Avdelningen för Data- och systemvetenskap

Literature review
Success factors for e-government's Information Systems development and implementation

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Abstract

This literature review aims to investigate which factors are regarded as important for successful development and implementation of Information Systems within e-government. The identified factors are categorized according to 18 critical themes of e-government implementation which fall under one of the main area of research – organizational themes, technical themes, political themes, and social themes. The review concludes with the discussion of which areas were over- or underrepresented, and suggestion for future research.

The reviewed articles come from various branches of Information Sciences, including those that closely intersect with Computer Science, Political Science, and Service Management. The study is conducted according to Machi and McEvoy's 6-step methodology for literature review with implementation of deductive analysis. The results of this literature review are that user-centric focus, consideration of future needs of the organization and following of IT standards were most mentioned factors for successful development and implementation of Information Systems within e-government.

Contents

1 Introduction

The concept of e-government (also called electronic government, digital government) has evolved during recent years as a result of digitalization processes within the public administration sector. The exact definition of this term varies from one author to another, but necessarily includes the use of technology in governmental administration with the purpose to bring benefits both internally (in terms of facilitating organizational processes) and externally (in terms of services that government offers to its citizens). (Solinthone and Rumyantseva 2016)

E-government is a complex construct that includes several interconnected dimensions. The scientific literature has so far mainly concentrated on the dimensions of the availability and usage of e-government, conceptualizing how citizens, businesses and governments interact with each other in the digital domain. (Ramaprasad, Sánchez-Ortiz, and Syn 2015)

Thus, the main challenge of the e-government comes from its multidisciplinary nature (which gave the concept of e-government a nickname "double-headed monster"), and the need of combining technical and social sciences in order to understand how e-government can fulfill both infrastructural and organizational requirements is strongly emphasized (Carrillo, Jimenez-Gomez and Falcone 2017).

The goals of e-government cover not only the increase of the efficiency of particular organizational activities, but also the establishment of social values and improvement of the quality of social welfare. Such values can include, for example, broad public participation, openness and accountability of government agents or better conditions for disadvantaged communities. However, any particular list of goals can be created only when national circumstances are taken into account. (Solinthone and Rumyantseva 2016)

There are five main models of e-government and e-government services: 1) internal e-government or government-to-employee (with focus on public sector employees and internal value-chain); 2) government-to-citizen (where the external customer-chain of government is supported); 3) government-to-business (where relationships between public and private sectors are established); 4) government-to-government (for intra-government collaboration); and 5) citizen-to-citizen (which traditionally has not been included to the e-government domain yet, but is considered to become an important part of future governments). (Beynon-Davies 2007; Solinthone and Rumyantseva 2016)

While there is a range of benefits of e-government (like improvement of transparency and reduction of costs), there are also known disadvantages that implementation of e-government can bring. Solinthone and Rumyantseva (2010, pp.5-7) name the following: lack of equality in public access to the Internet, lack of trust and cybercrime, hyper surveillance, false sense of transparency and accountability; and costly infrastructure.

If information systems (IS) that support e-government processes and services are developed unsuccessfully, these disadvantages can lead to catastrophic social consequences that influence not only the participants of state democracy internally, but also the global position of the country externally. It puts an extra pressure on understanding and analyzing the success factors for e-government IS development/implementation.

1.1 Purpose

The purpose of the literature review is to identify and categorize the success factors for e-government IS development/implementation in order to use this analysis to map a research problem area for further studies. This review will look at the success model for public sector IS from a theoretical perspective on general software products and IT project success factors.

The framework of critical themes within e-government implementation will be used in order to categorize different success factors according to institutional theory perspective. These critical themes are taken from EL-Haddadeh et al. (2010) and are the following: organizational themes (organizational structure, power distribution, information system strategy alignment, prioritization of deliverables, future needs of the organization), technological themes (IT standards, security and privacy issues, system integration, digital divide issue, e-government portal and access issues), political themes (government support, funding, leadership, legal and regulation issues), social themes (citizen-centric focus, organizational culture, training and educating of citizens, awareness).

