Editorial for EJEG Volume 16 Issue 1

It is with great pleasure that I write this editorial. In this issue, we have 6 full research papers. Kanya Rislana, Alice Good, Carl Adams and Philip Scott evaluate the role ICT education and training play in poverty reduction and economic empowerment using a case study from Nigeria. In doing this, they applied Heek’s Design-Reality Gap model and Sen’s Capability Approach framework in combination and identify recommendations to the Jigawa state government.

The second paper is also based on data from an African context. Jean Damascene Twizeyimana, Hannu Larsson and Åke Grönlund studied implementation of e-government in Rwanda, which applied Public-Private Partnership (PPP), and reflected on challenges and on the need to understand the installed base, or the Information Infrastructure (II). Overall, they found six overarching categories of aspects for successful implementation of e-government in Rwanda.

Enzo Falco and Reinout Kleinhans, from Delft University of Technology, attempt to identify how more effective two-way interactions between governments and citizens can be enabled. They define a typology of social media-based citizen-government relationship. Further, based on a limited literature review they identify a typology of government challenges. Lastly, based on material from two literature reviews, they identify government requirements for overcoming these challenges.

Ville Seppänen, Katja Penttinen and Mirja Pulkkinen study key issues in enterprise architecture (EA) adoption in the public sector. Finland mandated the use EA in public administration in 2011. Still adoption rates are low, especially in municipalities and local government. The three ran a survey with a purposeful sampling of experts on issues identified through a systematic literature review, and the analysis reveal three key factors, Resistance towards EA, Relevant EA goals, and EA practices in use.

The next paper is authored by five researchers from University West, at Trollhättan, with Irene Bernhard as the lead author. In Sweden, the municipality is the level of government with the closest relationship to citizen, providing most of the basic public services. The authors employ data from different national sources and apply multiple regression between e-indices and satisfaction, adjusting for covariates and find that the citizen satisfaction was related to degree of digitalization.

In the final paper Jesper Holgersson and three colleagues identify a set of dimensions for “critically exploring how, why and in whose interest user participation is conducted”, based on a literature review. In the Scandinavian IS literature, user participation has been considered a democratic right, but the review also shows potential drawbacks related to user participation. In three cases from local, regional and national level in Sweden they find triggers for user participation and incentives addressing external users but find that the initiatives to include external users can be “considered as unstructured without any clear goals regarding what to achieve”. There is still a long way to go ....

Carl Erik Moe

October 2018

Kanya Rislana¹,², Alice Good¹, Carl Adams¹ and Philip Scott¹
¹University of Portsmouth, Portsmouth, UK
²Baze University, Abuja, Nigeria

Rislan.kanya@bazeuniversity.edu.ng
Alice.good@port.ac.uk
Carl.adams@port.ac.uk
Philip.Scott@port.ac.uk

Abstract: It has been widely accepted in Information and Communication Technology for Development (ICT4D) literature that Information and Communication Technology (ICT) can foster socio-economic development, however, the process through which this occurs remains unclear. Historically, there has only been a limited focus on evaluating the impact of ICT projects vis-a-vis development, and little concrete analysis of these initiatives in terms of their long-term effects. In this paper, we evaluate the role ICT education and training play in poverty reduction and economic empowerment using an ICT4D Case study of Jigawa State Government, Nigeria. The State Government funded an initiative aimed to develop 500 ICT professionals annually between the year 2001 to 2012. This was to be attained through local and overseas training, as well as the activation of computerisation within certain government operations, such as financial management, procurement and payroll. In our research, we employed Richard Heek's Design-Reality Gap model and Sen's Capability Approach as a theoretical lens to inform the study and furthermore as an evaluative space for ICT4D impact assessment. A broadly interpretative approach was adopted within the Case Study context. Data collection was conducted using multiple sources including surveys, document analysis, and interviews with project beneficiaries and key policy makers. The primary contribution of this paper is in providing greater insights into the role of ICT Education and Training towards poverty reduction and economic empowerment. Furthermore, it aims to exhibit a unique and novel Reality Gap Model in examining ICT4D policy outcome, which will provide significant insights on how the gap between policy objectives and the outcome might be eliminated.

Keywords: ICT4D, Capability Approach, Design-reality gap, ICT4D evaluation, ICT4D champion, Jigawa ICT, economic empowerment

1. Introduction

Information and communication technology (ICT) is the application and usage of computers, which has become essential in modern societies. This technology helps to efficiently process data and produce information that helps in making a strategic decision and save time. Hatakka et al., (2014) argue that ICT service availability in a community can contribute to generating employment and income by providing a service platform through which the community can access public or commercial services and also render their services too to the prospective buyer. ICTs are widely adopted as a platform for development which is usually called ICT4D. However, considering the nature of ICT project implementation, the impact level, although significant, is still at a threshold level due to the disconnection between ICT formulators, public sector reformers and governance specialist (Hanna, 2010). This was as a result of high level of ICT intervention failure to deliver values to the broad group of its stakeholders; to this end, many of the ICT4D intervention are synonymous to failure due to the significant gap that exists between design and the reality of the interventions (Heeks, 2003).

1.1 Motivation and background of the study

Jigawa State lies between latitudes 11°N and 13°N and longitudes 8°E and 10°35'E and covers a total land area of about 22,410 square kilometres. The state is bordered on the east by Bauchi and Yobe states, on the west by Kano and the north by Katsina and Yobe states and by the Republic of Niger. Jigawa State was created from Kano State on Tuesday, August 27, 1991. The state has a total population of 4,361,002 as at 2006 Census (Nigeria Population Commission, 2014), with GDP of $2,988 Million, and per capita income of at $673 (National Bureau of Statistics, 2016). The State has a reasonable number of natural resources, and vast arable land, which is still yet to be explored. Farming is the major occupation accounting for about 80% employment in
the State. Jigawa has a low literacy level of about 53.6% and is among the poorest States in Nigeria (NBS, 2014). In view of this, the State has come up with different strategic action plans to attract investors locally and internationally (Directorate of Budget, 2009). Part of the State government strategy includes the introduction of attractive package and incentives to potential investors. These incentives include the free supply of infrastructure, tax relief, preferential approval of certificates of occupancy in any industrial estate, among others (Directorate of Budget, 2009).

Over the last one and a half decades, Jigawa State Government employed many ICT intervention packages and policies for aiding development in the area of education, poverty reduction, economic empowerment, reducing maternal mortality and public service reform. The policy was perceived to offer unprecedented opportunities for economic, political and socio-cultural growth and broad-based development (Directorate of Budget, 2009). The State ICT4D intervention packages include the creation of a community computer centre for ICT literacy, deployment of IP network and computer applications for government data processing, as well as an overseas scholarship for ICT studies. Also, the Directorate of Budget (2009) highlighted the following as the State ICT objectives:

- To produce an average of 500 ICT Professionals annually from 2010 to 2012 through scholarship of State Indigenes in local and overseas training institutes
- To establish indigenous software and hardware companies
- To achieve 100% computer literacy rate in the State civil service and 25% of the adult population of the State by the year 2012.
- To computerise 100% strategic Government operations such as procurement, payroll, Integrated Financial Management Information Systems (IFMIS), managing all aspects of Government expenditure and financial management by the end of the year 2012

To date, the Jigawa State ICT4D interventions are centred towards five major interventions, as listed below:

- 27 Community Computer training centres in each of the local Governments
- Informatics Institute Kazaure: for training and developing mid-level ICT Skills
- International ICT Scholarship: for high-level ICT skills
- Computerisation of Government operations: for efficient service delivery
- Broadband internet services: for connecting Government offices, Communities

This research focuses on the evaluation of objective number one, which was planned to produce an average of 500 ICT Professionals annually from 2010 to 2012 through scholarships in local and overseas institutes. The local training was conducted at Informatics Kazaure, while the majority of the overseas training was carried out at Informatics Singapore (details in section 4.1.1 and 4.1.2).

2. Conceptual Framework

2.1 Capability Approach (CA)

Sen’s Capability Approach (Sen, 1999 and 2004) is a broad normative framework for the evaluation and assessment of individuals’ well-being and social arrangements, as well as the design of policies, and proposals about social change in society. CA, as discussed by Robeyns (2005), has been widely used in different fields, most prominently in development studies, applied and empirical studies, welfare economics, academia, social policy and political philosophy. Furthermore, Robeyns stated that CA could also be used as an alternative evaluative tool for social cost–benefit analysis or as a framework for designing and evaluating policies, ranging from welfare state design in affluent societies to development policies by governments and non-governmental organisations in developing countries.

CA has also been widely used in evaluating ICT4D intervention (for example in Dasuki and Abbott 2015; Hatakka and Lagsten, 2012; Kleine, 2010; Van Den Hoven and Rooksby, 2008) and also in Sen (2010) in evaluating the use of mobiles phones within society, in which he discusses the positive impact of mobile phones in expanding human capabilities. Also, the operationalisation of CA by Hatakka and De (2011) focused on the difference between potential and achieved functioning and the important of context in the evaluation and added the role of technology in the framework as presented in Figure 1. In this research, the context of CA
as explained by Hatakka and De (2011) is illustrated in Figure 1 and Table 1 and will be further expanded in the discussion section.

**Figure 1:** The capability approach framework adapted from (Hatakka and De, 2011)

**Table 1:** Summary of CA as applied to the research context adapted from (Hatakka and De, 2011)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Jigawa State Government ICT4D intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply of hardware, software, network and support services</td>
</tr>
<tr>
<td></td>
<td>Training of workforce on ICT literacy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capability set</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To achieve 100% and 25% computer literacy level in the State civil service and overall population respectively by 2012</td>
</tr>
<tr>
<td></td>
<td>To Achieve 100% computerisation of the main Government operations such as payroll, and Integrated Financial Management Information Systems managing all aspects of public expenditure and financial management by the end of 2012</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Choices and Achieved functioning</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To improve access to quality education which will reduce poverty and provide economic empowerment</td>
</tr>
<tr>
<td></td>
<td>To improve service delivery</td>
</tr>
<tr>
<td></td>
<td>To reduce waste through effective utilisation of resources and lean workforce</td>
</tr>
<tr>
<td></td>
<td>To generate revenue from the intervention</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conversion Factors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lack of basic infrastructures, for example, power supply and the internet</td>
</tr>
<tr>
<td></td>
<td>Lack of prerequisite ICT skills</td>
</tr>
<tr>
<td></td>
<td>Lack of political will from Government official and the opposition</td>
</tr>
</tbody>
</table>

2.2 The Design-reality gap

The design-reality gap is a broad model that is drawn from the literature on contingency in organisational change (Venkatraman, 1989) and social construction of technology (Suchman, 1987). The framework was developed by Heeks (2003) and is used to analyse organisational change and the risk associated with it. In the domain of ICT4D, the design-reality gap has been adopted as an assessment tool to measure the success of the ICT4D intervention. The model has helped to explain the mismatch (gap) between ICT4D designs expectation and the reality. This gap occurs because the contexts of the project beneficiaries and the ICT4D project designers are often distant in socio-economic and cultural dimensions. Hence, this then results in specific design assumptions, which do not fit the local realities (Heeks, 2002). ICT4D failure or success would then depend on a gap that is present in the design of the ICT4D project and the current realities. According to Heeks (2002), the design-reality gap exists around seven dimensions abbreviated as ITPOSMO: Information, Technology, Processes, Objectives and values, Staffing and skills, Management systems and structures, and Other resources such as time and money.
2.3 Dimensions of the Design-reality gap

The extended dimensions of the design-reality gap can also be summarised with the OPTIMISM mnemonic (Heeks, 2008):

- Objectives and values (both formal strategies and culture, and informal goals)
- Processes (from individual tasks up to broader business processes)
- Technology (not just ICTs but other relevant technologies)
- Information (data stores, data flows, etc.)
- Management structures and systems
- Financial Investment
- Staffing and skills
- Milieu (the external political, economic, socio-cultural, technological and legal environment)

The above dimensions have been adopted to form an enquiry into the success and failures issues relevant to this research as illustrated in Table 2. The dimension as shown in the table was used in creating themes that guide the type of questions asked during data collection and analysis.

**Table 2: Interpretation of the design-reality gap in terms of research issues**

<table>
<thead>
<tr>
<th>Elements of the design-reality gap model</th>
<th>Interpretation of the framework in terms of the research issues</th>
</tr>
</thead>
</table>
| Objectives and values                    | • What are the objectives of Jigawa State ICT4D intervention and how does the project meet the expectations of all the stakeholders?  
  | • What are the expected associated values of the intervention?  
  | • What are the unintended consequences of the intervention and how are they related to the overall objectives and values of the State?  
  | • How do the objectives and value of the project align with the overall development strategy of the State? |
| Processes                                 | • What is the Government implementation strategy of the intervention as a whole?  
  | • What are the role and responsibility of each of the major stakeholders (Government, civil servant, citizens, opposition party, etc.) |
| Technologies                              | • What are the levels of basic infrastructure, e.g. power, connectivity, etc. are available to support the intervention? If there is no availability, what are the plans for sourcing them?  
  | • What is the level of engagement between all the project stakeholders in the State, for example, Government to citizens; citizens to citizens; Government to Business; Business to Business?  
  | • Is there proper information flow about the intervention amongst various government implementation MDA, for example, Education2Commerce, Agric2Technology, etc.?  
  | • What are the levels of engagement with development agencies and international communities for best practice, benchmarking and collaboration? |
| Management systems and structures         | • What is the preparedness level of all the stakeholders?  
  | • Is there a proper institutional framework within the MDAs, for example, legislation in taxation, labour and employment, budget and public finances?  
  | • What is the level of relationship between the three arms of Government (Executive, Legislative, and Judiciary) Does the project have the backing of the State house of assembly (legislation or act)?  
  | • What investment has been made to support the implementation of the intervention?  
  | • Is their plan for sustaining the project beyond the political timescale? |
| Investment resources                      | • Does the State have skilled staff to manage the project?  
  | • If not, what development strategy is there to attract staff or to train the current workforce of the State to acquire the prerequisite skills to manage the project? |
| Staffing and skills                       | • What are the legal issues surrounding the project (sustaining the project beyond the political tenure of the current government)?  
  | • What are the opposition perceptions regarding the project?  
  | • What are the perceptions and the fears of civil servants, citizens, and Businesses for reducing corruption, “sharp practices” and “man-to-man” through the intervention? |
2.4 Contributions of the two conceptual frameworks

The contribution of mixing the two frameworks in this research is in twofold: Firstly, it contributes to the debate of operationalising CA in investigating ICT intervention. Also, CA can also help to investigate what these ICT opportunities were good for, and the way someone can reap benefits from the opportunity exhibited by ICT interventions (Andersson, Grönlund, and Wicander, 2012; Qureshi, 2013a and 2013b). Secondly, for the design-reality gap model, it will help to investigate to what extent ICT implementation achieved or not achieved the expected target of the stakeholders. On this note, it is worth mentioning that Capability Approach and Design-reality gap will help in answering the “how and why” questions of ICTs in development practice, which may assist in reducing the gap between ICT4D policy design and implementation.

2.5 Summary of literature review and knowledge gap

While there is ICT4D literature available, the majority of the literature makes no or very little impact, with several epistemological shortcomings (Raiti, 2007). Although this is about a decade old now, ICT4D literature is still lacking the conceptual basis to prove its independence as a standalone domain like Information Systems, Development and Economics, with the majority of researchers coming from a diverse discipline like mass communication, development, economics, computer science, etc. This then provides a demand for rigorous and critical ICT4D research within the multi-level domain. Furthermore, Harris (2013) states that: researchers and policy-makers operate with different values, languages, time-frames, reward systems and professional ties to such an extent that they live in separate worlds. As a result of this, the research-based evidence is often only a minor factor when policies for development are formulated and practices shaped, and too often new public policies are rolled out nationally with little monitoring and evaluation (Harris, 2013). Moreover, University research reports structural barriers and disincentives to engaging in knowledge translation activities that might advise practice and policy formulation. Also, the ICT4D impact is regarded differently by each community, with researchers working over publications, citation counts and journal impact factors, while practitioners look for actionable advice that can be put to use for increasing the effectiveness of public services and policy (Harris, 2013).

The above theme clearly shows a higher level of disconnection between policy makers, practitioners and academia and has given rise to many inconclusive ICT4D types of research over the last three decades. These then bring the fundamental need for better analytical and empirical ICT4D research. Heeks (2007) proposed the need for ICT4D research to be drawn from pre-existing conceptual frameworks.

To address the above shortcomings, this research will operationalise the notion of Sen’s Capability approach in which the framework will be applied to enquire upon the impact level of the intervention packages, and Richard Heek’s design-reality gap will be used as an evaluative lens. This research is intended to develop and test a multi-level framework and proposed it for further ICT4D intervention evaluation as in Figure 2.

![Figure 2: The proposed framework adapted from (Rislana, et al., 2015)](image-url)
to expand their freedom of living and in turn expand their welfare economy. This research found that there was a significant number of research projects which operationalised the concept of CA in investigating the impact of ICT on human development. However, very few were able to get it right (Tshivhase et al., 2016). This failure of many researchers to effectively operationalise CA in evaluating ICT4D intervention has coincided with the massive failure of ICT4D intervention as discussed in section 2.2. Kleine (2010) proposed that: to understand the contribution of ICTs to development efforts properly; it is necessary to firstly, define which development paradigm we are working with and secondly, to refine our understanding of development processes to recognise their systemic nature. The majority of ICT4D intervention failures are not limited to her argument. Usually, ICT interventions are not adequately defined within a clear development paradigm. To address that, Kleine (2010 and 2013) proposed a systematic mapping of the development process and design and planning of choice; this was also regarded as one of the effective approach, which has effectively, operationalised CA in ICT4D research as found in Tshivhase et al. (2016).

