perspective

This part of the analysis is based on challenges to e-government identified by Gil-García and Pardo (2005), introduced above. Other theories presented in Section 2.2 are also used as additional references where applicable, and this is followed by a section focusing on putting the results in the

context of other theories and studies. The findings regarding these challenges are summarised in Table 3. Some of the empirical examples have also been used when discussing the life-cycle perspective in the section above.

Table 3 Challenges and success factors in the two e-government development projects

Challenges / E-gov. Project	Provisional driving license application project	Web portal project
Information and data	Complex process and definitions with a non-fixed point of departure in processes	Information and data quality secured by the agencies separately or together in a group – a straight forward process
IT	Lack of in-house IT skills IO IT challenges Platform and application development in parallel – complex technologies Login and certificate problems Usability test problems External hosting of the applications	Appropriate in-house skills An IT artefact with low complexity Well defined usability tests In-house hosting of the application
Organizational and managerial	Size and scope of the development project unclear Weak alignment between processes and IT Unclear staffing	Development project limited in time and scope Processes (limited scope) and IT aligned Clear staffing
Legal and regulatory	Complex relation between the two agencies Laws and regulations not supporting data interchange	Limited legal and regulatory interdependencies A pre-study of legal conditions was made
Institutional and environmental	High dependency on common agency solutions Ongoing (iterative) anchoring of the different solutions	Limited influence from institutional and environmental issues Well-anchored solutions

5.2.1 *The provisional driving licence application project – a challenge and success factors perspective*

Information and data – As a part of defining system requirements, data structures and data definitions had to be dealt with. As reported above, the development of the internal IT system made an extensive reconstruction of internal processes necessary. Thus, the task turned out to be much more complex than expected, because there was no agreement of the common process or data definitions (common terms to use). The data structure issues were also complicated due to the parallel development of both an internal IT system and a public e-service. Other challenges according to Gil-García and Pardo (2005) (data quality, data accuracy issues and so on) have not been identified.

IT – The lack of relevant skills within the project team was a major challenge in the provisional driving licence application project. The in-house skills, as reported above, were low and the dependence upon external consultants and their IT skills was high. Challenges associated with integration of internal systems and IO systems between the SCoA and the SRoA were also identified. Technical solutions regarding security (login) certificates and the possibilities for young people to obtain that technology were not thoroughly analyzed in the project start. The usability testing of the two applications were also surrounded by problems, for example the organization of the test environment, the use of test data (fictive identities applying for a driving licence, as discussed above). The applications are hosted by external consultants.

Organizational and managerial – The size and the boundary of the present project were unclear and changing during the project timeline. This has added complexity to the organization and management of the project. The alignment between the ongoing development of organizational processes and goals vs. the e-government IT related development part of the project was not the best either. As reported above (in section 5.1.1) the project staffing from the 21 CoAs was also more ad-hoc than rationally planned and managed. The SCoA and the SRoA, as a part of the IO dimension of the project, also had some challenges regarding their interpretations of rules regulating the data interchange between their IT systems.

Legal and regulatory – A government commission initiated the e-service development project, as reported above. This mission influenced the relation between SCoA and SRoA. The SRoA has to

provide the support needed in order to assist SCoA to develop e-services. The fact that a public authority should provide what another authority needs within the agency area of expertise is stated in the laws that regulate the work of agencies in Sweden. In parallel, the SRoA has the overall responsibility for the national road traffic issues sanctioned by the government; this adds challenges to the management and performance of the development project. The overall restrictive laws and regulations concerning, for example, agency data interchange using web technology, do not support these initiatives very well.

Institutional and environmental – The government commission initiating this project is an important institutional condition. The overall initiatives from the Swedish government providing coherent institutional conditions, however, are more on a policy level than a common concrete government platform or a base for developing coordinated public e-services on a national level. This strategy leaves each government agency with a rather high autonomy in developing e-services. This can be an advantage for individual agencies developing intra-organizational solutions, but contra productive for one-stop government solutions, with several agencies involved. In the studied project these conditions are explicit concerning, for example, the work with electronic signatures and security solutions.