1.2 Research questions

There is the following main research question of this literature review -
RQ1: Which factors contribute to successful development and implementation of IS in e-government?

1.3 Structure

The literature review is structured according to the following layout. First, the methodology behind selecting and analyzing academic sources is explained. Then, the analysis of success factors is presented beginning from general theories on success models to specific success models from employees' perspective, from citizens' perspective, and from a system development methodology perspective.

The literature review is concluded with a broad discussion on how different factors contribute to successful development and implementation of IS in e-government in accordance with critical themes within e-government implementation. Lastly, the suggestions for further research are developed.

2 Method

This literature review has been conducted according to the methodology presented in Machi and McEvoy (2016). This methodology consists of 6 iterative steps in which a researcher goes through: selecting a research topic, building a case for a literature review, scanning and skimming through the literature, analyzing and organizing the received data, critiquing the literature and, finally, writing a report. A modification of step two was applied due to the limited scope of the study.

The current review belongs to a complex literature review type (Machi and McEvoy 2016) since its purpose is not to argue a certain position, but identify research problems for further studies. A conduction of a literature review is an important phase in an independent academic study, since it helps to identify how different theories and concepts are defined and used in a chosen discipline and to describe the limitations of the current scientific discourse (Backman 2008).

The analysis conducted in this review is organized according to the stages of argumentation analysis described in Wallen (1996): identification of a main thesis, search for contraarguments, mapping the underlying conditions for the thesis, listing arguments and contraarguments, evaluation of arguments, reflection on biases, and connection of argumentation to the thesis. This review's analysis belongs to the type of thematic analysis (Denscombe 2014), since the focus was on how the topic of success factors for e-government IS development/implementation is consolidated among different studies. The analysis is conducted in a deductive manner, since this review does not aim to generate any new hypothesis (Backman, 2008, p.56).

2.1 Search term and selected databases

The choice of exact academic terms is important while conducting a literature review. Various wordings for one and the same concept might not be equally represented in the academic literature, which might give false impression of limited amount of scientific articles if one searches by the narrowly used expressions. Therefore it is important to choose the 'umbrella'-term that is accepted as a standard word or phrase for a certain phenomenon in a scientific community. (Machi and McEvoy 2016, pp.27-30)

'E-government' serves as such an 'umbrella'-term for the notions of electronic government, digital government, electronic public administration etc. Thus this word was used as a base word in search strings for this literature review. Due to the limited time available for the information search phase of this literature review, the database search was chosen as the base method among usual methods of searching the scientific literature, which are consultation, manual search and database search (Backman, 2008, p. 162).

The first stage was to search for an 'umbrella'-term, specifying it if necessary, in three major databases that index academic journals that specialize in Information Systems or Computer Science disciplines. The chosen databases were Scopus (one of the biggest abstract and citation databases which covers peer-reviewed journals in top level subjects), ACM Digital Library (a research platform of Association for Computing Machinery containing curated full-

text publications of selected publishers) and Emerald Insight (the indexing service of Emerald Publishing Limited, which is a scholarly publisher of academic journals and books).

2.2 Search strings and search results

The focus of chosen search strings were within the intersecting topics of 'e-government' and 'Information Systems', and the theme of how e-government is practically implemented. Thus the following search phrases were used:
1) "e-government", specified further as "e-government" AND "Information System*", specified further as "e-government" OR "public administration" OR "public sector" AND "Information System*";
2) "e-government implementation", without any further specifications.

The received search results are presented in Table 2.1.