This research proposes that a developmental approach must be well grounded within Sen Capability Approach (A dimension), thus ICTs, as described by Kleine (2010), could be seen as useful tools in processes of empowerment, when proper conversion factors are properly in place (D, E and F dimensions). Taking a view of ICT as a tool for achieving capability for both institution and individual and the frequent number of ICT4D intervention failures, this research proposes that the design-reality gap framework (C dimension) can be used as an evaluative lens during pre-implementation, mid-implementation and post implementation of ICT4D project, as proposed by (Heeks, 2003). The conversion factors would be used as a catalyst to stimulate ICT project planning, implementation, and evaluation, which will address the gap associated with ICT application in development (B1 and B2 dimension). This will be further expanded in section 5.

In this research, the combination of the two conceptual frameworks DRG and CA have extended their limitations, for example, the individualistic view of CA has been extended by the strength of DRG in analysing organisational change. While the limitation of DRG, it lacks developmental focus will be strengthened with the major contribution of CA, which is its focus on human development.

3. Methodology

A qualitative case study, particularly the broad interpretive approach was applied to the research problem. The philosophical basis of interpretive research is inherited from the ethnographic research tradition in anthropology, hermeneutic, and phenomenology (Klein & Myers, 1999; Walsham, 1995). The interpretive approach can better explain the complex socio-technical interaction process using ethnographic interviews, thick case description, and empirical observation (Thapa, 2012). The research approach adopted an interpretive case study as described in Yin (2013).

Data was collected through four open-ended interviews, observations, and surveys, from May 2014 to February 2015. The four open-ended interviews conducted were mainly centred towards capability approach with some context from the design-reality gap, as questions are primarily top level related to the policy as a whole and other high-level implementation issues of the policy. The following people were interviewed, also the code for the interviews are added in bracket which will be use in the sections to come:

- Former MD in the State (1999 to 2007) and Senior Consultant to the Current Government on ICT (INTERVIEW-1)
- Former Permanent Secretary and Director Scholarship Board (INTERVIEW-2)
- Director studies of Jigawa State Informatics Institute (INTERVIEW-3)
- Director entrepreneurship Jigawa State Informatics Institute (INTERVIEW-4)

The interviews lasted between 30 to 70 minutes; the first two interviews were conducted at Kano, Nigeria, while the third and fourth interviews have been carried out in Abuja, Nigeria. The justification of choosing the former MD and the former permanent secretary for the interview was to investigate the foundational process associated with the intervention which include the policy as whole and the initial implementation issues. Also, the two interviews with the directors is to investigate the current issues surrounding the intervention. All the four interviews are conducted in English, interview number three were later follow-up with a WhatsApp chat to clarify further issues. After the data from the four interviews had been analysed, a survey was designed based on the interview findings and administered to the beneficiaries of the intervention via SurveyMonkey.
The survey link was shared in four Facebook groups: https://www.facebook.com/groups/347582702018747/, https://www.facebook.com/groups/32605486410/, https://www.facebook.com/groups/397768236948740/ and https://www.facebook.com/groups/414185758602688/ and three WhatsApp group (Informatics ReUnion, Informatics Institute Kasaure, Informatics Students) created by various beneficiaries of the intervention and through sending links to some of the beneficiaries known to the researcher having been one of the beneficiary of the intervention. The survey questions were conceptualised using the theme adopted from CA as found in Sen (1999) in total 101 responses was received from the beneficiaries of the intervention. The justification for conducting the survey is to validate findings from the four interviews conducted and to evaluate the impact of the intervention from beneficiaries perspective.

All data collected was analysed using the set of principles of thematic analysis (Braun and Clarke, 2006). To interpret the findings, eight themes were generated using the OPTIMISM dimension as adopted from the design-reality gap (Heeks, 2003) and five themes were equally generated using CA framework as adopted from (Hatakka and De, 2011). The questions were designed using the construct of CA framework: background of the participant, intervention they have benefitted, conversion factors (i.e. which enable or restrict them), potentials and achieved functioning as found in (Hatakka and Lagsten, 2012).

4. Case study findings and analysis

4.1 Jigawa ICT4D educational interventions

The educational indicator of Jigawa State is very low; the National Bureau of Statistics website indicated that only about 25.08% of the State populations are literate (National Bureau of Statistics, 2016). This may not be unconnected to the State lowest GDP and per capita income and has placed the State to be among the poorest in the country. According to the 2012 Nigerian Poverty Assessment Report, the incidence of poverty in Jigawa State is 79.0% which is among the highest in the Country (National Bureau of Statistics, 2012). Also the Nigeria Socio-Economic Indicators report of November 2012 and National Bureau of Statistics (National Bureau of Statistics, 2016) indicated that 50.70% of the State population live below $1 a day and 57.3% of the total population are extremely poor, further statistics Stated that Jigawa has GDP (PPP) of $3.0 billion, with $673 GDP Per Capita. Looking at these poor indicators in the State, the Governor of the State between 1999 and 2007 came with ICT intervention policy to fast track development in the area of public service reform, increase in access to quality education; reduce poverty among the youth through application and usage of ICT.

The initial plan for the reform was to train the indigenous people of the State in various ICT skills, to realised that the Informatics Institute and International ICT scholarship intervention was conceptualised (section 4.1.1 and 4.1.2 will discuss the two intervention) also in Rislan et al., (2015). The ICT workforce development is also incorporated into the Jigawa developmental framework that aims to achieve 100% computer literacy rate in the State civil service, and 25% of the adult population by the year 2012. This was also aimed at providing empowerment, and to help in alleviating poverty (Directorate of Budget, 2009).

The project is now fourteen years old. However, no assessment has been carried out to evaluate the success or failure of the intervention and to what extend the intervention has achieved its major aims and objectives. This research is crucial, considering that many State Governments in Nigeria like Kano, Zamfara, Yobe, Rivers among others are joining Jigawa in studying their ICT4D intervention policy, and the majority of those States are replicating similar in their States. To date, no proper research has been conducted to evaluate the viability of the intervention, as such this research provides empirical findings that examined and identified issues associated with the project and provides policy guidelines for future implementation.

4.1.1 Jigawa Informatics Institute

In the initial conceptualisation process of Jigawa State ICT4D policy, the ICT4D strategic team headed by the State Governor discovered that Jigawa State is having dearth of ICT skills set, this hinted the creation of Jigawa State Informatics as described by Governor Turaki as found in Taiwo (2008): “To prepare the citizenry, the government bought a master franchise from Informatics Holdings, Singapore and established Informatics Institute in Kazaure. This Institute, which is the first of its kind in Africa.” Also, the former Institute Director, Mr George Kong stated that “The main aim of the institute origin is to produce ICT professionals that would head Jigawa ICT revolution targeted to launch the State’s new economy into the 21st century” (Taiwo, 2008).

In his maiden speech on his first visit to the Institute, the former Governor of the State (2007 to 2015) Alhaji Lamido describing his predecessor who is the initiator of the institute Governor Turaki (1999 to 2007) said that "I must say here that my predecessor’s decision to invest in the development of IT as a way of creating wealth..."
was a right one. In particular, the establishment of Informatics Institute as the hub of the IT development was a
good investment which would yield many dividends for the State." (Taiwo, 2008).

The institution has evolved through three major regions of a political time scale from 1999 to 2007, 2007 to 2015, and from 2015 to date these findings reveal that the first political cycle of the intervention: “has
witnessed a massive physical infrastructural development, aggressive campaign to sensitise general public to
embrace the intervention and building franchising, linkage and international collaboration with institutions like
informatics, C-tech among others” (INTERVIEW-2).

However, the second cycle of the policy encompassed “Localisation, indigenisation of the institution through
transferring the management of the institution to the indigenes, passing an act by the State legislature to
recognise the institution as a State-owned institute, and getting accreditation from the National Board of
Technical Education.” (INTERVIEW-4). Further findings reveal that there is a consistent continuation of the
institute within the two political loop however the quality and quantity of the graduate produce, the
reputation, and the national acceptance of the institute has significantly reduced within the second political
loop.

“...You can’t localise ICT knowledge transfer, previously we had students from every State in Nigeria,
we have more than 15 expatriates Lectures and instructors from South East Asian countries who are
proven to be qualified and up-to-date in the area they are teaching, the level of teaching facilities we
had then are not up to what is obtainable in the institution now” (INTERVIEW-1).

The above fact has been validated by an ethnographical visit to the institution in which we confirmed that the
enrolment has significantly reduced as in Table 1. A participant of this research interviewed who work with the
institute stated out the following as a major constraint of the institution:

“Failure of our product to get admission into Domestic tertiary institutions due to the incompatibility of
our system to Nigeria educational system. This has resulted in many our students after Advanced
Diploma could not go further especially if they are not financially sound to go to private or foreign
universities, the same apply to securing employment in both public and private sectors. Also “lack of
intervention funding because we are monotechnic, we do not enjoy Tertiary Education Fund or any
funding which militate against the conduct of research and lack of State government’s effort in
providing funds for staff development since they are aware of the institute’s problem of lack of access
funding” (INTERVIEW-4).

4.1.2 International ICT Scholarship

The second initiative of Jigawa State, in widening the skill set of the indigenously trained ICT graduate of
Informatics, was to sponsor them to further their education abroad. To this end, Jigawa has sponsored about
500 indigenous students to study ICT courses in foreign schools. This research reveals that quite a large
number of beneficiaries of the scholarship are the major stakeholders of Jigawa ICT sector and beyond, other
have found a placement in private sector, however a greater number of beneficiaries are stranded as they are
yet to complete their studies considering the nature of the scholarship which was attached to years not
completion of a programme. Further findings indicate that there is a mismatch between the skill set required
by Jigawa eGovernment and the skill set obtained by the majority of the graduates. For example the State-
owned official website (www.jigawa.gov.ng) which has been offline for over 6 months was outsourced to a
third party, and the majority of other ICT services like basic computer literacy training for Government
employee are also outsourced. A graduate from the interventions reveals that:

“Government does not value our skills and capability; we are very much underrated, most of the
consultants they are engaging as service providers are not well experienced and qualified like what we
have in the State.”

Another graduate stated that:

“what we studied is not what we are doing for the State, I studied Software Engineering, and what I
do now does not go beyond typing for my bosses.”
An ethnographical visit to Jigawa State Ministry of Education reveals that more than 100 graduates were employed and are posted to teach ICT at Secondary Schools, but have found it very difficult to do that as the majority of the schools have no functional computer laboratories or there is no power supply to power the computers. A further visit to one of the schools in which one of the graduates was interviewed revealed that “I was employed as a computer teacher, but ever since I came here I have never taught anything related to computer, I am now teaching Geography and Mathematics”. Another encounter with a graduate who operates Computer centre in one of the Local Government called for a Government intervention to create linkage between ICT graduate and the business, like in the area of outsourcing.

The level of ICT4D in Jigawa is still at threshold level, even though the availability of basic infrastructure is commensurable, however, the primary objectives of Jigawa State ICT4D in generating 2 billion Naira (About $5 million) beginning from 2013 fiscal year (now 3 years ahead of the target) was not feasible, considering that all the strategic action plan are not properly implemented. The second objective of producing about 500 ICT professionals is realisable considering the number of indigenous professionals graduated from the Institute which is now major key stakeholders in the public-sector reform as presented in Table 3.

Table 3: Summary of student enrolment (Source: Jigawa State Institute of Information Technology, 2015)

<table>
<thead>
<tr>
<th>Year</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
<th>MALE (%)</th>
<th>FEMALE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2964</td>
<td>328</td>
<td>3292</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>2007</td>
<td>3183</td>
<td>263</td>
<td>3446</td>
<td>92</td>
<td>8</td>
</tr>
<tr>
<td>2008</td>
<td>3470</td>
<td>211</td>
<td>3681</td>
<td>94</td>
<td>6</td>
</tr>
<tr>
<td>2009</td>
<td>1873</td>
<td>134</td>
<td>2007</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>2010</td>
<td>1984</td>
<td>220</td>
<td>2204</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>2011</td>
<td>1415</td>
<td>85</td>
<td>1500</td>
<td>94</td>
<td>6</td>
</tr>
<tr>
<td>2012</td>
<td>1292</td>
<td>68</td>
<td>1360</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>2013</td>
<td>1704</td>
<td>143</td>
<td>1847</td>
<td>92</td>
<td>8</td>
</tr>
<tr>
<td>2014</td>
<td>1531</td>
<td>155</td>
<td>1686</td>
<td>91</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>19416</td>
<td>1607</td>
<td>21023</td>
<td>92</td>
<td>8</td>
</tr>
</tbody>
</table>

5. Discussions

4.2 The project capability perspective and background

The two ICT4D interventions discussed above are mutually exclusive Informatics was established with an aim to offer foundational to mid-range courses in ICT. While the international ICT scholarship was aimed at widening the skill set of the indigenous student trained and graduated from Informatics to be a sponsor to further their education abroad. The main cardinal point of these two interventions, as adapted from JSIIT website (www.jsiit.edu.ng) was:

“To articulately pursue and promote Information and Communications Technology (ICT) professionalism that meets local and universal applicability of the present and future generations and to provide requisite education and training in Information and Communications Technology (ICT) with a touch of excellence and consistent global relevance.”

The Informatics Institute has another stream of a certification program in Networking and Telecommunication which three major programs: Integrated Systems: Voice and messaging, Copper and Fibre based networking. Further findings discovered that the international ICT scholarship is mainly for MSc, MBA and B.Sc. programs. The B.Sc. scholarship is primarily for students of Informatics who excel very well and pass international Diploma and Advance Diploma, while the MSc and MBA are mainly for students who completed their B.Sc programs. The international ICT scholarship training was administered mainly at Informatics Academy Singapore who has a partnership to offer a degree for three various UK universities (University of Portsmouth, Wales, and Oxford Brookes) among other universities.
4.3 Operationalising Capability Approach to investigate design-reality gap within ICT4D intervention

Sen’s Capability Approach (Sen, 1999 and 2004) has been widely used in evaluating ICT4D intervention (Van Den Hoven and Rooksby 2008; Kleine, 2010; Hatakka and Lagsten, 2012) and Sen (2010) himself, in evaluating the use of mobiles within society, in which the study discussed the positive impact of mobile phones in expanding human capabilities. Also, the operationalising of CA by Hatakka and De (2011) focuses on the difference between potential and achieved functioning and the importance of context in the evaluation, and has added the role of technology in the framework. For this research the context of CA as explained by Hatakka and De (2011) was adopted in creating five themes (intervention, capability set, choices, Achieved functioning and conversion factors) together with the OPTIMISM dimension adopted from Heeks (2003) which is used as guide for the interviews and designing the instrument for the survey. The following section will expand on that.

4.3.1 Intervention

The intervention as discussed in the background and findings section was aimed at developing ICT skills set for the State development framework. To this end, these findings indicated that informatics had trained more than 20,000 graduates of various training programs. Furthermore, about 500 have benefitted from the international ICT scholarship. The data analysed in Table 4 presented clear insight on the nature of the intervention process from the beneficiaries’ perspective.