5.2.2 The driving licence web portal project – a challenge and success factors perspective

Information and data – In the present project a national web portal has been developed. There are mainly two types of data represented; common information about the overall driving licence process, and links that provide the citizen with access to e-services located at the agencies. The quality of the information and data are secured by the agencies separately or together in a defined group. This process has been rather straight forward and uncomplicated.

IT – The SRoA had appropriate in-house skills that were used when developing the one-stop government solution. External consultants were only hired for limited assignments. The complexity of the artefact (the national web portal) has been relatively low. The application is hosted by the SRoA.

Organizational and managerial – The present project was limited in time and scope and run by an experienced project manager using structured project management models. The staffing of the project was also clear, recruiting people with useful skills from the regional CoAs and the SRoA. The web portal has effects on the organizations' different processes concerning, for example, the editorial information handling. These issues were dealt with when developing the one-stop solution. The IO dimension of the project was not a complicated issue from a managerial point of view; rather a proactively used resource and a constellation of comparative advantages that were professionally used during the project.

Legal and regulatory – The project was performed under the same overall restrictive laws and regulations concerning, for example, data interchange between agencies as the driving licence application project, but here the conditions and the character of the artefact did not challenge the legal and regulatory preconditions. A pre-study was made in order to handle any possible legal issues that could influence the development process.

Institutional and environmental – The web portal project is rather uncomplicated and not that dependent upon institutional or environmental issues. The project dealt with agency ownership of data, hosting and the organizing of roles in a structured and correct way, and anchored different solutions in the organizations in order to, for example, handle political issues.

5.2.3 Results in the Context of other Theories and Studies

Project management skills and leadership is one issue discussed when analysing the two development projects above. Project management and leadership issues and their importance have also been discussed by Allen et al. (2001), Lam (2005) and Rosacker and Olsen (2008). Allen et al. (2001) claim that these issues together with the overall understanding of IT no longer is a skill only for the technical oriented public agency staff of the workforce. It is rather the integration with information management

and strategic change that is a key issue, since all dimensions of public sector activity are affected by technology. Ownership and governance on a strategic level pointed out as critical by Lam (2005), and the lack of it and the absence of implementation guidance are identified as barriers when integrating e-government. The IO dimension highlighted in this paper is also put forth by Allen et al. (2001). They claim that development initiatives similar to the ones analyzed above must bridge traditional administrative and political-cultural frameworks in order to produce a new “culture” in government, enabled to take advantage of the potential of e-government (ibid.). The need to handle new strategies and culture of e-government as well as the need for staff to be prepared for novel ways of dealing with new technologies, which emerge with e-government, is also highlighted by Ebrahim and Irani (2005) and Lam (2005).

If the process and results from the provisional driving license application project are put in the context of other theories, an over-simplified view of e-services as a limited technical issue with organizational impacts can be identified. This view has several similarities with one of three implementation strategies classified by Keil (1991), based on Markus and Robey’s (1998) work, viewing implementation as technology acceptance. Keil’s (1991) two other implementation strategies are: implementation as organizational change, and implementation as organizational problem-solving involving mutual adaptation. In the present project implementation is viewed as being static, and IT is, inside the agency, seen as a driver of change. Thus, the agency focuses on user acceptance of the technology. Viewing implementation of e-services and internal IT as organizational change or as organizational problem-solving involving mutual adaptation (following Keil, 1991 and Markus and Robey’s, 1998 second and third strategies presented above) would probably have been more appropriate in order to achieve a more successful process; appropriate for example regarding agency readiness to change (Lam, 2005).