Table 2.1. Search results in three chosen databases before refinement of filters

Search string	Amount of search results in Scopus	Amount of search results in ACM Digital Library	Amount of search results in Emerald Insight
"e-government"	10745	5613	58556
"e-government" AND "Information System*"	1812	2751	43076
"e-government" OR "public administration" OR "public sector" AND "Information System*"	3451	245	51705
"e-government implementation"	393	17694	31660

The second stage was to apply relevant filters in order to refine the received results and narrow them down to peer-reviewed articles in the disciplines of Information Systems or Computer Science published within the recent 5 years in English language. The refined results are presented in Table 2.2.

Table 2.2. Search results in three chosen databases after refinement of filters

Search string	Amount of search results in Scopus	Amount of search results in ACM Digital Library	Amount of search results in Emerald Insight
"e-government"	789	5613 (no filters available)	839
"e-government" AND "Information System*"	101	2751 (no filters available)	839
"e-government" OR "public	171	245 (no filters available)	741, (78 after including only

administration" OR "public sector" AND "Information System*"			abstracts with keyword 'Information Systems')
"e-government implementation"	29	17694 (no filters available)	658, (68 after including only abstracts with keyword 'Information Systems')

In the next stages the techniques of scanning and skimming were used. These techniques help to first identify potentially useful information, and then make a selection of the best fitting studies represented in the academic sources (Machi and McEvoy 2016, pp.62-73).

The third stage was to go through search results in each respective database, and choose the articles which abstracts, keywords, and structure showed the coverage of the chosen topic for this literature review. The search results for "e-government" OR "public administration" OR "public sector" AND "Information System*" complemented with results for "e-government implementation" were selected, so that the selection would be among a pool of articles that was neither too wide nor too narrow for this academic field. 100 articles were selected at this stage.

2.3 Selected articles

The fourth stage was to skim more thoroughly through the chosen articles, and look at the used citations as well as research in which recent publications the selected articles were referenced. All publications were also double-checked in Ulrichsweb in order to secure their peer-reviewed status. The result was a selection of 31 articles, of which 20 – after more thorough reading - became the basis for this literature review:

1. Agbabiaka and Ugaddan 2016
2. Alfadhel, Liu, and Oderanti 2017
3. Anthopoulos, Siozos, and Tsoukalas 2007
4. Cauter et al. 2017
5. Cenci 2014
6. Chan et al. 2011
7. Djeddi and Djilali 2015
8. Dwivedi et al. 2014
9. França et al. 2016
10. Gamboa, López Rodríguez, and Son 2014
11. Loukis and Charalabidis 2011
12. Melin and Axelsson 2009
13. Melin, Axelsson, and Söderström 2016
14. Middleton 1999
15. Nielsen 2017
16. Olsson and Öhrwall Rönnbäck 2010
17. Parycek, Schöllhammer, and Schossböck 2016
18. Rowe and Bell 2005

19. Stefanovic 2016
20. Styrin and Dmitrieva 2015

3 Results and analysis

Analysis of studies that discuss the topic of success factors in e-government's IS development and implementation is challenging in two dimensions. The first dimension is the interdisciplinary nature of this area. The success factors are directly or indirectly brought up in various branches of informational, computer, and social sciences. The second dimension stems from the first one in the sense that every discipline has its own academic vocabulary or traditional way of describing phenomena and asking research questions, and therefore the same factors might be described with different terms or one and the same term might refer to different concepts.

It is problematic to summarize the reviewed problem area without using standardized classifiers. Therefore, it has been chosen to perform a deductive analysis and use critical themes in e-government implementation as a categorization tool for success factors mentioned or implied in the chosen studies. These critical themes are first described EL-Haddadeh et al. (2010) and are presented in Table 3.1. The advantage of a deductive approach is that it would give a better connection between this literature review and the theoretical framework of e-government's IS development and implementation.