Table 4: Intervention process (adopted from Hatakka and De, 2011)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was clear to me what I was supposed to impact from the intervention(s).</td>
<td>4%</td>
<td>1%</td>
<td>10%</td>
<td>46%</td>
<td>39%</td>
</tr>
<tr>
<td>We were provided with adequate choice over which of the intervention(s) to choose from</td>
<td>7%</td>
<td>16%</td>
<td>16%</td>
<td>41%</td>
<td>20%</td>
</tr>
<tr>
<td>The intervention(s) are relevant to my intended personal development</td>
<td>6%</td>
<td>6%</td>
<td>14%</td>
<td>36%</td>
<td>40%</td>
</tr>
<tr>
<td>The intended benefits of the intervention(s) are clearly stated to me</td>
<td>4%</td>
<td>5%</td>
<td>16%</td>
<td>55%</td>
<td>19%</td>
</tr>
<tr>
<td>The intervention(s) process is well organised</td>
<td>8%</td>
<td>8%</td>
<td>21%</td>
<td>43%</td>
<td>21%</td>
</tr>
<tr>
<td>The impact of the intervention matched the intervention’s intentions</td>
<td>3%</td>
<td>15%</td>
<td>16%</td>
<td>53%</td>
<td>14%</td>
</tr>
<tr>
<td>I was encouraged to look for links between the various intervention(s) and others</td>
<td>8%</td>
<td>18%</td>
<td>27%</td>
<td>39%</td>
<td>8%</td>
</tr>
<tr>
<td>The Government official supported us and tried to give help when it was needed during the intervention(s)</td>
<td>7%</td>
<td>15%</td>
<td>19%</td>
<td>47%</td>
<td>11%</td>
</tr>
<tr>
<td>Talking with other beneficiaries helped me to develop my understanding and impact of the intervention(s).</td>
<td>7%</td>
<td>3%</td>
<td>8%</td>
<td>57%</td>
<td>25%</td>
</tr>
<tr>
<td>I was provided with support after benefiting the intervention(s)</td>
<td>11%</td>
<td>22%</td>
<td>23%</td>
<td>31%</td>
<td>14%</td>
</tr>
<tr>
<td>We were still in touch with the intervention(s) stakeholders (Official, Co-beneficiary).</td>
<td>5%</td>
<td>26%</td>
<td>15%</td>
<td>46%</td>
<td>8%</td>
</tr>
<tr>
<td>My views, opinion, and needs were valued during the intervention(s) process.</td>
<td>11%</td>
<td>16%</td>
<td>24%</td>
<td>38%</td>
<td>11%</td>
</tr>
</tbody>
</table>

4.3.2 Capability set and choices

Findings from the intervention beneficiaries indicated that the intervention had presented a lot of capabilities and choices to them as presented in Table 5. Question four and seven were asked to see if there is any disconnect between the intervention and their intended capabilities and choices.
Table 5: The capability and their choices (adopted from Hatakka and De, 2011)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was clear to me what intended capability(s) I will benefit from the intervention(s)</td>
<td>2%</td>
<td>5%</td>
<td>18%</td>
<td>52%</td>
<td>24%</td>
</tr>
<tr>
<td>I was encouraged to think and reflect about the intended capability(s) of the intervention</td>
<td>4%</td>
<td>4%</td>
<td>16%</td>
<td>63%</td>
<td>12%</td>
</tr>
<tr>
<td>I have developed set of capability(s) from the intervention(s)</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
<td>57%</td>
<td>31%</td>
</tr>
<tr>
<td>I have not developed any set of capability(s) from the intervention(s)</td>
<td>31%</td>
<td>45%</td>
<td>12%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>The set of capability(s) that I have benefited suit well with my personal and development goals</td>
<td>3%</td>
<td>3%</td>
<td>12%</td>
<td>49%</td>
<td>33%</td>
</tr>
<tr>
<td>The set of capability(s) I have benefited help in achieving/acquiring other set of intervention(s) unintended capability(s)</td>
<td>2%</td>
<td>6%</td>
<td>22%</td>
<td>57%</td>
<td>13%</td>
</tr>
<tr>
<td>The set of capability(s) that I have benefited stopped me from achieving/acquiring another set of capability(s)</td>
<td>22%</td>
<td>41%</td>
<td>19%</td>
<td>15%</td>
<td>3%</td>
</tr>
<tr>
<td>I have received proper guidance throughout the capability dev. process</td>
<td>6%</td>
<td>10%</td>
<td>19%</td>
<td>53%</td>
<td>12%</td>
</tr>
<tr>
<td>Talking with other beneficiaries helped me to develop my understanding and impact of the intervention(s)</td>
<td>7%</td>
<td>3%</td>
<td>8%</td>
<td>57%</td>
<td>25%</td>
</tr>
<tr>
<td>I was provided with support after benefiting the intervention(s)</td>
<td>11%</td>
<td>22%</td>
<td>23%</td>
<td>31%</td>
<td>14%</td>
</tr>
<tr>
<td>We were still in touch with the intervention(s) stakeholders (Official, Co-beneficiary)</td>
<td>5%</td>
<td>26%</td>
<td>15%</td>
<td>46%</td>
<td>8%</td>
</tr>
<tr>
<td>My views, opinion, and needs were valued during the intervention(s) process</td>
<td>11%</td>
<td>16%</td>
<td>24%</td>
<td>38%</td>
<td>11%</td>
</tr>
</tbody>
</table>

4.3.3 Achieved functioning

Kleine (2010) argues that, the outcome component will map or measure the achieved functioning resulting from an individual’s choices as a proxy for the capabilities, from the findings in Table 5, it is clear to see that the intervention has met or partially met up with the expectations of the beneficiaries even though the core objectives of the government in achieving 100% computerisation of its core public services operation and 25% of its revenue through the intervention are not achieved.

Table 5: Achieved functioning (adopted from Hatakka and De, 2011)

<table>
<thead>
<tr>
<th></th>
<th>Very little</th>
<th>Not much</th>
<th>Not sure</th>
<th>Quite a lot</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and understanding about the intervention as whole</td>
<td>12%</td>
<td>17%</td>
<td>12%</td>
<td>26%</td>
<td>32%</td>
</tr>
<tr>
<td>Knowledge and understanding about the intervention choices</td>
<td>15%</td>
<td>26%</td>
<td>12%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>Knowledge and understanding about the intended functioning(s) of the intervention</td>
<td>11%</td>
<td>22%</td>
<td>14%</td>
<td>28%</td>
<td>26%</td>
</tr>
<tr>
<td>Knowledge and understanding about the unintended functioning(s) of the intervention</td>
<td>20%</td>
<td>28%</td>
<td>26%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Ability to think about ideas or to solve problems related to my development</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
<td>38%</td>
<td>47%</td>
</tr>
<tr>
<td>Achieved skills or technical procedures specific to my development</td>
<td>6%</td>
<td>12%</td>
<td>2%</td>
<td>41%</td>
<td>39%</td>
</tr>
<tr>
<td>Ability to be economically sufficient from the achieved functions of the intervention</td>
<td>8%</td>
<td>8%</td>
<td>15%</td>
<td>30%</td>
<td>39%</td>
</tr>
<tr>
<td>Ability to communicate and use ICT effectively for personal &amp; economic development</td>
<td>2%</td>
<td>6%</td>
<td>3%</td>
<td>29%</td>
<td>61%</td>
</tr>
</tbody>
</table>
4.3.4 Conversion factors

Robeyns (2005) and Hatakka and De (2011) argue that intervention can enable a potential functioning but conversion factors may hinder the choices of the people to utilise it. This when deepened into the case findings we could see that the beneficiaries of the intervention have not been hindered much with some of the conversion factors associated with the intervention. From Table 6 we could see that their literacy level; personal and economic reasons have not hindered them much from achieving functioning and capabilities of the intervention. Although during the first cycle of the intervention there was much politicking about the intervention from the opposition party, that still didn’t reduce the adoption level of the intervention and its impact.

Also from the final rating of the interventions by the beneficiaries we could see that the intervention is well about average in terms of their personal interaction with it, even though they claimed that more support in the area of creating enabling environment for them to secure job, and be part of the overall ICT4D intervention in the area of patronising their competency is not well sought by the government.

Table 6: Conversion Factors (adopted from Hatakka and De, 2011)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think your literacy level has stopped you from benefiting</td>
<td>34%</td>
<td>44%</td>
<td>15%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>from the intervention impact?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think politicising the intervention has stopped you from</td>
<td>12%</td>
<td>27%</td>
<td>17%</td>
<td>32%</td>
<td>13%</td>
</tr>
<tr>
<td>benefiting from the intervention impact?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think your personal issues have stopped you from benefiting</td>
<td>28%</td>
<td>43%</td>
<td>17%</td>
<td>8%</td>
<td>3%</td>
</tr>
<tr>
<td>from the intervention impact?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think your social and economic status has stopped you from</td>
<td>28%</td>
<td>43%</td>
<td>13%</td>
<td>13%</td>
<td>2%</td>
</tr>
<tr>
<td>benefiting from the intervention impact?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think insufficient access to other technologies has stopped you</td>
<td>17%</td>
<td>33%</td>
<td>17%</td>
<td>18%</td>
<td>15%</td>
</tr>
<tr>
<td>from benefiting the intervention impact?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think insufficient access to other resources has stopped you</td>
<td>8%</td>
<td>28%</td>
<td>13%</td>
<td>34%</td>
<td>16%</td>
</tr>
<tr>
<td>from benefiting from the intervention impact?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rather Badly</td>
<td>2%</td>
<td>16%</td>
<td>32%</td>
<td>37%</td>
<td>14%</td>
</tr>
<tr>
<td>Not so well</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quite well</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very well</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.4 The Design reality gap dimension

4.4.1 Objectives and Value

Design Expectations

The objectives of the projects as found in Jigawa State Institute of Information Technology Website are “To articulately pursue and promote Information and Communications Technology (ICT) professionalism that meets local and universal applicability of the present and future generations. Moreover, to provide requisite education and training in ICT with a touch of excellence and consistent global relevance.” (www.jsiit.edu.ng).

Reality

From the empirical findings of the study, it was evident to see that the main objectives and value of the project was achieved, due to a high number of indigenous people graduated from the two programs. These findings discovered that more than 20,000 and 500 people have benefited from the Informatics Training and International Scholarship program respectively.

Design-Reality Gap

From these findings, it clears to note that there is no gap between design and reality of the interventions.
4.4.2 Process

Design Expectations

The intervention was designed to be managed by Informatics Institute for offering the training, Ministry of Education, Science and Technology to give the regulatory framework, while Scholarship Board to ensure that bursary and tuition were effectively awarded to Jigawa State citizens.

Reality

Informatics managed the process of the intervention in collaboration with Scholarship Board and Ministry of Education, Science and Technology and this has remained unchanged since inception.

Design-Reality Gap

There is no much-designed reality gap here.

4.4.3 Technology

Design Expectations

The intervention was designed to have all the technological platforms; Informatics was planned to be the centre of Excellence for learning and training. The Institution was planned to have effective connectivity to the National Power Grid and Backup, High-Speed Internet Connectivity, among others.

Reality

During the first phase (1999 to 2007) the Institution was adequately equipped with all the necessary technology and teaching tools ranging from Desktop, Laptops, Servers, Printers, Internet Connectivity, and Standby Generator. However, this was not effectively sustained during the second cycle (2007 to 2015) and beyond.

Design-Reality Gap

The gap here is not much even though there has been a declined in the supply of technological equipment to the intervention; this may not be unconnected due to the massive penetration of smartphone, personal ownership of computers, and availability of GSM services.

4.4.4 Information

Design Expectations

The intervention was designed to be transparent as issues related to admission, job vacancy, registration, and scholarship was planned to be shared among all the stakeholders.

Reality

The institution shared all its information effectively, issues related to admission, job vacancy, registration, and scholarship was well advertised through the institution's website, social media pages, State-owned community radio stations, etc. Also, in the first cycle of the intervention religious, traditional and the political institution was used to advertise admissions and other related issues.

Design-Reality Gap

There is no much gap between Information and its related components.

4.4.5 Management structures and systems

Design Expectations

The intervention was designed with the aim to develop mid to high-level cadre of ICT personnel for the State eGovernment initiatives; this was very well captured in the entire policy pronouncement document and on various occasions by different executives of the State. Informatics was given the role in managing all the training issues, Ministry of Education, Science and Technology to manage the regulatory issues, funding provision, effective deployment of graduates into State’s eGovernment initiatives among other issues, while Scholarship Board to manage award of Bursary.
Reality
The Informatics has effectively conducted all the prescribed training. However, weak legislation was experienced from regulatory ministries as the failed to ensure good Governance and proper coordination and utilisation of the graduates. It was equally discovered that many non-indigenes were awarded various bursary.

Design-Reality Gap
There are many Gap issues with the management of the interventions, the Ministries as clearly stated above have failed to support the institution with the regulatory framework, which leads the institution to lose its focus, and there is a weakness in the management and award of the scholarship by the Scholarship Board.

4.4.6 Financial Investment

Design Expectations
The Two Interventions are designed to receive full funding from the State Government.

Reality
During the first cycle of the intervention (1999 to 2007), the two interventions have experienced steady flow of funding from the Government, this has enabled the Informatics to promptly pay for all tuition to its partner Institutions (Informatics Singapore, purple train, C-Tech Academy, USA, etc.), develop physical infrastructure and staff welfare. However, during the second cycle (2007 to 2015) the Institutions witnessed a very low allocation of funding, this has crippled the intervention not to function effectively.

Design-Reality Gap
There is much gap here, which occurred due to the failure of the State to allocate a reasonable funding for the interventions. This research discovered that about 80% of the beneficiaries of the intervention have failed to complete their education (up to the first-degree level) due to limited grants as the majority of the beneficiaries terminated their education after Advance Diploma. It was also discovered that the Informatics is no longer providing free tuition to the male students as it was before for all gender, this has made the Institution inaccessible to citizens from a low-income family which defeats its purpose for inclusive enrolment for all indigenes.

4.4.7 Staffing and skills

Design Expectations
The intervention was designed to be handled within the first five years by international staff with little support from the locals, while the Local staffs are expected to take over full teaching and management of the institution.

Reality
The above has been achieved particularly through recruitment of about 20 staff from Asian countries and two from America. These findings reveal that currently, the institution has two international staff from Singapore and India who only comes on an ad-hoc basis to help in Admission, Registration, and Examination Governance.

Design-Reality Gap
There is no much gap here as a proper transition in staffing between International, and the Local staff was experienced.

4.4.8 Milieu

Design Expectations
The intervention was designed to be in conformity with the available legal and Institutional framework related to Ministry of Education, Science and Technology, Labour and Productivity among others. It was also designed to accommodate every citizen irrespective of Gender, Ethnicity, Religion and Political inclination.

Reality
It was discovered that even though, the intervention provides an enabling environment to all irrespective of Ethnicity, Gender, and Religion. However, an issue related to Political inclination was used in the first cycle (1999 to 2007). During this era, a lot of ‘man-know-man’ issues was witnessed, for example of all the, about 200 International scholarships awarded only five are based on partial merit. In the second cycle (2007 to 2015)
this barrier was addressed as only students who successfully passed Diploma, and Advanced Diploma from Informatics are qualified to be awarded the International Scholarship to study Bachelor Degree and Masters. Also, Female was marginalised in the intervention even though these findings discovered that it is not deliberate this may not be unconnected to local norm, culture, and religion inclination.

**Design-Reality Gap**

There is partial Gap in the award of the Scholarship even though this has been addressed.

6. Conclusion and recommendations

This paper presented an insight on the role of ICT Education and Trainings in poverty reduction and economic empowerment in Jigawa State, Nigeria. The research also presented implementation gap, challenges, and impact of the intervention. The intervention could be described as a success due to the number of students graduated as conceptualised in the policy documents “Produce 3000 professional graduates annually by 2007 towards the establishment of a virile indigenous software and hardware industry” (Kanya, et al., 2016). This objective was achieved from 2006 to 2007. However, there is a sharp decline of about 30% in the enrolment in 2008 and 2009, and a further decline of about 50% was witnessed to date in the enrolment. This decline could not be disconnected to the issues discussed in section five. Furthermore, from the impact assessment of the intervention beneficiaries, the capability and choices were very well derived from the intervention. This has resulted in matching the realities and design expectation of the intervention as found in (Heeks, 2008).

This research engagement with graduates found that a lot of them are now well placed in the Nigeria ICT space; however the notion of Jigawa State being the regional hub for software production and for assembling hardware by 2015 and to achieve 25% of the State’s Internally Generated Revenue (IGR) from the ICT sector by 2007 is not feasible. An analysis of the State Accounts from 2003 to date indicates that the State is not able to internally generate up to 10% of its revenue and is wholly dependent on the Federal Allocation. This could not be disconnected from the failure of the government to take the ICT intervention seriously and its inability to integrate the intervention into its key economic and development activities like agriculture, education and mining. This research found a lot of unopened ICT equipment containers, which may not be unconnected with the planned ICT Park. Also, the ICT Park established in 2005 is no longer operational as Informatics Institute staff has now occupied it as their official quarters.

The design-reality gap identified above could only be addressed if the Government can go back to the drawing board and reformulate its new ICT4D strategy, as the current one is about two decades without having a proper revisit. Furthermore, the State needs to accommodate the pressing change in the economic climate in Nigeria that is witnessing dwindling inflow of revenue coupled with its increasing population, which overstressed its income. If that could be done with its over 20,000 well-trained ICT graduates, the State could achieve competitive advantages in the area of advancing education, health, agriculture, tourism among others through sectoral integration with ICT.

The findings presented in this paper and the practical application of combining Capability Approach Framework and Design-Reality Gap model was aimed to contribute to the literature of ICT4D and in building a novel process of people-centred ICT4D intervention. Furthermore, this finding intends to help in the promotion and understanding of ICT4D project champion, which is now very well-articulated in the post-2015 development agenda (See Renken and Heeks 2013 and Heeks 2014).

**References**


E-government in Rwanda: Implementation, Challenges and Reflections

Jean Damascene Twizeyimana¹², Hannu Larsson¹ and Åke Grönlund¹
¹Örebro University School of Business, Örebro, Sweden
²College of Science & Technology University of Rwanda, Kigali, Rwanda
damascene.twizeyimana@oru.se
Hannu.Larsson@oru.se
ake.gronlund@oru.se

Abstract: E-government is currently high on the agenda in many developing countries (DCs). While e-government is well-established in many developed countries it is new to least developed countries. Countries that start implementing e-government today can benefit from easy import of modern technologies, but adaptation to local conditions and the organizational change that is required cannot be imported, but must be developed at home. By using examples of an ongoing initiative by the Government of Rwanda to digitalize all G2C and G2B into a single window platform, the current study investigated the important challenges in the implementation of e-government in Rwanda. An interpretive case study was followed. Data was collected through interviews and participatory observations during August to December 2015. Data analysis was inductive, the analysis method was content analysis, and the coding followed open-coding. NVivo software has been used to handle data and facilitate the analysis. The study found six overarching categories of aspects that challenge a successful implementation of e-government in Rwanda. They include information infrastructure for e-government, social inclusion, governance, management, trust in the new system, and languages. However, challenges to e-government implementation should not be taken as of the same extent, neither their degree of mitigation. Rather, they influence and are influenced by various contextual factors which include political support, nature of the e-government project, implementation strategies, human and socio-economic development, existing information infrastructure, and operational capabilities. Having said this, we also argue that countries should learn from one another of their experiences, success stories, and mistakes. Despite a number of associated challenges, the adopted public-private partnership (PPP) approach to e-Government implementation in Rwanda might indeed seem as a suitable catalyst for e-government success in the country.