The level of in-house versus external resources when developing e-services can be analyzed more in detailed than what has been done above. Two different strategies are identified in the studied projects; the provisional driving license application project with a significant level of external (outsourced) resources when developing e-services and the driving licence web portal project with a significant level of in-house resources. In the analysis above, the significant level of external resources in combination with low competence regarding the ability to procure competence-services have been a major problem and challenge. This, however, does not have to be the case; outsourced and external resources might as well be a driving force behind and a necessity when developing public e-services. Chen and Gant (2001) and Moon (2002), for example, discuss that the shortage of IT workers is ranked as the number one barrier to e-government concerning the public sector’s ability to provide next generation e-government services. This is mainly due to the difficulty of attracting and retaining appropriate IT talented personnel and lack of financial resources. Application service providers (ASPs), which can be seen as a kind of outsourcing, can help transform e-government services (Chen and Gant, 2001). Ebrahim and Irani (2005) list a number of skills including, for example, computer information systems analysis, systems design, applications integration, web development, project management, and systems maintenance, which can be related to the findings in the two projects studied in this paper.

6 Conclusions and Further Research

In this section the conclusions will be presented followed by some issues for further research.

6.1 Conclusions

A qualitative, interpretative, analysis of data from two IO e-service projects in Sweden using an e-government systems development life-cycle perspective as well as a challenge and success factor perspective are conducted in this paper. The two cases are each others’ opposite regarding several aspects (cf. summaries in Table 2 and Table 3). Nevertheless, it is claimed that these two cases, both from a Swedish government context, are illustrative and valid examples of public e-service

development projects, since such projects can possess a wide range of appearances. The life-cycle perspective illuminated some differences between the cases that regarded as important. The ground and incentives for initiating an e-service development project is one critical aspect – an aspect also critical for other types of ISD projects. The use of project management models also differs in the projects. These are two interesting differences, but probably not the most crucial ones to understand and explain the differences in process and project outcomes. Significant differences in project manager skills and position (formal and informal) are identified in the two organizations that most likely had a larger impact on the processes and the project outcomes. This seems to be especially important in relation to the degree of complexity of the project’s expected outcome (the artefact and the related processes). The amount of in-house or outsourced activities during the project is another key aspect that is identified to be related to project experience and complexity of the results. There is also a difference concerning the perspective on IT in the two projects. In the provisional driving licence application project the technology was too much in focus during parts of the development due to several challenges in the platform and the dependence upon external consultants. The organizational change was then put in the background together with the citizen needs (Irani, Love & Jones, 2008).

Yet another aspect that the analysis revealed is the importance of focusing on systems maintenance issues early in the project. Regarding this last aspect the e-government systems development life-cycle by Heeks (2006) is regarded as insufficient. System maintenance is placed in the last stage (implementation and beyond), but the empirical results clearly indicate that these issues need to be handled earlier in the project and more strategically than in the phase of implementation. Thus, it is suggested that the life-cycle should be revised in the sense that system maintenance is introduced during the second stage (analysis of current reality). Finding solutions of system maintenance in the IO e-service context often implies an analysis of several organizations’ existing maintenance models, which obviously are parts of the current reality. The latter aspect is also critical to ISD initiatives in general, for example in the private sector, and can be formulated as a critique against traditional systems development life cycles or so called waterfall models. For example the general structure presented by Avison and Shah (1997) and Avison and Fitzgerald (2003) that usually consists of the stages described in Section Two. Since Tsai et al. (2009) report that the primary systems analysis and design methodology in use by many government agencies is the traditional systems development life cycle, this is an important issue for government agencies to be aware of.

In Table 4 results is summarized and the results based on empirical findings from the two studied cases analyzed by using the e-government system life-cycle by Heeks (2006) together with the challenges to e-government identified by Gil-García and Pardo (2005), both introduced above. The aspects to analyze (information and data, IT, etc.) are important when managing and developing e-service initiatives in different stages (project assessment, analysis of current reality, design of the new system etc.). Thus, it is identified as rewarding to integrate these two perspectives into an analysis grid. Every aspect of analysis is not always present in every projects stage, but the aspects can serve as a checklist. The aspect of information and data is for example more explicit in the analysis of current reality than in the project assessment stage.