Tabel 3.1 Classification of success factors according to critical themes in e-government implementation

Area of research	Critical theme	Studies that highlight the significance of succes factors within the critical theme
Organizational themes	Organizational structure	*(Loukis and Charalabidis 2011)*
	Power distribution	*(Dwivedi et al. 2014)*
	Information system strategy alignment	*(Alfadhel, Liu, and Oderanti 2017)*
	Prioritization of deliverables	*(Chan et al. 2011), (Olsson and Öhrwall Rönnbäck 2010)*
	Future needs of the organisation	*(Anthopoulos, Siozos, and Tsoukalas 2007), (Melin and Axelsson 2009), (Olsson and Öhrwall Rönnbäck 2010), (Stefanovic 2016)*
Technological themes	IT standards	*(França et al. 2016), (Melin, Axelsson, and Söderström 2016), (Rowe and Bell 2005), (Gamboa, López Rodríguez, and Son 2014)*
	Security and privaty issues	*(Agbabiaka and Ugaddan 2016)*
	System integration	*(Cenci 2014)*
	Digital divide issue	none
	E-government portal and access issues	none

Political themes	Government support	none
	Funding	none
	Leadership	*(Loukis and Charalabidis 2011)*
	Legal and regulation issues	*(Loukis and Charalabidis 2011), (Olsson and Öhrwall Rönnbäck 2010)*
Social themes	User/Citizen-centric focus	*(Agbabiaka and Ugaddan 2016), (Anthopoulos, Siozos, and Tsoukalas 2007), (Djeddi and Djilali 2015), (Dwivedi et al. 2014), (França et al. 2016), (Middleton 1999), (Olsson and Öhrwall Rönnbäck 2010), (Styrin and Dmitrieva 2015)*
	Organizational culture	*(Cauter et al. 2017), (Loukis and Charalabidis 2011), (Parycek, Schöllhammer, and Schossböck 2016)*
	Training and educating of citizens	*(Chan et al. 2011)*
	Awareness	*(Nielsen 2017), (Parycek, Schöllhammer, and Schossböck 2016)*

3.1 Organizational themes

The importance of alignment between IS and other governmental agencies for the successfull implementation of e-government IS has been strongly emphasized in the scientific literature, and, as a consequence, most of the research focused on satisfaction of governmental needs as success factors for IS. The fulfillment of system requirements from the organizational perspective was considered important, which required a good understanding of business environments. Success of IS implementation was thus anchored to the succes of modelling business processes for e-government (Alfadhel, Liu, and Oderanti 2017). However, when e-government borrows business models from the private sector – for example, e-commerce – the results might not be sustainable in a long-term, since the future needs of governmental organization might differ and the re-used business model might not account those special requirements. Thus it is important to consider future organizational needs when applying a new business model in e-government IS development (Anthopoulos, Siozos, and Tsoukalas 2007). The need to plan organizational needs in the future has been also emphasized by Melin and Axelsson (2009) and their study mentioned as well the importance of planning for IS maintanace early in the project.

Another organizational aspect brought up was the power distribution. Implementation of IS changes how people work, which might lead to 'some win and some loose' scenario. Thus consideration of power distribution was named in the context of general IS success factors (Dwivedi et al. 2014) and is highly applicable to the sector of e-government.

Understanding of the process and which final results are most important for consideration was also considered valuable (Olsson and Öhrwall Rönnbäck 2010), which implies that successfully developed IS take into account how deliverables are prioritized and what e-government might need in the future. Particular case studies (Chan et al. 2011) points out the importance of having a focal capability on different stages of IS development that adjust prioritization level of deliverables according to requirements changed with time, rather than trying to plan all the activities of the development/implementation process beforehand and follow them strictly. The same study emphasizes the importance of social capital and knowledge management. This approach stems from the days when the waterfall-model with locked stages was largely disproved (Middleton 1999).

3.2 Political themes

The majority of risks preventing the success of e-government IS come from problems within project management, while technical themes are not that prevelant (Loukis and Charalabidis 2011). However the politic factors also play a role. Loukis and Charalabidis (2011) name the following IS failure risks: lack of IS skilled personnel, lack of knowledge and lack of cooperation, which bridges the organizational, political and social issue through implying the importance of skilled leadership that understands underlying organizational structure as well as the importance of collaboration between regulatory organs and governmental organizations.