Keywords: information infrastructure, e-government, implementation, public-private partnership (PPP), least developed countries (LDCs), sub-Saharan Africa, Rwanda.

1. Introduction

E-government is commonly defined as the use of Information and Communication Technologies (ICTs) by government agencies for a better government (Field et al., 2003, p.61). Today, e-government is seen as a technology innovation and is expected to help governments’ achievement of, inter-alia, improved administration, internal efficiency, delivery of public service (Heeks, 2002, Field et al., 2003, Ndou, 2004, Grönlund and Horan, 2005, Guida and Crow, 2009, Rose et al., 2015) and increased opportunities for citizens to participate in democratic institutions and processes (Fang, 2002, Field et al., 2003).

While several high-income countries have seen more than two decades of e-government development; e-government initiatives have also increased considerably in less developed countries (Ndou, 2004, Nkokhwo and Islam, 2013, Amagoh, 2016) . The hopes are that developing countries could benefit from following experiences and implementation models of developed countries (Shin, 2008, Nabafu and Maiga, 2012). However, so far this leapfrogging has been of limited use since such models and experiences are more suited for the developed countries with up-to-date technology and where there is a higher level of public awareness and e-readiness (Ghapanchi et al., 2008). Rather than being one-size-fits-all, the challenges and determinants of a successful e-government implementation to a great extent depends on the context (Shin, 2008, Nabafu and Maiga, 2012). Hence, despite high hopes to quickly gain a plethora of benefits, there are several reports of challenges to e-government in developing countries (Bhatnagar, 2002, p.2).

Challenges in implementing e-government in developing countries relate to the specific conditions in these differing contexts. More specifically several issues have to do with Information Infrastructure development in developing countries. It is based on approaches like the cultivation of installed base and gradual or state-wise transition in the implementation of large-scale information systems, for example, e-government system (Hanseth and Lyytinen, 2004, Hornnes et al., 2010, Anestad and Jensen, 2011). The notion of “installed base”
embodies sociotechnical and practice-oriented aspects, i.e. it includes the physical and social context of work, existing technologies and routines, and the workers’ skills and beliefs (Hanseth and Lytinen, 2004, Aanestad and Jensen, 2011).

In this paper, we argue that while questing for a successful implementation of an e-government project, there is a need to understand its installed-base and how to move ahead from there. The literature on e-government in the sub-Saharan Africa region of the LDCs raise several issues, relating to IIs as well as to other issues. In the next section we look into these issues.

1.1 Background

This study is positioned in the field of challenges in the implementation of e-government in the LDCs, in particular, sub-Saharan. The existing literature has been adopted to position and to discuss the findings from this study. Considered literature include literature reviews on challenges to e-government in developing countries (Dzhusupova et al., 2011) —, and (Alshehri and Drew, 2010); a literature review study on challenges to e-government in sub-Saharan Africa by Nkohkwo and Islam (2013) ; and other relevant studies which include Shin (2008), Nabafu and Maiga (2012), and Mutula (2008).

Though there is also a progressing and promising adoption of e-government in developing countries(Ndou, 2004, Nkohkwo and Islam, 2013) , research on e-government in developing countries has indeed identified some relevant issues that seem pervasive to several different contexts.

In a review of literature on challenges to e-government in developing countries (Dzhusupova et al., 2011) identified seven overall challenges which are: ownership; leadership; lack of management commitment; institutional capability; design versus reality; capacity and awareness; and dependence on external assistance such as the common reliance on donors for running projects.

In another literature study on challenges in e-government implementation, Alshehri and Drew (2010) grouped e-government challenges into four overarching categories: technical (e.g., ICT infrastructure, security); organizational (e.g., top management support, resistance to change, lack of qualified personnel and training); social barriers (e.g., digital divide, culture); and financial barriers. The authors argued that ICT infrastructure and lack of qualified personnel and training are more experienced in developing regions.

However, research is still lacking details as to what these general issues might imply for different contexts. In this paper we aim to investigate a Sub-Sahara African context, since there is generally a lack of reliable data about the status of e-government in this context (Mutula, 2008, p.247).

Previous research in this context has for instance pointed to challenges concerning the gap between existing e-government implementation models and the local context in these countries (Nabafu and Maiga, 2012, p.31) . Others have shown that countries in this region face various challenges, where ICT infrastructure, human resources, the legal framework, and the digital divide are core issues (Nkohkwo and Islam, 2013). Compared to other countries, e-government in Sub-Saharan Africa is severely lagging behind where the major barriers are infrastructure, policy, legal and skillfactors, which all act as barriers for Sub-Saharan African use of e-government services (Mutula, 2008, Nabafu and Maiga, 2012). For example in Uganda, e-government has faced challenges with financial resources, building ICT infrastructure, awareness and social political factors (Nabafu and Maiga, 2012, p.32). In Nigeria the most populous country in Africa, the challenges to e-government are the lack of basic infrastructures, high rate of corruption and a large digital divide with is a significant gap between who have access to ICTs and those do not have (Amagoh, 2016). Also, Nigeria faces issues of poor organizational skills attitudinal problems, inadequate infrastructural support, and poor or unavailable human capital resources (Ifinedo, 2006, p.22). In Zambia implementation of e-government has faced challenges such as resistance from employees and citizens, lack of ICT infrastructure, lack of IT skills in human resources and financial due to overreliance on donor support (Bwalya, 2009, p.9). In Botswana, reported as one of the ICT usage power in the Southern African Development Community (SADC) region (Bwalya and Healy, 2010, Nabafu and Maiga, 2012, Nkwe, 2012), the e-government implementation faced challenges regarding a lack of a formal e-government strategy, lack of trust in the e-government technology, illiteracy, and awareness of the importance of e-government to citizens (Bwalya, 2009, p.10). In Kenya reported challenges to e-government were the lack of ICT policies, poor information infrastructure, entrenched graft, the digital divide, inadequate human skills and low IT literacy (Kamar and Ongono, 2007,
Challenges and determinants of a successful e-government implementation may vary between countries and regions where the determinants depend on the unique environment at hand (Shin, 2008, Nabafu and Maiga, 2012). The environmental factors may entail political stability, legal framework, trust in government, government structure (Basu, 2004, p.112), population size and economy, IT infrastructure development and skilled manpower to run the digital system (Shin, 2008). Thus, the issues identified so far are corresponding with issues in the broader literature on e-government in developing countries. However, the amount of research in the Sub-Saharan African context is still scarce, and little contextual understanding exists. In order to avoid treating developing countries as one unit there is need for more research that focuses on in-depth understanding in this context.

1.2 Objective of the study

This study investigated important challenges in the implementation of e-government in Rwanda. The findings would inform further research and efforts on a successful implementation of e-government in Rwanda and in the context of a LDC. This is done through a case study of the IREMBO project; the initiative by the Government of Rwanda to digitalize all government services to citizens and businesses into a single window platform.

Hence, this paper addresses the research question: What are the important challenges and the lessons from the implementation of the “IREMBO” single window for e-government services in Rwanda?

In the next section we discuss e-government in Rwanda and then we describe the IREMBO project which is the case study for this research. After that, the method is presented. Thereafter the results are presented. Finally, the findings are discussed, the conclusions are summarized, including implications for research and practice, and suggestions for further research are made.

2. E-Government in Rwanda

Rwanda is a country with high ambitions regarding ICTs and where e-government is one of the priority areas. According to the Ministry of Information Technology and Communication (MITEC) previously designated as the Ministry of Youth and ICT (MYICT), ICTs in Rwanda are expected to enable the country in achieving its Vision 2020 of transforming the country from a Least Developed Country to a middle-income country (MITEC, 2015, MYICT, 2015). The approach is to adopt ICTs as a mean to facilitate access to information and services which in turn would yield a dynamic and knowledge-based economy MITEC (2015;2016;2017), MYICT (2015), and Twizeyimana (2017, p.172). As Rwanda is concerned, considerable efforts have been put in place for ICT and its development in the country. These efforts are documented in policy documents such as the National Information Communication Infrastructure plan [2000 – 2015] and the Smart Rwanda Master Plan [2016 – 2020]. In the NICI Plan I to III [2000-2015] the target was to put the legal and regulatory framework in place and build a basic ICT infrastructure MITEC (2015;2016;2017) and MYICT (2015). The major infrastructure consists of telecommunication networks, a national fiber optic backbone, a submarine cable, and an integrated national data center. In the current era of the Smart Rwanda Master Plan [2016 – 2020], the focus is on digitalizing the government towards a 24/7 self-service, "cash-less" and "paper-less" government; with 95% of all government services are transacted online by 2018 MITEC (2015;2016;2017), MYICT (2015), and Twizeyimana (2017).

At the time of writing, the IREMO platform is considered the core platform for e-government in Rwanda and this platform will be described next.

2.1 IREMBO Project – Building Rwanda’s single window for e-government

The IREMBO project is an initiative by the Government of Rwanda envisioned to digitalize all public services into a single window platform called “IREMBO” (a local term that would mean “Gateway” in English or “Porte d’entrée” in French). In their wish for a solution to inefficient manual processes, delays in service delivery, long queues and bottleneck in service delivery, the government of Rwanda has entered into a public private partnership (PPP) with the private company Rwanda Online Platform Ltd (henceforth referred to as ROL) for the digitalization of government-to-citizens (G2C) and government-to-business (G2B) services MITEC (2015). The private partner - ROL is given a BOT (Build, Operate, and Transfer) agreement for the IREMBO platform that is envisioned a one-stop-shop for G2C and G2B e-government in Rwanda (Twizeyimana, 2017, pp.174-175). According to the BOT agreement, the company ROL is expected to build and operate the IREMBO
platform for 25 years (Ibid.). In this PPP, as per the BOT agreement, the government expects to reap the benefits from the private partner’s capacity to design, finance, procure, build, and maintain the platform. The company ROL is paid through a commission fee framework, a percentage taken from the service fee paid by citizens when they transact with the government services via the platform (Ibid.).

The services to be digitalized include services related to life events (birth, marriage, and death), land management, driving licenses, doing business licenses, road traffic, motor vehicle inspection, etc. (Ibid.). The first 100 e-services are planned to be available by the end of 2017; and a visit to the IREMBO platform1 in March 14, 2017, showed that IREMBO was hosting 44 services online (Ibid.).

The IREMBO as a platform provides a front-office for users (citizens and businesses) to file their applications over the internet, and a back-office system for public servants to manage users’ applications where back-office operations are under the responsibility of each government agency in the IREMBO project (Ibid.).

3. Method

The study presented in this paper adopted an interpretive methodology (Myers, 1997), and a case study method (Yin, 2017). The interpretive methodology suggests that knowledge is socially constructed (Myers, 1997, p.5).

A case study strategy is an empirical enquiry adopted when there is a desire to investigate a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident (Yin, 2017, pp.13). Like each of its competitors (e.g., surveys, experiments, archival analysis), case study strategy can be used for three purposes: exploratory, descriptive, and explanatory (Ibid., p.3). The case study strategy is also suitable to investigate the "what" questions which aim at exploratory purposes (Ibid., p.5).

Interpretive approach facilitates an understanding of phenomena from the point of view of actors directly, rather than using a priori constructs (Cavaye, 1996, Klein and Myers, 1999), and an understanding of process whereby information systems influences or is influenced by the context (Walsham, 1993).

We have selected the case study strategy and the interpretive approach through content analysis and open coding technique as the suitable strategies to address the objective and the research question as they are described in section 1.2. Indeed, that approach has facilitated us (i) to investigate contemporary challenges encountered by direct actors in the IREMBO project, and (ii) that the findings emerged from the data itself. In addition, the existing literature has been used to discuss the findings for conclusions and recommendations. On the other hand, the IREMBO project (described in section 2.1) was identified as a suitable case to understand e-government in Rwanda today, as it is a large-scale and complex project meant to act as a central driving force for e-government in the country.

3.1 Data Collection

Data was collected by the first author through extensive participatory observations, as well as semi-structured interviews. The study was conducted over the period of August to December 2015. During this time the first author spent at least one day a week at ROL, with the purpose of having colloquial interaction and discuss with project managers to get a deeper understanding of the project. Further participatory observations took place during regular visits at the company, especially during training sessions where each session lasted around 3 hours on average, and during a two-day retreat. Two questions have informed the data collection for this research: (i) in relation to the project IREMBO, what are the major challenges and experiences so far? and (ii) what measures are in place in order to address those challenges?

During observations and interviews, data was captured through note taking. Note taking was chosen over its competitors such as the audio/video recording due to the fact that employees would refrain from elaborating and speaking openly if they were audio/video recorded. Hence, when compared to its competitors (audio/video recordings), the advantages with note taking would include, but are not limited to, a comfortable environment for informants to feel more free in their interactions with the researchers. Notwithstanding the shortcomings with note-taking, including difficulties in writing while paying attention, making sense of notes, 1 https://irembo.gov.rw/rolportal/web/rol
recording the exact words used by the informants (Piolat et al., 2005, Kiewra, 1985), we have also acknowledged meaningfulness of note taking to the note-taker which relate to a better recall performance when reviewing self-produced notes (Kiewra, 1985, p.25). As in our previous study, Twizeyimana (2017), the challenges to note-taking have been addressed through (i) listening first and take notes after (during dialog break or directly after the event); and (ii) through reviewing self-produced notes just after the session for a better recall performance.

Apart from colloquial conversations at ROL, and observations at the retreats, shorter interviews were also conducted to get responses to more direct questions that had been raised during the participatory observations. The interviewees were selected by purposive sampling of people from stakeholders directly involved in the work with IREMBBO. A total of 16 semi-structured interviews were conducted, with an average length of 10 minutes. 11 with employees at ROL and 5 with government actors. Observations were conducted through participation in four training events for Civil Registration Officers (CROs), and during a two-day retreat with participants from senior management, corporate department, project management, and IT support departments at Rwanda Online Platform Ltd. CROs are public servants at sector level in the local government and, among other activities, CROs are in charge of providing services related to the civil status or life events to citizens and include, but are not limited to, registration and issuing certificates of marital status, birth, death, and authentication services. Hence they are the direct users of the IREMBBO system at the local government level. Table 1 and Table 2 respectively, present a generalized profile of participants in participatory events, and summarized profiles of interviewees.

Table 1: Generalized profile of participants in the observed training sessions.

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Location</th>
<th>Participants &amp; roles</th>
<th>Domain/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>1st October 2015</td>
<td>Bugesera District – Nyamata</td>
<td>Civil Registration Officers (CROs)</td>
<td>Civil Registration Office at sector level.</td>
</tr>
<tr>
<td></td>
<td>15th October 2015</td>
<td>Kigali e-ICT Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19th October 2015</td>
<td>Rulindo District- BDF Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16th December, 2015</td>
<td>Gicumbi District - BDF Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retreat organized by ROL</td>
<td>27th &amp; 28th August 2015</td>
<td>Bugesera District – Nyamata</td>
<td>Chief executives, Project managers, invitees which included consultants and researchers</td>
<td>Senior management, Project management, and corporate offices at ROL</td>
</tr>
<tr>
<td>Fieldwork visits at ROL</td>
<td>August - December 2015</td>
<td>ROL Headquarters in Kigali</td>
<td>Chief executives &amp; Project managers</td>
<td>Senior management, Project management, and corporate offices at ROL</td>
</tr>
</tbody>
</table>

Table 2: Generalized profile of interviewees

<table>
<thead>
<tr>
<th>Interviewees from ROL</th>
<th>Domain</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive</td>
<td>Senior Management Office</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Directorate of Product Development</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Infrastructure Development Office</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Payment channels and “directory of services”</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Criminal records and Land services</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Criminal records services</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Trainings &amp; Capacity Building</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Integrated Call center / Customer care services</td>
<td></td>
</tr>
<tr>
<td>Technical</td>
<td>IT security</td>
<td></td>
</tr>
<tr>
<td>Legal counsel</td>
<td>Legal Affairs Office</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewees from the government</th>
<th>Domain</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Directorate of ICT Support</td>
<td>Unit at Rwanda National Public Prosecution Authority - Ministry of Justice</td>
</tr>
<tr>
<td>Management</td>
<td>System and Network Administration Office of Bugesera District</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>IT office of Rubavu District</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>IT office of Gicumbi District</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>IT office of Kamonyi District</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Data Analysis

Data analysis followed an inductive approach, the analysis was content analysis, and the coding followed open-coding. That is, we have followed a bottom-up approach for moving from the specific to the general, the codes to categories, and they have emerged from the data. Starting from data transcripts to code, from code to sub-themes, and then from sub-themes to themes. Through open-coding, we read the transcripts line-by-line. Hence a code (word or expression) was assigned to representing the meaning of the entire line or paragraph (group of lines). Thus, initial codes stayed close to the informants own formulations (Benaquisto and Given, 2008). Following the initial coding, we moved to sub-themes, where the focus was on relationships between single codes, where similar challenges were discussed. Thus new codes were created by combining two or many codes whenever it was suitable. This was done iteratively, as codes were revised, and scrutinized for overarching relationships (Dwivedi et al., 2011). In the final stage of coding the overarching categories (as presented in Table 3, below) were created to group the related themes. The coding process was conducted by using NVivo Pro version 11, a software which provides facilities to create, organize, and analyze the codes. Finally, the findings have been positioned and discussed by means of the existing literature on implementation of e-government in the LDCs and the sub-Saharan Africa. That discussion has led to some conclusions and recommendations.