Table 4 Revised/developed project stage and analysis grid

Project stage / Aspect of analysis	Information and data IT Organizational and managerial (intra and inter-organizational issues) Legal and regulatory Institutional and environmental
Project assessment	Identify possible e-government projects. Internal or external initiatives Outline of basic project parameters Identify project drivers and triggers
Analysis of current reality	Describe and analyze information, technology, processes, objectives and values, staffing and skills, management systems and structures, and other resources: money and time Identify and use a mixture of hard and soft techniques such as information systems audit, information systems analysis, problem analysis, context analysis etc. (for example a SWOT-analysis) in order to build an overall

	picture Make a progressive systems maintenance analysis
Design of the new system	Set objectives for the new e-government system and processes to meet Deal with issues of platform, software and hardware Design work processes – front-end and back-end (underlying processes)
System construction	Manage the process and activities in acquiring any new IT, undertake a detailed design of the new e-government system (system installation etc.), build it, test it, and document it
Implementation and beyond	Plan the implementation processes, for example: train users to use the new information system, convert data from old to new formats, introduce the new e-government system, monitor and evaluate its performance and context, and undertake necessary activities

The aspects and the integrated perspective covered in Table 4 can be used when managing e-service development within and between government agencies in order deal with the challenges related to the e-service development in public sector. The grid can for example be used by project leaders focusing on process and e-service development.

In the present study the lack of precision and depth in the simplified assumptions of characterising a project as a success or a failure is identified – this is of course a perspective and situational dependent phenomenon. When analyzing the success and failure factors, mainly based on Gil-García and Pardo (2005), of the two cases, it is identified that the majority of the findings seems to be similar to those of any kind of ISD project. What distinguish e-government projects from other ISD projects is the heavy influence of laws and regulations in the design and construction process. Another difference is the fact that citizens’ access to secure electronic signatures is crucial for the usage of the e-service.

6.2 Further Research

The analysis above has focused on *managing* e-service development. If the outcome of the projects is briefly commented one can identify that some of the potentials in developing public e-services has been achieved; regardless of the differences in management, use of resources, etc. Extended services for citizens have been developed and transformation of government structures and processes (Irani Love & Montazemi, 2007) has occurred. In the provisional driving licence application project an e-service that makes an automated decision in “green cases” has been launched supporting a driving licence application form that makes it possible to automatically check the quality and the completeness of data. In the driving licence web portal project a national web portal has been developed that covers relevant citizen needs along the driving licence life-cycle. This project also combined citizen benefits and agency efficiency in an interwoven way.

Another aspect not highlighted in this paper is the consideration of the political dimension in e-government development. The way that different stakeholders in a project relate to each other via political processes is, for example, studied by Heeks and Stanforth (2007) using actor network theory in an interesting and rewarding way. An analysis of the cases from a political perspective would probably add another interesting dimension into the understanding of e-government development. However, the present study is based on an e-government systems development life-cycle perspective and a challenge and success factors perspective in this paper. The traditional information systems development cycles and the variants presented in this paper can be challenged by alternative approaches such as design oriented development approaches (for example as described in Löwgren & Stolterman, 2004), explorative, prototype based approaches and more emergent, dynamic, iterative, explicitly socio-technical processes and cycles (for example as described in Luna-Reyes et al., 2005). This is an important issue for further research. Further studies on managing IO e-service development can also show if the patterns identified (for example the results presented in the revised/developed project stage and analysis grid in Table 4) in this paper are possible to generalise from a statistical point of view. Testing the revised/developed project stage and analysis grid, as such, in other studies is also possible as a part of further research. The focus in this paper is, however, on the analytical generalisation of results (above) in line with qualitative, interpretative, research ideals.

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