Another study mentioning the importance of legal issue and regulations is Olsson and Öhrwall Rönnbäck (2010). This paper discusses how e-governments are limited in the variety of vendors that they can choose from due to legal limitations, and how those vendors do not necessarily have business models that align with government organizational structures (Olsson and Öhrwall Rönnbäck 2010), which confirms the thesis expressed in Alfadhel, Liu, and Oderanti (2017).

3.3 Technological themes

From a technical perspective, information sharing was named as beneficial for e-government IS development (Cenci 2014). Solution sharing was another technological factor mentioned as contributing to success (Rowe and Bell 2005).

Researchers, using the Learning History framework, identified several technological factors as important for e-government IS success. They are the following ones: knowledge of technological solutions (which implies avaliability of IT standards) and double-loop organizational learning (which implies focus on the client – including citizens, when it comes to e-government – that helps to re-structure and effectivize working processes). (França et al. 2016)

It was shown that projects with higher technological risks benefit from the existence of IT standards (Melin, Axelsson, and Söderström 2016; Gamboa, López Rodríguez, and Son 2014). Melin, Axelsson, and Söderström (2016) has also emphasized importance of successful project management, and user acceptance.

3.4 Social themes

When it comes to the social perspective, most of the studies based their theoretical framework on the DeLone and McLeane IS Success Model. However different researchers enriched it with their own contributions brough from practical cases.

Agbabiaka and Ugaddan (2016) redefine the updated (in 2003) DeLone and McLeane IS Success Model for e-government purposes and include an important focus on Citizen and 'citizen trust in e-government'. They argue that the quality of developed IS (from the perspectives of which information is contained, which technology is provided, and which service is offered) influence the level of satisfaction and trust that citizens have in their e-government, which projects onto the public value that is created by the government. In particular, their study showed that the quality of information and service play the major role in promoting citizen satisfaction, while the system quality does not have any significant effect. Satisfaction of citizens was also named important by Styrin and Dmitrieva (2015). On the other hand, from the employee perspective, the system quality was shown to be more important (Stefanovic 2016).

The success of the service-oriented approach was also confirmed by practical studies (Djeddi and Djilali 2015), where hands-on methodology was developed for a user-centered framework of ubiquitious e-government IS. The importance of user involvement is not a new thing to emphasize (Middleton 1999) and the use of a system is still considered to be a sign of its success (Dwivedi et al. 2014).

The limitations of the DeLone and McLeane IS Success Model for public sector was as well shown by Cauter et al. (2017), where it was pointed out that there are context elements that are not covered by the model, but that directly influence the success or failure of public sector IS. These context elements are: cultural barriers, intergovernmental/inter-organizational relationships, intra-organizational relations, organizational capacity, the availability of alternativies, and political motives.

Public awareness is emphasized in recent studies (Parycek, Schöllhammer, and Schossböck 2016; Nielsen 2017). Nielsen (2017) points out that a critical mass of users and usage activities are needed for e-government IS success, while Parycek, Schöllhammer, and Schossböck (2016) accentuate social factors like organizational culture and citizen awareness: they argue that an inclusive approach is needed, otherwise there is a risk of passive resistance both from within and from outside the governmental organization.

Social themes have the widest coverage in the reviewed papers and the user participation success factor is represented in some way or another in most of the studies: both internal (governmental employees) and external (citizens) users are mentioned. It is not a new topic and already ten years ago it was shown that basing e-government only on political plans and not including citizens' or public servants' perspective leads to failures (Anthopoulos, Siozos, and Tsoukalas 2007).