4. Results

The analysis of data led to the creation of the following six overarching categories of aspects challenging a successful implementation of e-government in Rwanda. They are: information infrastructure, management, governance, social inclusion, trust in the new system, and languages. The categories of challenges and their descriptions are listed in Table 3. Those challenges are described as follows:

Table 3: Categories and sub-categories.

<table>
<thead>
<tr>
<th>Category of Challenges</th>
<th>Descriptions</th>
<th>Mentioned in No. of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information infrastructure</td>
<td>Database, documentation, use of standards</td>
<td>6</td>
</tr>
<tr>
<td>- Database and/or use of standards</td>
<td>Lack of standardization required for data retrieval, reuse, sharing, and for interoperability of systems</td>
<td>5</td>
</tr>
<tr>
<td>- Documentation and/or service template</td>
<td>Poor documentation of available data and/or services such as the name, type or category of service, cost, delivery location and time, entities involved, etc.</td>
<td>1</td>
</tr>
<tr>
<td>1.2. Computer systems</td>
<td>The availability of computers (hardware, software, and equipments), printers, applications such pdf readers, image readers in organizations.</td>
<td>4</td>
</tr>
<tr>
<td>1.3. Electricity</td>
<td>Lack of access, availability, stability, reliability of electricity</td>
<td>6</td>
</tr>
<tr>
<td>1.4. Internet</td>
<td>Lack of availability/access to internet, and high cost of internet</td>
<td>9</td>
</tr>
<tr>
<td>1.5. Regulatory environment</td>
<td>Lack of laws, regulations, and policy documents regulating the delivery of online/digital service in general and through IREMBO in particular</td>
<td>2</td>
</tr>
<tr>
<td>2. Management</td>
<td>Lack of project awareness in concerned institutions and stakeholders</td>
<td>4</td>
</tr>
<tr>
<td>2.1. Awareness</td>
<td>Lack of a collaboration plan and framework within stakeholders in the project</td>
<td>6</td>
</tr>
<tr>
<td>2.2. Collaboration</td>
<td>Poor communication between stakeholders in the project, especially on who is doing what, how, and when.</td>
<td>5</td>
</tr>
<tr>
<td>2.3. Communication</td>
<td>Lack of involving stakeholders in the process from the early stages of implementation.</td>
<td>2</td>
</tr>
<tr>
<td>2.4. Stakeholders’ engagement</td>
<td>Resources and innovations in the financing of the project, involving users, IT staff, Human resource, etc.</td>
<td>4</td>
</tr>
<tr>
<td>3. Governance</td>
<td>Although a PPP, it was unclear who composed the project team in concerned government organizations.</td>
<td>2</td>
</tr>
<tr>
<td>3.1. Project staff and structure</td>
<td>Lack of who does what, how, and when. Who is the government</td>
<td>2</td>
</tr>
<tr>
<td>3.2. Roles, responsibilities, and accountability Enforcement, and leadership</td>
<td>Conflict due to mandate or who is eligible and legitimate to do what?</td>
<td>2</td>
</tr>
<tr>
<td>3.3. Distribution of power</td>
<td>A need for ICT/e-infrastructure in rural area, especially in high mountains, social inclusion consideration in the use of the system, ...</td>
<td>3</td>
</tr>
<tr>
<td>4. Social inclusion</td>
<td>Lack of general ICT skills, computer skills, and/or IT security skills ...</td>
<td>6</td>
</tr>
</tbody>
</table>
In the following sections the challenges are presented and analyzed.

4.1 Information infrastructure

The identified information infrastructure challenges include lack of computer systems and their maintenance, laws and policies required for the execution of IREMBO, issues of accessibility and availability of electricity and internet, lack of IT personnel for system upkeep.

As is the case in many developing countries, there are significant concerns about the use of IREMBO in some parts of the country, especially, in high mountains where access to basic infrastructure such as electricity and internet connectivity are not in place. One respondent from the government institution in a remote area criticized the ambitions of the project:

“You have said that six months after that the service is running online, the manual delivery of that service should be stopped and the services be fully offered online. How this could be possible? Remember, here we live in rural areas sometimes in high mountains where access to internet, PCs and even tele-centers is not possible, modems here are not working. Even if you use those private agents, I think they will be located in centers where there is access to infrastructure!”

One of the major concerns for government users also relates to this. In the strive for a 24/7 working system, obstacles such as the lack of mobile tools to be used when out of office (such as laptops and modems for wireless connectivity), lack of and/or unstable electricity and internet, and the cost of internet are central. For instance, one public servant stated that

“There are some sector offices with no electricity. Internet is a common issue here. We have 21 sectors, but only 15 sector offices are ready to start using IREMBO. If the government could solve some issues like electricity and internet it could help”.

Also, other required office equipments and tools are missing. They include computers, regular maintenance, printers, basic applications such as pdf readers, image editors. Futhermore, the existing management processes entail a number of challenges. There are also issues with existing data management routines, especially poor use of database standards, and the lack of service templates (i.e., information on available services such as the name, type or category of service, cost, delivery location and time, entities involved, etc). Also, a lack of a regulatory framework (e.g., policy documents, laws, and regulations regulating PPP projects) was reported.

Although the adopted PPP entailed various challenges, the approach was seen as a suitable catalyst for e-government development in the country. The clause that the private partner is paid through a commission fee framework instigated the private partner to do more in maximizing the adoption and use of the system because they could maximize the benefits if, and only if, many users are using the platform. For example, through strategic approach such as user training, awareness activities, cultivation of the installed-base of agents, etc. the private partner (ROL company) is bridging the digital divide, improving the awareness, access, use and adoption of the IREMBO platform.

4.2 Management

Poor management is a key challenge in the implementation of many e-government projects. Management is understood as organizing and operating the project, or to put it more simply - getting the work done. A core challenge was the lack of awareness in terms of information sharing which influenced the stakeholders’ engagement in the project. A respondent from the government argued that the implementation team did not communicate what they were doing in the early stages of the project. He said: “[t]here is a need for
awareness to share what they are doing with all involved stakeholders”. This lack of awareness also concerned the communication between clients and contractors, as highlighted by members of the implementation team in statements such as:

“We were expecting government institutions to be prepared to work with us. But in some cases we go to institutions to showcase of what we want to achieve with them. Surprisingly some are not aware of who we are and about the solution we are bringing to them! Probably it is our fault, or our partners”.

The second issue in this category concerns collaboration - especially collaborating with direct stakeholders in the early stages of the project. Respondents from the government highlighted that the developed system did not respond to their actual needs. This was seen as being due to a lack of involvement with the clients (government institutions) in a detailed requirements analysis and business process reengineering. For example, the manager in one government institution said

“The analysis conducted did not take every details on how we work and how we offer services to citizens. I mean the whole process starting from how citizens apply until they get the services.”, and that “There should have been a detailed analysis instead of we (as clients) to show them that their proposed system is not fulfilling our needs! They missed the ability to involve the client in value proposition”.

There are also concerns of operational capabilities including, but not limited to, human resources in the project. For example, a participant in a training session pointed out:

"We CROs we have many tasks to deal with! Ask ROL if they will appoint a staff to deal with IREMBO platform issues at UMURENGE, we have many responsibilities and tasks to deal with, you did not provide us with equipments to use, electricity is not reliable, internet issues ..."

4.3 Governance

In the case studied, the implementation of e-government followed a PPP approach. There are challenges related to the created PPP institution due to the complexity of the government and the complexity of such a PPP framework which entails strong partnership and dependencies. Initially, one organization was set to represent the government with the mission to play the role of the government that included mobilizing and engaging concerned organizations. Despite this a major challenge was still related to the unclear role of the government and identifying who should represent the government in that PPP framework for a much more operational and flexible environment.

For example, a respondent from senior management in the company reported that they are facing issues which include the awareness of the project in the concerned government institutions. He said:

“We are expecting that government institutions are prepared to work with us. But in some cases we go to institutions to show case of what we want to achieve with them, but surprisingly some are not aware of who we are and about the solution we are bringing to them!”

He added that they wondered if the institution that represents the government in the BOT deal was backed by the whole government.

Another similar observation from senior management in the company.

He said: “We are wondering if the current institution representing the government has failed to fulfill its responsibilities in this project or if it is the right institution to represent the government in this kind of deal!”. There are also concerns of commitment and accountability. For example, one respondent claimed: “The government side did not play its role to enforce the BOT as it is in the agreement”.

On a similar note another respondent said:
“At the backend side there is not yet someone dedicated to approve the services at IREMBO! There should be someone there to play this role if we really work with them! They can claim that they have much work to do on the other agenda, no resources to hire new employee, etc.”

### 4.4 Social inclusion

Concerns about digital divide, ICT illiteracy and the ability to design e-government systems for inclusion were raised in the case. Norris (2001, p.4) expressed the digital divide as the gap between, on one hand, them who have, and on the other hand, them who do not have the skills, resources, and the information to engage, mobilize, and participate digitally. According to one of the respondents from ROL “few are computer literate, as consequence, the project is facing difficulties on how to send credentials to citizens after they register to use the platform”. He also added: “Another consequence related to computer illiteracy, is that, the use of the platform is low”. This illustrates how ICT illiteracy is one of the big concerns for the adoption of IREMBO by citizens, since illiteracy (regarding computer or reading and writing at all) can significantly impair, if not altogether stop, people from using available services.

In relation to ICT illiteracy, concerns about the security culture within the community were seen as central in the upcoming e-government system. According to a respondent from ROL the targeted community is not aware, or possibly ignorant, regarding information security measures:

“We have many challenges. Cyber security awareness or ignorance is a big issue. For example, people could have a strong and complex password but the way they take care of that credential is not fair! For example, people are used to share the credential of their email accounts with their friends to act on they behalf like sending a message to someone on their behalf, etc. This seems to be like the culture out there! In relation to IREMBO we fear this culture out there because people may share or mismanage their credentials in a way that they may fall into arms of unintended person who can use them for bad purposes”.

Another concern in relation to the digital divide challenge has to do with what was mentioned with regard to ICT infrastructure. Since electricity and internet connectivity is lacking in several areas of the country, citizens that live there will risk being largely excluded from using e-services.

### 4.5 Trust in the new system

Lack of trust in the new system when compared to well-established systems was also an issue in the case. For example, a respondent from the ministry of Justice, who are stakeholders in the project, highlighted their concern regarding the security and reliability of the new system. For example, he suggested that the system will be better if hosted by Rwanda National Data Center which they have confidence in. He said:

“we have agreed on to host the system at Rwanda National Data Center which has been in operation for years and we now know it is good to cope with power cut issues, data security, cyber-attack, etc.”.

In regards to the lack of trust in the new system when compared to the existing system, the respondent emphasized their trust in the existing National Data Center (NIDA). He said:

“in regard to submitting photographs online, we do not trust an applicant photo when submitted online! Unless we get it from a trusted partner such as NIDA. We have also agreed on to use applicants’ photos if they directly come from the NIDA”.

Other concerns of trust (in terms capabilities and reliability) of the new system have been highlighted by CROs during the training. For example, a CRO asked:

CRO: “I can see that, when the user applies, fills in information. So what can prove that the applicant has paid the service applied for?”. Trainer responded that the proposed system provides an automatic service to validate the payment if done via Mobile money, Visa Card, Bank deposit, etc.

CRO: “What happens if I change the status myself!”
Trainer responded that the system is integrated with payment systems available on the platform, so that it pulls data directly from those other payment systems.

CRO: “Do the names of parents come automatically or the applicant has to type them?” Trainer answered that the names are coming automatically from the NIDA because the system is connected to NIDA (the National Identification system).

Thus, from these answers and questions, a CRO reacted in a somehow satisfactory manner saying: “If so, it is good because they will prevent those who can cheat and give false information”.

4.6 Languages

One important challenge in designing online services in Rwanda has to do with translation. That is, translating local language terms to web terms, or the existing web interface vocabulary, often in English, so as to be suitable to the local language. One respondent from ROL mentioned that “There are challenges related to content translation in order to build a simple-to-use system, especially for Kinyarwanda language with its vocabulary that changes with time”. On a similar note, the other respondent from ROL highlighted:

“Translation is not only a challenge in the design of the IREMBO platform, it is a problem for many online platforms in Rwanda. Our mission is to handle translation problem at IREMBO, and also to innovate ways to improve it for other existing e-government portals”.

One reported issue was the lack of a common dictionary and language structure for IT terms in the local language (Kinyarwanda). This has affected the design of a user interface that integrates local language content while living up to standards for web usability. For example, the effort it takes to make the interface as simple as possible (short, concise) in one language (say French) will not be the same in another other language (say English).

5. Discussion

This article investigated the important challenges in the IREMBO project, a project that is envisioned to digitalize all G2C and G2B in Rwanda. The IREMBO project was the suitable case as it goes beyond the existing complexity in the management of e-government project implementation in the LDCs to include the complex nature of a PPP framework.

Six overarching categories of aspects that challenge a successful implementation of e-government in Rwanda were identified. The are information infrastructure for e-government; social inclusion; governance; management; lack of trust in the new system; and languages. These findings add importance to previous studies in developing countries and Sub-Saharan Africa (Kamar and Ong’a’ndo, 2007, Mutula, 2008, Alshehri and Drew, 2010, Nabafu and Maiga, 2012, Al-Shboul et al., 2014) which have also reported many of these challenges. These findings would also support (Hanna et al., 2009) that Context matters and there is no single model to fit all countries; and (Basu, 2004, Shin, 2008, Nabafu and Maiga, 2012) that challenges and determinants of a successful e-government vary between contexts and that the determinants depend on the unique environment. For example, in the case studied, governance issues have been intensified by the complexity and new experiences introduced by the PPP approach. The issue was not only leadership, as observed in previous research on developing countries (Dzhusupova et al., 2011), but also of co-ordination and need for anchoring decisions. The major challenge was to understand “who is the government?” and/or “who should represent the government?”.

Also, the fact that the IREMBO platform is a PPP product has also decreased public managers' trust in the new system. Their concerns were much more on the aspect of the security and reliability of the new system. Hence, confirm (Chircu and Lee, 2005, Rose et al., 2015, Larsson and Grönlund, 2016) by suggesting that the adopted PPP framework would entail value conflicts between governments and private stakeholders who might exercise different views and values.

On the other hand, the adopted PPP approach has entailed some advantages, for example, the clause that the private partner gets paid through a commission fee motivated them to maximize the use of the system through users training, awareness campaigns, and the cultivation of the installed-base of “agent based”
framework. Thus, the adopted PPP has mitigated financial, technical, and managerial challenges, for example, the PPP approach impacted the institutional capabilities of improved ICT skills, social inclusion, bridging the digital divide, and ICT infrastructure development which are among the most important in developing regions (Mutula, 2008, Shin, 2008, Alshehri and Drew, 2010, Nabafu and Maiga, 2012).

6. Conclusions

The aim of this study was to investigate the important challenges in the implementation of the “IREMBO” project, the initiative by the Government of Rwanda to digitalize all G2C and G2B into one single window platform. Through that case studied, this study contributed to the elaboration of important challenges experienced by actors in the implementation of e-government in the context of a LDC. The study found six overarching categories of aspects for a successful implementation of e-government in Rwanda. They include information infrastructure for e-government, social inclusion, governance, management, trust in the new system, and languages.

This study also revealed that challenges to e-government implementation should not be taken as of the same extent, neither their degree of mitigation. Rather, they influence and are influenced by various contextual factors which include, but are not limited to, political support, nature of the e-government project, implementation strategies, human and socio-economic development, existing information infrastructure, and operational capabilities such as resources and innovations.

Although the adopted PPP framework entailed issues of leadership and co-ordination, the approach was seen a venue to address financial, technical, and managerial challenges which are major and common challenges in developing regions. Also, the introduced platform for e-government has entailed the managerial revolution because it would inscribe good staff performance where staff would avoid to delay applications which would make them look incompetent. This study would add importance to the existing research on challenges and critical success factors for e-government implementation in the LDCs, in particular, the perspective of a PPP framework. Finally, the findings would support that implementation of e-government would succeed when the implementation strategies and arrangements would consider the context at hand.

6.1 Limitations and Recommendations

While being a “snapshot” case study E-Government in Rwanda, we recommend comparative case studies on approach, governance, management and development of e-Government in other countries in the region. Another limitation of this study is the focus on the management side. To some extent, a citizen perspective was raised by the CROs. However, there is still a need to understand the project from the view of citizens with focus on the use and impact. Also, a key difference, and interesting venue for future research, is the challenges related to setting up such huge PPP initiatives, while still lacking fundamental organizational and technical structures, as well as maturity, to fully support this.

Acknowledgments

The authors would like to thank the staff of Rwanda Online Platform Ltd and the staff in various government institutions in Rwanda, who smoothly have provided their space, time and experiences on the IREMBO project. We also acknowledge the intellectual contribution of Annika Andersson, who beyond her role as the main supervisor, Annika has contributed to rhetorics and genre of this paper and has made it more clear and readable.

References


Beyond Information-Sharing. A Typology Of Government Challenges And Requirements For Two-Way Social Media Communication With Citizens

Enzo Falco and Reinout Kleinhans
Faculty of Architecture and the Built Environment, Department OTB - Research for the Built Environment, Delft University of Technology, Netherlands
E.Falco@tudelft.nl
R.J.Kleinhans@tudelft.nl

Abstract: Despite great advances in ICT, social media, participatory platforms and mobile apps, we seem to still be locked in the one-way communication “paradigm” where information flows unilaterally from government to citizens and seldom vice-versa. As a result, citizens are more receivers rather than conscious producers of information, data, ideas, solutions and decisions in the context of public policies. By means of an extensive literature review, this paper aims to explore the challenges on the part of government that prevent the transition to more dialogic governance and identifies the requirements for a meaningful application of social media for this purpose. The paper contributes to the literature in three ways: i) redefining a typology of social media-based citizens-government relationship; ii) clarifying the difference between challenges and risks of social media application by governments and identifying a typology of government challenges; and iii) identifying government requirements as a conditio sine-qua non for overcoming these challenges upfront, enabling more effective two-way interactions between governments and citizens. The paper concludes with discussion of implications and directions for further research.

Keywords: Social media, Social media-based collaboration, Government challenges, Government requirements, Citizen engagement, Two-way communication, Citizens-government relationship

1. Introduction

Social media have become highly embedded in the daily activity patterns of many citizens. Digital and web 2.0 technologies (e.g. online forums, web-GIS, e-petition platforms, wikis, and social networking sites such as Facebook and Twitter) are supposed to facilitate new forms of citizen participation in government activity within the framework of concepts such as digital democracy, open and e-government, e-participation and co-production (Conroy and Evans-Cowley, 2006; Silva, 2010; Meijer, 2011; Desouza and Bhagwatwar, 2014). Collaboration between governments and citizens is sought in various policy domains, ranging from health care, crime prevention, public service and information delivery to urban planning, transportation, corruption and so on (Desouza and Bhagwatwar, 2012).

However, it is still unclear whether the aforementioned digital technologies are able to contribute significantly to a more active engagement of citizens in policy-making, implementation and (public) service delivery. While it is widely acknowledged that social media open up opportunities for improved government-to-citizens interactions and communication (Bertot et al., 2012; Chun and Reyes, 2012; Lee and Kwak 2012, Linders, 2012; Picazo-Vela et al., 2012; Skoric et al., 2016), some authors highlight the need for a change in government culture, routines and resource management that also includes connecting in person and taking offline action to effect change (ALotaibi et al., 2016; Evans-Cowley & Hollander, 2010; Slotterback, 2011; Magro, 2012; Casey and Li, 2012; Kleinhans et al., 2015). The rise of social media use by governments appears not to have affected the unilateral relationship between who provides information and takes decisions (playing an active role, the government) and who receives the information or the consequences of a decision (playing a passive role, the citizens). In fact, we seem to still be locked in the one-way communication “paradigm” where citizens are more receivers rather than conscious producers or creators of information, data, ideas, solutions and decisions in the context of public policies. The actual influence of social media (in general applications that allow creation and sharing of user-generated content) on decision-making processes and their results is yet to be fully explored. Many authors have emphasised that current practices have not reached the dialogic (two-way communication and collaboration) ideal of governance (Desouza and Bhagwatwar, 2012; Zavattaro and Sementelli, 2014; Afzalan and Evans-Cowley, 2015; Ertiö, 2015).

The need for more effective and substantial two-way communication between governments and citizens is not just a product of technological progress. Due to the prolonged economic crisis, many European countries have installed austerity measures and severe cuts and reforms in public policy. To mitigate austerity regimes and continuing welfare state retrenchment, governments promote active citizenship, citizens are invited to take (more) responsibility and fill in gaps left by government spending cuts in health care, education, employment and neighbourhood governance (Voorberg et al., 2015). This challenge for citizens does not require less but rather more two-way interaction, or at least more effective dialogue between citizens and governments. They need to make better use of each other’s assets and resources to achieve better outcomes and/or more efficiency in (public) service delivery. In essence, this is a definition of co-production (Bovaird and Loeffler, 2012: 1121), implying that two-way communication and collaboration between governments and active citizens, both offline and online, are a *sine qua non* for co-production.

Considering the growing importance of co-production and the widespread acknowledgement that social media create opportunities for ‘better’ interactions between governments and citizens, the question is why current practices of social media application have not reached the aforementioned transition to a dialogic ideal of governance. Using an extensive literature review, this paper aims to explore the challenges on the part of government that prevent such a transition and identify the requirements for a meaningful application of social media that enables two-way communication between governments and citizens. While the literature on social media challenges is abundant, this paper contributes to the extant literature through a clarification and systematization of three issues:

1. the confusion regarding the nature and various intensity of citizens-government relationships due to a proliferation of categorizations of these relationships in the literature that tend to overlook each other;
2. the nature and types of challenges for governments because of a tendency to confuse challenges and other elements such as requirements and risks, while we will show that they are different;
3. the essential initial requirements (from the government) to apply social media in a more dialogic way.

Hence, the paper tries to answer questions such as: beyond the readily available technology, what steps do governments need to take for two-way communication and meaningful collaboration with citizens? What challenges do governments face in the application of social media for such purposes and what are the necessary requirements that allow challenges to be addressed?

The paper is structured as follows. Section 2 identifies and clarifies the levels of social media-based interaction between citizens and government that may lead to collaboration and/or co-production. In section 3, we present the research design that has been utilised to conduct this research. In section 4, a specific typology of government challenges is defined. Section 5 provides a typology of the requirements that governments need to meet to address the challenges. Section 6 sets out the conclusions and the specific contribution of this work to the wider literature and e-government activity.

### 2. Types of social media-based citizens-government relationship

The use of social media, defined as internet-based applications built on the ideological and technological foundations of Web 2.0 that are designed to facilitate dissemination of information, interaction, and exchange of user-generated content (Kaplan and Haenlein, 2010; Kavanaugh et al., 2012), allows new forms of interaction and civic engagement to emerge and is adding on to other forms of communication, rather than replacing them (Wellman et al., 2003; Wenger et al., 2009; Chun and Reyes, 2012; Lee and Kwak 2012, Linders, 2012; van Varik & van Oostendorp, 2013; Skoric et al., 2016). In this paper, we will refer to these forms as types of the *citizens-government relationship typology* within which different types and levels of communication, interaction and involvement can be found. These new types of citizens-government relationship have been discussed by many authors, but categorizations available in the literature are often overlooked by authors trying to develop their own categorization (McMillan, 2002; Suen, 2006; Linders, 2012; Khan, 2015; Mergel, 2013; Williamson and Parolin, 2013; De Souza and Bhagwatwar, 2014; Li and Feeney, 2014; Ertiö, 2015; Jones, 2015). This has increased rather than cleared confusion. Generally, three levels with an increasing degree of interaction are identified:


6. Civic engagement, involvement, collaboration: on this level, the two-way interactions go beyond basic information exchange to ‘materialise’ in policy measures or other interventions. This level is also known as *co-production*, i.e. the public sector and citizens making better use of each other’s assets and resources to achieve better outcomes and improved efficiency (Bovaird and Loeffler 2012: 1121).

However, some authors (e.g. Desouza and Bhagwatwar, 2014; Ertiö, 2015) identify more levels and sub-levels which further specify the role of and information flows between the actors involved in the citizen-government relationship. Ertiö (2015) for example identifies *consultation* as a sub-level of information sharing where information flows one-way from citizens to governments, and *criteria power* (ability of citizens to determine a policy or service) and *operational power* (ability of citizens to determine how a policy or service is carried out in practice) as the two sub-levels of civic engagement, involvement and collaboration (the author calls this level *empowerment*). Interestingly, Desouza and Bhagwatwar (2014: 37) in their four archetypes of technology-enabled participatory platforms identify the *citizen-centric and citizen-sourced data* archetype “as an alternative medium for citizens to organize themselves to make a difference in their local communities.” Linders (2012) calls this level *Do it Yourself Government*.

This, in our opinion, is the ‘top’ level of the citizen-government relationship typology in which citizens self-organize to produce solutions. However, at this level there may be little or no interaction between citizens and government as self-organization is predominantly effectuated by citizens. Interaction takes place only where choice and implementation of the solution still requires some government action, as Desouza and Bhagwatwar (2014) and Linders (2012) emphasise in their categorizations. However, in this *Do it Yourself* and citizen-to-citizen relationship type, we also find self-organization among citizens about matters of private interest that concern individual decisions (where to find the best plumbing service, or the best school for their children). In such a case there is not necessarily a relationship between citizens and government. Hence, government action is not by definition required. This kind of self-organization about private and individual matters may result in two different kinds of output: in the first case they stay in the domain of private and individual choice without impacting the public sphere. In the second case, they may develop into demands of public interest (new playground needed, new kindergarten) that require some government action, for example in terms of building permits. It is for this latter reason that we include them in the self-organization level. Based on the international literature, the levels of the citizens-government relationship typology can be defined as in Table 1 below.

### Table 1: Typology of social media-based citizens-government relationship

<table>
<thead>
<tr>
<th>Levels</th>
<th>Sub-levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information sharing</td>
<td><em>Informing</em>: One-way communication (‘broadcasting’) from government to citizens.</td>
</tr>
<tr>
<td></td>
<td><em>Consulting</em>: One-way communication from citizens to governments.</td>
</tr>
<tr>
<td>Interaction</td>
<td>Two-way communication with dialogue and feedback between citizens and government representatives.</td>
</tr>
<tr>
<td>Co-production</td>
<td>The public sector and citizens making better use of each other’s assets and resources to achieve better outcomes and improved efficiency.</td>
</tr>
<tr>
<td>Self-organization</td>
<td>Citizens create solutions independently that are to be recognised, facilitated or adopted by governments and require some government action.</td>
</tr>
<tr>
<td></td>
<td>Citizens share information and self-organize for matters of private interest that may develop into public demands requiring some government action.</td>
</tr>
</tbody>
</table>

However, despite a growing number of web-based and mobile-based platforms where people can express their opinion, identify local problems and propose solutions, authors highlight persisting issues, including “little evidence of social media being used to create mutual discourse communication” (Williamson and Parolin; 2013: 560), a model of “participatory sensing rather than participatory decision-making through apps” (Ertiö; 2015: 317), and “a large segment of the population (...) does not feel comfortable making use of emerging social media (Linders, 2012: 452).
In sum, while the technology is readily available, we find that government is not fully exploiting the potential of such platforms, so there are probably issues and challenges that prevent governments from further developing and using the communicative potential of social media. The challenges may relate to technical, organizational, and online matters, but also to factors that are predominantly of an offline nature. While recent research has explored those factors affecting citizens’ decisions to use social media platforms for communication with their government (Alotaibi et al., 2016), we still lack a proper answer to the following question: what are the challenges for government to application of social media platforms in ways that enable effective two-way communication about ideas and solutions?

In the next section the research design is discussed. The aim of section 4 is to identify the challenges that can hinder web-based two-way communication through social media.

3. Research Design

In order to perform our extensive review of government challenges and requirements we split our work into two phases: the first one dedicated to the challenges and the second phase to the requirements. We decided not to employ a systematic literature review method because of the extremely high number of articles on social media use which would have included too many irrelevant sources (i.e. topics such as advertising, healthcare, families and parenting). Instead, we decided to employ a snowball approach and built our body of literature through this method. As far as the challenges are concerned, we started with a Google Scholar search via the most relevant keywords to our study of social media challenges for government organizations: “government social media” and “social media challenges”. In order to identify the most relevant research articles among the Google Scholar search results, we started from those which contained in their title the term social media in connection with either the word government/public sector or challenges and were cited more than 100 times (according to Google Scholar) (e.g. Kaplan and Haenlein, 2010; Bertot, 2010; Mergel, 2010; Kaplan and Haenlein, 2010; Mergel, 2010; Bertot et al., 2010 & 2012; Kavanagh et al., 2012; Linders, 2012; Macnamara and Zerfass, 2012; Magro, 2012; Picazo-Vela et al., 2012; Khan et al., 2014). We have mainly reviewed studies that focus on the application of social media in government and highlight challenges specific to their case studies and surveys (e.g. Evans-Cowley and Hollander, 2010; Landsbergen, 2010; Casey & Li, 2012; Kavanagh et al., 2012; Picazo-Vela et al., 2012; Mergel, 2013; Williamson and Parolin, 2013; Afzalan and Evans-Cowley, 2015; Alasem, 2015; Bonson et al., 2015; Jukic & Merlak, 2017). The snowball approach used the reference lists of the aforementioned studies to identify and further build up relevant literature. However, we did not limit our search for challenges to government and e-government studies only. Literature from other fields was also used such as business, management and corporate social media (Farhoomand et al., 2000; Kaplan and Haenlein, 2010; Kuikka and Akkinen, 2011; Poba-Nzaou et al., 2016) since some issues and challenges originating from these fields (e.g. organization reputation, human resources, resistance to change) are relevant for the public sector too.

As far as the requirements are concerned, we started from the concept of capabilities to which scholars generally refer in the e-government literature (e.g. Layne and Lee, 2001, Gottschalk, 2009; Kliewink and Janssen, 2009; Lee, 2010; Valdes et al., 2011; Lee and Kwak, 2012; Fath-Allah et al., 2014; Khan, 2015) and extended our review to the maturity models and maturity stages, and their inherent capabilities, of adoption and implementation of social media and ICT in government (see Table 3 in section 5). The analysis of these capabilities informs our identification of requirements that governments need to meet. We also look at business literature since social media have been used in business for longer than in government and requirements could potentially be drawn from here, especially with regard to financial, budget, analysis, and monitoring elements (Lehmkuhl et al., 2013; Geyer and Krumay, 2015).

4. Challenges to application of social media by government

In this section we review and focus specifically on the challenges that make it hard for governments to engage in two-way communication activities with citizens. However, before we start our review of challenges, it is of utmost importance to define what we mean by ‘challenge’ to the use of social media by the government. Poba-Nzaou et al. (2016: 4011) define challenges as “any issue an organization may have that may prevent them from adopting social media.” However, this definition seems too general for our purposes. We feel that a clear definition of challenges is lacking in the literature and there is a general tendency to include other elements, e.g. risks, in the challenges category. We focus on challenges and try to clarify what is meant by challenges, why they are different from risks and therefore cannot be included in the same category.
4.1 Definition of challenges

**Challenge** is defined by the Oxford Dictionary as “a task or situation that tests someone’s abilities”. The Cambridge Dictionary defines challenge as “the situation of being faced with) something that needs great mental or physical effort in order to be done successfully and therefore tests a person's ability.” As can be seen, both definitions emphasise the ability of a person to do something (a task). For our categorization purposes, it is necessary to further clarify what an ability is as a prerequisite to identify the challenges. The Oxford Dictionary defines ability as the “possession of the means or skill to do something”. The Cambridge Dictionary defines it as “the physical or mental power or skill needed to do something.” In our case the focus is on government and so we can define the abilities (means, power and skills) of government as the set of human and financial resources that the government possesses to do something. Thus, challenge can be defined as the situation or task that tests the government’s abilities (resources, skills and expertise) to do something, namely adopt, use and optimise social media for two-way communication and collaboration strategies with citizens.

On the contrary, **risks** are negative or unwanted consequences (Khan et al., 2014) that arise after the government has started using social media. Risks differ from challenges in their nature and because they arise usually at a later stage and as a consequence of not properly addressing challenges. It derives that the ability to address challenges will reduce and mitigate risks. Examples of risks are related to intellectual property or copyright infringement, psychological consequences, identity theft, public criticism, the amount of time that government employees without social media duties and responsibilities spend on social media while at work, system failures and downtime. Even though extremely important for the success of social media projects, risks are not the focus of this section. Also, in this section we are not interested in the factors that influence the usefulness of social media, the satisfaction of the general public with government social media, citizens’ adoption of e-government services, and the success of social media implementation (e.g. Creswell et al., 2006; Hrdinova et al., 2010; Shareef et al., 2011). Some of them are of course interrelated (e.g. availability of a social media strategy is fundamental for the success of social media projects), but our focus is explicitly placed on challenges.

4.2 Typology of challenges

Different categorizations of challenges have been already attempted in the literature (e.g. Bertot et al., 2012; Meijer et al., 2012; Picazo-Vela et al., 2012; Khan et al., 2014). We review the challenges that have been identified through both empirical applications of social media in government (e.g. in urban planning) and surveys and interviews with government officials. Two categorizations are particularly useful for our purposes. First, Kuikka and Akkinen (2011) distinguish between challenges based on whether they are **internal** or **external** to the organization. Second, Poba-Nzaou et al. (2016) distinguish between challenges **directly associated with social media** and challenges **not related to social media themselves**. We will call these **direct** and **indirect** challenges, respectively.

We will first discuss the challenges based on the internal/external categorization and then we will move on to present whether they can be considered direct or indirect through the help of a matrix that defines a typology of challenges for social media application by governments.

2.1.4 External challenges

As the name indicates, this kind of challenges comes from aspects that are external to the organization. Therefore, the organization has little or no power to address the causes of these challenges in advance or to influence their scope. Borrowing from the categorization and conceptual framework of Picazo-Vela et al. (2012: 507) (general context, institutional framework, inter-organizational collaboration and networks, organizational structures and processes, information and data, technology), we found that external challenges fall within the categories of general context, institutional framework, data and technology.

Generally, the main external challenge identified in the literature is related to the general context and concerns Internet accessibility, digital illiteracy and the digital divide of the population. This is normally considered not to be a major issue in the Western World where the majority of people have access to the Internet. However, as many authors highlight (Burkhardt et al., 2014; Bertot et al., 2012; Picazo-Vela et al., 2012) if we broaden the spectrum of countries and contexts, people and age groups, limited access to the Internet by the wider population and their low ability to use social media can constitute a problem for government and complicate the use of social media for the dissemination of information, provision of services, collaboration with citizens...
and so on. However, single government organizations have little power or too few means to overcome limited access and citizens’ lack of abilities to reduce the digital divide.