4 Discussion and conclusions

This literature review combined and analyzed sources from different subdisciplines of Information Sciences, taking into consideration intersections with Informatics and Computer Science / Software Development, Informatics and Political & Social Science, as well as Informatics and Service Management. However, no additional categorization according to the research filed has been performed. It might mean that there are more focus on certain success factors, because the selected scientific discourses consider certain critical themes to be more vital for their researched fields, not because certain success factors are more important for the e-government sector than the others. In the following discussion it would be shown which critical themes were under- or over represented. The literature review concludes with a short summary and suggestions for future research.

4.1 Discussion

Nowadays citizens start to demand better e-government services, and there is a clear trend in the scientific literature that public sector IS should focus on citizens as customers. In the end it is a question of which value e-government IS bring to its primary customers – the citizens. Peng and Value modelling has been shown as useful in value analysis for e-government (Juell-Skielse and Perjons 2009), and its advantage is putting all possible actors in focus.

However focus on customers in IS development is not a new invention and user input for e-government IS implementation was considered as important from a long time ago (Middleton 1999). So the question that arises is why has there be no change in how the actual processes in public sector IS development is conducted?

The possible answer might be that though the alignment of IS and government agencies is important, it has been traditionally tied only to bettering business performance, communication and relationships internally, and not externally, which draws away the focus from external actors/customers/users already during the design stage. So even though the trend of development by IT-users became spread in public administration (França et al. 2016), it has been too often forgotten that citizens, and not only government employees are also end-users.

Another possible answer comes from the mandatory nature of e-government services. If we take a comparison to a private sector software development projects, where customer satisfaction is named as one of the most important success factors (Berntsson-Svensson and Aurum 2006), then we see that the 'survival' of an IS system in e-government is not that dependent on how customers/citizens are satisfied with it.

In 2011 it was identified that more research into the effect of political themes is needed (Chan et al. 2011), however, as this review showed, the political themes or technological themes with a political perspective (like digital divide and access to service) is still widely underrepresented in studies with a focus on success models for e-government IS development. Of course, it might be a limitation of this particular literature review, since the majority of articles was chosen from the branches of informatics that have a closer connection to service management, project management, and software development.

4.2 Conclusions

This literature review has identified which factors contribute to successful development and implementation of IS in e-government. The success factors were categorized according to the framework of critical themes within e-government implementation developed by EL-Haddadeh et al. (2010). The current study followed the classical methodology presented in Machi and McEvoy (2016). Through complex literature review and deductive analysis of 20 selected articles the following conclusions has been reached.

The reviewed authors describe the success factors within all chosen areas (organizational, technological, political, and social), however certain themes are clearly overrepresented, and some themes are clearly underrepresented. 13 articles emphasized the importance of factors within social themes (overrepresentation), while only 2 articles talked about the importance of factors within political themes (underrepresentation). Factors within technological and organizational themes received a medium coverage with respectively 6 and 8 articles.

The most prominent success factor - user/citizen-centric focus – was analyzed by 8 articles. Other important factors were consideration of future needs of the organisation and following of IT standards (4 articles each). Other widely pointed out factors were prioritization of deliverables (2 aricles), adjustment to legal and regulation issues (2 articles), adaptation to and by organizational culture (3 articles), and raising awareness among system users (2 articles). There was also a brief mentioning (1 article each) of such factors as consideration of organizational structure, change of power distribution, information system strategy alignment, eliminating of security and privaty issues, system integration, successfull leadership, as well as training and educating of citizens.

None of the authors mentioned the importance of dealing with digital divide issues, resolving e-government portal and access issues, getting governmental support, or receiving funding as success factors for development and implementation of IS in e-government.

4.3 Suggestions for future research

The problem of voluntary vs. mandatory usage of e-government IS systems and services has been noted as one of the research frontiers (Weerakkody et al. 2015), and it might be interesting to look at how success factors differ in development/implementation of voluntary-used vs. mandatory-used e-government IS systems.

When it comes to other suggestions for further research, it might be beneficial to observe how academic studies covering the topic of this literature review start going away from purely technical factors, or project success factors and admit that softer - socio-political - factors are becoming more valuable.

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