Other external challenges come from the institutional framework. Bertot et al. (2012) provide an extensive analysis of the impact of U.S. laws and regulations on the use of social media by government. Examples are regulations on accessibility of social media by people with disabilities and in different languages, on privacy, data protection and security. Availability of information in different languages and for the visually impaired requires further work and expertise from the government. With regard to privacy and data protection, external challenges also relate to the use of third party social media (e.g. Facebook, Twitter, YouTube) and ownership of the data and information that is posted to them.

Finally, Poba-Nzaou and colleagues (2016) identify challenges related to data management and technology that can be classified as external ones. These relate to the complexity and high speed of (global) technological change of social media, and the completeness, accuracy, and format of data and information coming from the public which test government’s abilities as consumer of this externally created information.

2.2.4 Internal challenges

Contrary to external challenges, internal challenges depend on aspects that are internal to the organization and its structure (e.g. Voorberg et al., 2015), and which the organization can directly influence. Several internal challenges are identified in the literature. Again, referring to the categorization of Picazo-Vela et al., (2012), we can relate internal challenges to organizational structures and processes, information, data and technology. As can be noted, we do not consider “inter-organizational collaboration and networks” since we believe that this category gives rise to challenges that are included in the three previously mentioned internal categories (e.g. uniformity of data, consistent technology between government agencies, and relationships between agencies in terms of functions and hierarchy).

The first set of internal organizational and process-related challenges can be linked to the preparation of a clear strategy and policy guidelines for social media use regarding purposes, target audience, what, when and how often to post, announcing and publicizing social media use (Heeks, 2006; Landsbergen, 2010; Bryer and Zavattaro, 2011). Macnamara and Zerfass (2012) in their study found that about 20 percent of surveyed organizations had a broad social media strategy and about 35 percent had social media guidelines. As Mergel (2013) stresses in her work, based on 25 interviews with US federal government agencies’ representatives, there is little reflection to strategically plan engagement activities beyond pushing government information out through social media. The lack of a social media strategy and guidelines can depend on a second set of internal challenges that relate to the structure of the organization and organizational culture. As Curtis et al. (2010) suggest, organizations with a strong public relations department are more likely to adopt and use social media. Farhoomand et al. (2000), Williamson and Parolin (2013), and Voorberg et al. (2015) emphasise that as regards the organization culture, challenges concern lack of knowledge and understanding of the value and benefits that could be gained from citizen input to public service delivery, lack of management commitment, resistance to change, and negative attitudes. Meijer et al. (2012) stress the importance of availability of transformational leadership as one of the main challenges to achieve institutional innovation.

Another important internal challenge comes from the management and business literature (Kuikka and Akkinen, 2011) in terms of reputation of the organization. The reputation challenge is believed to apply to government agencies too and can derive from public criticisms. Government agencies need to be able to handle criticism on social media related, for example, to lack of political commitment to policy agenda and social issues, episodes of corruption, unpopular decisions on public investment and so on. This challenge depends on the organization’s decisions and can be managed and influenced by the organization itself. We consider this as a direct challenge when it arises on social media channels. Other internal challenges relate to availability of trained personnel and expertise, and cost justification to retrain public relations managers or hire new personnel to guarantee timely responses to citizens’ comments and questions on social media to foster two-way communication (Landsbergen, 2010; Bryer Zavattaro, 2011; Bovaird & Loeffler, 2012; Kavanaugh et al., 2012; Lee and Kwak, 2012).

The last set of internal challenges regard data management and technology. The government agency needs to guarantee the objectivity of data, its quality, integrity and openness (e.g. accessible formats, complete, reliable and updated data) (Bertot et al., 2012). Hardware, software and infrastructure needs also represent a
challenge and if not well planned could result in incompatibility of systems and use of untested technology (e.g. all departments of an agency using the same social media platform) (Pica-Vela et al., 2012).

After having categorized the challenges in internal and external categories, Table 2 summarises the different sub-categories and highlights whether a challenge can be considered direct or indirect. Based on this, the next section discusses and identifies the requirements on the part of government that (if these are properly satisfied) allow challenges to be overcome upfront.

Table 2: A typology of challenges: Direct-Indirect and Internal-External

<table>
<thead>
<tr>
<th>Direct challenges</th>
<th>Indirect Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal challenges</strong></td>
<td><strong>Organization structure and culture.</strong></td>
</tr>
<tr>
<td>Availability of social media strategy and policy guidelines.</td>
<td>Availability of trained personnel, expertise, cost justification.</td>
</tr>
<tr>
<td>Data management, technology and proper understanding of benefits.</td>
<td></td>
</tr>
<tr>
<td>Organizational reputation</td>
<td></td>
</tr>
<tr>
<td><strong>External challenges</strong></td>
<td><strong>Institutional framework, laws and regulations.</strong></td>
</tr>
<tr>
<td>Digital divide and inaccessibility</td>
<td></td>
</tr>
<tr>
<td>Complexity and speed of social media change (data protection, privacy and ownership).</td>
<td></td>
</tr>
<tr>
<td>Accuracy, completeness, and format of social media data coming from the public.</td>
<td></td>
</tr>
</tbody>
</table>

5. Organizational and technological requirements

After having reviewed the different levels of the relationship between citizens and government (see Table 1) and defined the challenges that governments face in the adoption and use of social media for two-way communication purposes, it is now important to focus and understand the actions, processes and requirements that the government needs to meet for an application of social media that leads to meaningful two-way communication with citizens. In the e-government literature, scholars generally refer to capabilities rather than requirements (e.g. Layne and Lee, 2001, Gottschalk, 2009; Klievink and Janssen, 2009; Valdes et al., 2011; Lee and Kwak, 2012; Khan, 2015). However, we feel that the term ‘requirement’ is able to express the role of such conditions better than capability, since the latter gives the idea of something that should be part of government’s abilities, skills and expertise. Instead, we believe that a requirement is a necessary condition, a pre-requisite that however does not have to be necessarily part of what the government is able to do (capability, skills, expertise). Certain requirements can be outsourced (e.g. analytics and use of metrics, as discussed later). Hence, requirement refers to any necessary condition, i.e. a *conditio sine qua non*, for application of social media in a way that allows two-way communication and perhaps the co-production level of the government-citizens relationship to be reached. Taking the necessary actions to meet the requirements would enable the government to get rid of, mitigate or more easily address the previously explained challenges once they arise. Such requirements are very unlikely to be addressed all at once but rather in consecutive steps over time. Hence, we are interested in stage models that conceptualise the capabilities (requirements) to transition from less to more mature stages of social media use by governments. Such models are commonly found in the literature on e-government.

For example, Lee (2010) carried out a qualitative review of 12 stage models of e-government and highlighted the main concepts and themes (information, interaction, transaction, and so on) that are common to the different models in different stages. Fath-Allah et al. (2014) carried out a review of 25 models developed over time, focusing on the differences and similarities between models and the features of different stages. These two studies, however, do not focus on the requirements needed to move from one maturity stage of e-government to the next one.

We try to integrate these two reviews with models that were overlooked and seek to focus more on the models that are dedicated specifically to social media (and their requirements) rather than e-government in general. We include models that were produced in academic literature only, thus excluding those produced by international organizations like the United Nations or consultancy firms like Accenture (UN, 2001 and 2012; Accenture, 2003). Also, we focus on more recent models without the need to go back to the late 1970s (Nolan, 1979) and early 1990s (Galliers and Sutherland, 1991) when the internet and social media did not exist. Table 3 below summarises the relevant literature that we have reviewed in relation to e-government models and in particular the needed capabilities to transition from a less mature to a more mature stage of social media use.
in government. We are not trying to integrate different models into a single model. Rather, the review of capabilities informs our identification of requirements that governments need to meet in order to move from a lower stage of social media use (information-sharing purposes) to a higher stage (interaction and co-production purposes), as identified in Table 1. We focus our attention on the higher-stage capabilities found in the literature (stages 3 to 5, see Table 3) as more relevant to identify the essential requirements for achieving two-way communication between citizens and government.

Requirements also emerge from the analysis of the challenges carried out in the previous section. Different from the challenges, we believe that there is no need to distinguish between internal and external requirements here, since by definition government requirements need government (internal) action. Instead, we adopt the same classification as Lee and Kwak (2012) who make a distinction between organizational and technological capabilities and see it as fit for the concept of requirements. Moreover, we again distinguish between direct and indirect requirements which, just as in the previous section on challenges, directly concern social media and their features in the case of direct requirements and other elements such as the legal framework, governance and interoperability, financial and budget management in the case of indirect requirements.

Table 3: Review of e-government and social media (SM)-based Maturity Models capabilities

<table>
<thead>
<tr>
<th>Models</th>
<th>1st Stage capabilities</th>
<th>2nd Stage capabilities</th>
<th>3rd Stage capabilities</th>
<th>4th Stage capabilities</th>
<th>5th Stage capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Gov. Maturity Model (Lee and Kwak, 2012)</td>
<td>Publish online only limited and not up to date data. Publish online high value government data. Improve data quality (accuracy, consistency, and timeliness). Develop data privacy standards, architecture, governance, structure. Build culture of transparency. Post and share user created content. Optimize data governance structure and processes. Enhance data privacy and security.</td>
<td>Set up data analytics for new insights and improving decision-making. Train government employees to develop data analysis skills.</td>
<td>Expand depth of data transparency. Make data accessible easily by mobile devices. Achieve seamless integration of data analytics with government activities. Realize public value of data.</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Models</td>
<td>1(^{st}) Stage capabilities</td>
<td>2(^{nd}) Stage capabilities</td>
<td>3(^{rd}) Stage capabilities</td>
<td>4(^{th}) Stage capabilities</td>
<td>5(^{th}) Stage capabilities</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Three-stage Adoption Process (Mergel and Bretschneider, 2013)</td>
<td>Push for adoption of SM (&quot;intrapreneurial&quot; change agents). Expand domain of use (number of applications and individuals).</td>
<td>Set standard processes for technology adoption. Set standards for privacy, access, and accuracy of information. Accept organizational changes in culture and operations.</td>
<td>Set standards, rules and processes to manage process and resources associated with SM adoption. Formalize ICT management. Train and support SM staff.</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>SM for Organizational Innovation (Lehmkuhl et al., 2013)*</td>
<td>Partially integrate SM content with existing communication channels. Use process measures (number of comments). Define employees directly involved with SM. Accept SM use (by innovators).</td>
<td>Define SM objectives. Develop and publish dedicated SM contents. Assess performance (number of responses, amount of user generated content). Define SM budget. Identify indirectly involved employees. Accept SM use (by early adopters).</td>
<td>Define a centralised perspective of SM. Differentiate type of information and contents to publish on SM channels. Use qualitative measures (customer satisfaction). Set up centralised SM channels. Identify management collaboration between functions. Accept SM use (by early majority).</td>
<td>Integrate SM entirely into organization’s operations. Define a brand strategy. Assess user generated content (sentiment analysis). Use budget only for major adaptations (operations are integrated and run smoothly). Integrate external partners into SM communication. Accept SM use (by late majority).</td>
<td>SM as enabler of new business/service models. Full align SM channels and other media. Link SM to organization objectives. Make SM part of regular communication (no specific budget needed). Identify all points of interactions with external users and stakeholder. Accept SM use (by almost all staff).</td>
</tr>
</tbody>
</table>

* From this table we are excluding the capabilities of Stage 0 of the model "no degree of maturity".

**We have merged the capabilities from two different stages (SM integration and SM strategy) into stage 4.

5.1 Organizational requirements

Organizational requirements refer to the processes, roles, policies, resources, governance settings that the government needs to meet if social media are to be used for two-way communication. Our analysis excludes fundamental cultural elements such as a civic culture of openness, transparency and collaboration. These basic and contextual elements are fundamental for leveraging social media in government. However, single (local) government agencies usually have little or no power to influence and shape them.

One of the basic organizational requirements (generally found in the capabilities of stages 1 to 3 of Table 3 above) is to have in place a social media strategy and a set of guidelines (Valdes et al., 2011; Lee and Kwak, 2012; Picazo-Vela et al., 2012; Khan, 2015; Lehmkuhl et al., 2013; Geyer and Krumay, 2015). Through the social media strategy the government agency determines whether it wants to use a push, pull or networking strategy (Mergel, 2010), the type and purposes of social media it wants to use (e.g. relational, expressive, informational) (Skoric et al., 2016), its objectives, the targeted audience, stakeholders and influencers (both private and public), community and crisis/reputation management processes, monitoring and measuring activities. Slightly different from the social media strategy is the preparation of guidelines which determine how often to post,
the kind of information, responsiveness, acceptance of comments, and wording and behaviour guidelines (Geyer and Krumay, 2015). As different authors highlight (Lee and Kwak, 2012; Meijer et al., 2012; Mergel and Bretschneider, 2013) it is also essential to obtain political support, sponsorship and acceptance by the organizational leadership of the social media initiative and develop mutual trust with citizens.

Another essential set of requirements relates to the structure of the organization and governance in terms of interoperability and integration between departments of the same agency or of different agencies (these last ones are generally found in the higher stages of Table 3). Dedicated departments, trained personnel, financial resources in the budget, roles, tasks and responsibilities such as social media managers, experts, analysts and consultants also need to be determined (Lee and Kwak, 2012; Lehmkuhl, 2013). Mergel and Bretschneider (2013) emphasize the need for co-ordination and governance among different sub-units of an agency in order to avoid for example the creation of multiple social media accounts. Gottschalk (2009) and Klievink and Janssen (2009) place strong emphasis on this aspect also in terms of inter-organizational exchanges of best practices and back-office coordination for joined service delivery.

The last set of organizational requirements concern the definition of an up-to-date regulatory framework in terms of privacy, disclosure of confidential information, authentication, security, ethical issues and service agreements with third-party social media providers (Layne and Lee, 2001; Lee and Kwak, 2012).

5.2 Technological requirements

As regards the technological requirements, which are closely linked to the organizational ones, we found that these are mainly related to three areas: ICT infrastructure, data, and technological skills.

ICT infrastructure and architecture (lower stages of Table 3) (networks, information systems) need to be aligned between different departments and with the technology that the agency has chosen for its social media initiative. Standards-setting processes need to involve hardware as well as software to allow the different sub-units of an agency to collaborate effectively (Gottschalk, 2009; Klievink and Janssen, 2009; Mergel and Bretschneider, 2013). As far as data are concerned (higher stages of Table 3), we can distinguish two dimensions: firstly, data and information created and published by the agency; and secondly, data and information gathered from social media channels. Ownership and control over data produced and shared by the agency is required as well as quality in terms of accuracy, timeliness, and consistency (Lee and Kwak, 2012). The agency also needs to set up standards and guidelines for social media data and feedback collection, archiving mechanisms and communication procedures (Geyer and Krumay, 2015).

The final set of requirements is linked with technological and analytical skills within the organization (higher stages of Table 3). Moderating, monitoring and measuring social media activities and their impact on followers is essential. Technological skills such as data crawling and mining, content and sentiment analysis are required if the government intends to use the social media data and feedback to improve or create new services, activities and decisions. As can be seen, this set of requirements is strictly related with organizational requirements to train or hire skilled personnel. Geyer and Krumay (2015: 1865) call this set of skills “social media listening and monitoring” as a fundamental element to understand and assess the opinions of relevant stakeholders. Lee and Kwak (2012) distinguish between process-centric metrics and outcome-centric metrics. While the former tend to focus more on quantitative aspects such as number of visitors, downloads, published datasets, likes, retweets, shares and so on (for use of such metrics see for example Bonson et al., 2015; Agostino and Arnaboldi, 2015), the latter focus more on intangible aspects such as learning, innovation, creation of best practices, and continuous public engagement. Table 4 summarizes the requirements that we have identified in the literature review through the analysis of the maturity models and classifies them on the basis of whether they can be considered direct or indirect. In the concluding section, we present the discussion and conclusions of this review paper. We also provide some directions for future research.
Table 4: A typology of requirements: Organizational/technological and Direct/Indirect

<table>
<thead>
<tr>
<th>Organizational requirements</th>
<th>Direct requirements</th>
<th>Indirect requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SM Strategy.</td>
<td>• SM Strategy.</td>
<td>• Political support and sponsorship.</td>
</tr>
<tr>
<td>• SM Guidelines.</td>
<td>• SM Guidelines.</td>
<td>• Governance and interoperability.</td>
</tr>
<tr>
<td>• Trained personnel for technological skills (see below).</td>
<td>• SM feedback management, analysis and interpretation techniques (data crawling and mining; content and sentiment analysis).</td>
<td>• Update of the legal framework to support and regulate the use of SM in government.</td>
</tr>
</tbody>
</table>

6. Discussion and Conclusions

Since the turn of the millennium, we have witnessed the rise of popular social media and the associated wide belief in their utility for facilitating new forms of citizen participation in government activity (Linders, 2012; Picazo-Vela et al., 2012; Skoric et al., 2016). More recently, austerity regimes and post-crisis recovery policies have resulted in multi-scalar government invitations that ask citizens to take (more) responsibility and engage more with governments. Despite this twofold window of opportunity for stronger interaction, a one-way communication “paradigm” where citizens are still receivers of public policy seems to prevail (Casey and Li, 2012; Mergel 2013; Kleinhans et al., 2015). It is highly unlikely that this lack of progress can be ascribed only to technological issues. Rather, the evidence points at governments’ organizational and human resources as a bottleneck. Instead of moving the field forward, confusion has been created by a proliferation of problem categorizations in the literature that tend to overlook each other and a tendency to mix different elements that may hinder government application of social media (e.g. confuse risks with challenges). Therefore, this paper has set out to clear part of the confusion and to contribute to the literature by providing typologies of government-citizen relationships, challenges and requirements, based on a review of literature from the fields of public administration, urban planning, business, management and corporate social media. As such, it takes a different viewpoint from papers that unilaterally delve into technological implications.

We have argued that clearing up confusion requires, first of all, integrating various definitions and intensities of interaction between citizens and governments into a relatively ‘simple’ but comprehensive typology of social media-based citizens-government relationship with four levels: information-sharing, interaction, co-production, and self-organisation (Table 1). With each level, the complexity of relationships increases, creating both challenges and requirements for governments to facilitate appropriate two-way communication.

Secondly, confusion can be reduced if we distinguish between challenges and risks, and focus on challenges on the part of government that may prevent a transition to social media-supported interaction and dialogic governance with citizens. We define challenges as situations or tasks that test governments’ abilities to adopt, use and optimise social media for two-way communication and collaboration strategies with citizens. Challenges are not to be confused with risks, which usually arise as a consequence of not properly addressing challenges. The typology (see Table 2) distinguishes between challenges that are either internal or external to an organization, and, in line with Poba-Nzaou et al. (2016), between challenges directly associated with social media and challenges not related to social media themselves: direct versus indirect challenges.

Finally, this paper defines requirements as any necessary condition for the use of social media in a way that allows two-way communication and/or the co-production level of the government-citizens relationship to be reached. In line with Lee and Kwak (2012), our typology of requirements distinguishes between organizational and technological requirements and between direct and indirect requirements (see Table 4). In brief, requirements are conditions that must be met to improve two-way communication, whereas challenges reflect situations that test governments’ abilities to use social media for this purpose. Key organisational requirements relate to social media strategies, guidelines, structure of the organization, and governance. Key technological requirements relate to ICT infrastructure, data management, and technological skills.

There are of course limitations to this research. Being grounded in literature reviews, the findings need contextualisation, based on characteristics of specific settings, ranging from national contexts to local organisational cultures. Moreover, considering the origin of the used literature, the findings may reveal a slight
imbalance towards the situation in the USA, compared to Europe. Our typologies can be used as a starting point for further refinement and empirical testing in specific situations. They are particularly useful to systematically evaluate cases of ‘networked co-production’ of citizens and governments (Meijer, 2011), to reveal to what extent governments have addressed all challenges and to what extent requirements towards effective two-way communication can be met. Future research may also rank various challenges and requirements according to their (relative) importance and target specific challenges or requirements for governments in more detail. Finally, even if challenges and requirements for social media use are well addressed, online two-way communication between governments and citizens requires offline follow-up actions to make any changes in public policy or service delivery. Further research should reveal to what extent government ‘back offices’ need to be adapted to implement ideas or solutions that arise from online dialogic governance.

Acknowledgements

The research leading to these results is developed in the context of the SmartGov Project (Advanced decision support for Smart Governance). It has received funding from the Joint Programming Initiative (JPI) Urban Europe, i.e. the program ERA-NET Cofund Smart Cities and Communities (ENSCC), under the European Union’s Horizon 2020 Program.

References


Key Issues in Enterprise Architecture Adoption in the Public Sector

Ville Seppänen, Katja Penttinen and Mirja Pulkkinen
University of Jyväskylä, Faculty of Information Technology
ville.r.seppanen@jyu.fi
katja.i.penttinen@jyu.fi
mirja.k.pulkkinen@jyu.fi

Abstract: This paper examines the challenges of enterprise architecture (EA) adoption in public sector organisations. So far, demonstrating the benefits of EA has appeared difficult in this context, and the results in transforming public sector remain modest: Both the penetration and the maturity of EA appear rather low. In the academia, however, the adoption of EA has gained less interest than the EA development and methodologies. Hence, there is a need for research on what are the challenges of EA adoption, and how to overcome them. This paper presents the results of an expert survey on the challenges of EA adoption in the Finnish public sector. The analysis of quantitative data, supported with a qualitative data, reveals three interrelated factors: Resistance towards EA, Relevant EA goals, and the EA practices in use. Managing the identified key issues classified in these three broad concepts would be the prerequisite for institutionalising EA and making it a legitimate practice. The findings extend the current knowledge of the public sector EA with practicable ideas how to increase the level of penetration and maturity.

Keywords: enterprise architecture (EA), adoption, organisational change, resistance towards EA, relevant EA goals, EA practices in use, survey research

1. Introduction

Few question the benefits, such as improved alignment, informed decision-making, and reduced costs, attributed to well-planned and methodical management of enterprise architecture (EA). However, organisations, especially in the public sector, are struggling to adopt EA and related enterprise architecture management (EAM) practices. Lack of properly managed EA leads into problems in interoperability and holistic development that are the requirements for a fluid digital transformation of governments. This study aims at uncovering the reasons for the moderate success in introducing EA to public organisations, and suggest improvements in the EA adoption stage.

EA can be used as a business management tool, that supports especially communication and change management within and between the organisational entities. EA identifies the main components of the organisation, including its information systems, and the ways in which these components act as a whole to achieve defined business objectives (Kaisler, Armour and Valivullah, 2005). However, the consensus regarding the key constituents and practices of EA is lacking (e.g., Schönherr, 2009; Zink, 2009; Lemmetti and Pekkola, 2012; Lucke et al., 2012, Rahimi, Gatze and Möller, 2017) and, therefore, each organisation adopting EA can be advised to define the purpose and scope for the work based on their individual needs. The definition of EA in any particular instance emerges from the purpose and scope (Hope, 2015). Thus, the first step in building a relevant EA program is to understand and embrace the most appropriate implementation approach for the organisation (Bui, 2015). For example, Hjort-Madsen and Pries-Heje (2009) identified two types of EA programs in the public sector. One type is a stable element of information technology architecture, and the other is a fashion-driven business architecture element. Even if used in parallel, these types of EA differ substantially in focus, approach, and produced artefacts. For these reasons, in this paper we avoid committing to a single definition of EA, but examine the adoption of EA as a practice, rooted in current theory.

In the public sector, EA programs often set goals to increase the quality of public services, to improve the cost-efficiency, and to reduce the number of overlapping systems and processes (Christiansen and Gatze, 2007; Saha 2009). Recently, EA has gained significance in managing the digital transformation (e.g., Aier and Schelp 2010; Schmidt et al., 2015; Zimmermann et al., 2015). However, demonstrating the benefits of EA is difficult (Morganwalp and Sage, 2004; Niemi and Pekkola, 2016), because many of the expected benefits are indirect and intangible (Niemi, 2006). EAM is a challenging task (Kaisler. Armour and Valiullah, 2005; Zink, 2009; Lucke et al., 2012; Hauder et al., 2013) and pessimistic opinions about the researchers’ ability to overcome the challenges have been presented recently (Kaisler and Armour, 2017).
Many government organisations have performed poorly in their EA efforts and EA programs have failed to meet the expectations (Saha 2009; Foorthuis et al., 2015; Hope, Chew and Sharma, 2017). Currently, the research on EA success factors is mostly conducted as literature reviews (Jusuf and Kurnia, 2017) and the public sector EA adoption has gained less interest in empirical research than EA development (Dang and Pekkola, 2017). This motivates our empirical research on the adoption stage of EA. The research question is:

What are the key challenges and issues in EA adoption in the public sector?

To answer this question, we first search the EA literature for the reported challenges and critical issues. We turn them into a survey questionnaire, targeting EA experts in the Finnish public sector. Since the adoption of EA requires an organisational change, the survey is structured according to a generic pattern of supported organisational change, derived from good practices for organisational change management. Our study aims at revealing what are the specifics in the EA adoption case, and the reasons behind the moderate success in public administration. The study indicates the existence of three factors, namely resistance towards EA, relevant EA goals, and EA practices in use. The detailed results reveal the key issues in adopting EA in the public sector.

The remainder of the paper is organised as follows. First, we present the background literature and a generic structure for EA adoption process. Then, we describe the research method, present the results of data analysis and construct the key issues of EA adoption. Finally, we discuss our findings, consider their implications, and make suggestions for future research.

2. Background

2.1 Enterprise architecture in the public sector

Dang and Pekkola (2017) provide a systematic literature review on EA in public sector that we found to give a very good coverage for this area. What is significant for EA, public administration generally is a collection of heterogeneous organisations with different business processes and information systems. Consequently, public sector EA has a wide variety of stakeholders, domains and organisations, resulting in considerable complexity. This is a key difference compared to the private sector, where EA is often used within a single organisation (Janssen, Flak and Sæbø, 2013). The focus of EA in the public sector varies from the whole-of-government to specific domain architectures, such as e-healthcare (Kaushik and Raman, 2015), online public service provision (Tambouris et al., 2014), federated identity management (Baldoni, 2012) and bureaus (Gregor et al., 2007). Whole-of-government approach has been of interest in the developed countries, such as Canada, Denmark, Japan, Netherlands, New Zealand and Norway (Christiansen and Gøtze, 2007; Janssen and Hjort-Madsen, 2007; Aagesen et al., 2011), and more recently also in developing countries (Dang and Pekkola, 2017), for instance, in Namibia (Shaanika and Iyamu, 2014) and Vietnam (Dang and Pekkola, 2016). On the other hand, some countries with high level of local autonomy, such as Sweden (Janssen, 2012), have deemed EA unsuitable for the whole-of-government.

Policymakers initiate public sector EA programs to enhance interoperability, productivity and the standard of service systems (Hjort-Madsen, 2006; Janssen et al., 2012; Janssen et al., 2013; Hiekkana et al., 2013; Lemmetti and Pekkola, 2014). Participation in the programs is usually voluntary, although the United States and Finland have mandated the use of EA by legislation. In Finland, the government EA was introduced in 2006. The Finnish Act on Information Management Governance in Public Administration was passed in 2011, making the use of EA mandatory, for example, in central government offices, courts of law, and local government agencies conducting tasks assigned to them by law. Similarly, in the United States, EA is controlled at the federal government level through legal regulation (for example, the Clinger-Cohen Act of 1996). The legislation and encouragement by the National Association of State Chief Information Officers have lead the U.S. state governments to invest in EA adoption. 24 out of the 50 U.S. state governments have implemented EA (Bui, Markus and Newell, 2015), however, with challenges encountered in adoption (Saha, 2009). Currently, Finland shows similar adoption rates at the level of state government, but lower in municipalities and local government organisations.

EA programs face challenges difficult to overcome, as related to the integration and interoperability within and between public agencies (Hjort-Madsen and Burkard 2006) since government structures often impede EA programs (Hjort-Madsen and Gøtze 2004; Bui and Levy 2017). EA adoption cannot transform the government by itself; a transformation will happen only if institutional forces promote it (Hjort-Madsen and Pries-Heje,
Overall, it seems that both the penetration and the maturity of EA remain low, even among organisations that have taken EA into use.

### 2.2 Enterprise architecture adoption

Hjort-Madsen (2006) describes EA adoption in government as “emergent, evolving, embedded, fragmented and provisional social production that is shaped as much by cultural and structural forces in the organisational context in which they are implemented as rational technical and economic ones.” Introducing EA can be characterised as a process during which these practices are first initiated, then deployed, with the goal to institutionalise them in an organisation. To have EA as part of the organisational routines, EA management is needed. EAM is a management approach that helps organisations to plan, develop, and control their EA. EAM provides a holistic understanding of the EA (Rahimi, Gøtzø and Møller, 2017). EAM influences the decision making at the level of IT/IS planning and design, and is intertwined with the strategy process of the organisation, with EA becoming a tool in strategy deployment. The practices typically include the deployment of an EA method and a governance model, as well as at least the introduction of the processes and structures for EA planning, design, and development. As an adoption of a novel set of methods, an organisational change process is required, with alterations in the current modus operandi.

Regarding EA development models, besides the Architecture Development Method (ADM) included in the evolving standard, TOGAF (current version 9.1), there have been also research accounts on generic EA development process models (e.g., Pulkkinen, 2006; Aier and Gleichauf, 2010). These models implicitly assume that an adoption phase has been completed, and the EA development is an established practice, supported by an executive mandate. However, our focus lies on the adoption phase, initiating the EA management process in an organisation.

The EA adoption will require changes in current operating models, regarding IT/IS planning and implementation, project and program management, and IT management. It also should change the business management practices. Implementing any novel practice, or a change in existing practices, follows a pattern of organisational change process (e.g., Kolb and Frohman, 1970; Keen, 1981; Slevin and Pinto, 1987; Kotter, 1995; Schein, 1996; see also Figure 1). A variety of explaining models exist emphasizing different viewpoints and variation in granularity. More recent literature has taken distance from these basic models, seeing them as too monolithic or too much top-down, or managerial (e.g. Smets, Morris and Greenwood, 2012). However, if a public organisation implements a regulatory change which often comes with a set time for adoption, a managed and holistic change is needed.

The Kolb and Frohman (1970) process model, has seven stages, which may occur sequentially, or some of them simultaneously. Two feedback loops emphasize the need for continuing renegotiation or refinement during the process, and the use of evaluations of previous actions to modify the activities (Kolb and Frohman, 1970). In the case of adopting a new policy, or methodology, this reflects the needed learning in the adopting organisation. Hirvonen and Pulkkinen (2005) have been examining the client and consultant roles in EA projects, reflected on the organisational change frame. According to them, the main lesson to learn are the responsibilities of the client organisation itself for a successful change effort at its different stages.
The Scouting stage precedes the launch of the adoption project. During this stage, Kolb and Frohman (1970) advise to evaluate the organisation’s resources and limitations, major subsystems (such as departments, divisions, and subsidiaries), attitudes toward change, motivation of the organisation to improve itself, and its social and cultural norms and values. In the Entry stage, that follows next, the key is to find an entry representative (“a project champion”), through whom the contract (i.e., how the succeeding stages of the adoption process will be implemented) can be negotiated. This stage begins with developing the initial statement of the project goals and by examining the contributions that are required from different stakeholders. The executive sponsorship for the project should be established during this stage as well. Finally, the project is positioned within the organisation, and a project team with the capabilities to perform up to the initial goals is set up.

The third stage, Diagnosis, focuses on refining the initial project goals. The Planning stage covers two parallel branches of activities. The first branch contains the tasks that contribute to planning the project implementation and operationalization. The second focuses on preparing in our case of, in introducing EA, the governance model implementation, introducing EAM to the organisation. Without EAM, EA may remain a tool only used within a single IT project. The stage ends with the creation of a formal project plan and by establishing a communication strategy that addresses all relevant stakeholders. The feedback loop from Planning to Entry emphasizes the need for continuing renegotiation in the organisation by reflecting the results of Diagnosis and Planning.

The Action stage can be divided into three intertwining parts: modelling the current state architecture, modelling the target state architecture, and planning the transition roadmap. The final stages are Evaluation and Termination. Evaluation involves the tasks such as evaluating the project’s results and contributions, and the overall change that has taken place. The second feedback loop, from Evaluation to Planning, enables the re-evaluation of the previous actions and, if necessary, allows to modify planning activities (Kolb and Frohman, 1970). The results of Evaluation define whether the project can move forward to Termination stage, should return to Planning stage to make a new action plan, or even reverse back to Entry stage to renegotiate the EA adoption project. It is noteworthy, that the Termination is emphasized in consultancy led projects for the practical reason that the client and the consultancy agree on the completion of the assignment and the results.
However, within the adopting organisation, the Termination stage ends the only the change process, and should flow into an organisational ‘refreeze’ leading to institutionalisation of the new practice.

As the adoption of EA is only the initial step in the continuous process of EAM, Termination needs to focus on confirming new behaviour patterns, transferring the responsibilities and ensuring their continuity. In contrast to a typical development project with the definitive end, an EA adoption project is only the first phase of what must transform into the continuing processes of EA planning, development, and management. These are usually undertaken as follow-up activities (Pulkkinen and Hirvonen, 2005). Therefore, during the Termination stage, it is important to ensure the continuity of the work that has been started. The institutionalisation of EAM (c.f., Hjort-Madsen, 2006; Iyamu, 2009; Weiss et al., 2013), however, is beyond the scope of this paper.

3. Research method and data collection

The majority of the previous research on the problems and success factors of EA is conducted in the forms of literature review, or interpretation of qualitative data. While our research builds on these findings, we chose the quantitative approach to allow the assessment of the commonness of problems and to explore, what are the key issues. For the data analysis, we used Principal Axis Factoring accompanied with qualitative data in a triangulation setting.

To evaluate the commonness and criticality of the issues found to hamper EA adoption and use in public organisations, and to find more insights into the challenges, a survey questionnaire based on a literature review on EA-related problems was set up online. The literature was searched with Google Scholar with keywords such as “enterprise architecture” and “problem”, “challenge”, “issue”, to find reported problems. Over 80 issues have been reported as problematic. In a critical consideration, the relevance of the issues raised, and their possible overlaps (different interpretations of the same phenomena) were evaluated. As a result, the number of different items to include into the survey questionnaire was reduced to 28. Given the space limitations, a comprehensive list of EA-related issues and the survey items are not presented here, and are provided upon request by the first author.

For each item, we asked whether the respondents had encountered similar problems, and to evaluate the criticality of each problem on a scale from 1 to 3 (Not challenging, Fairly challenging, Highly challenging) regarding their impact on the success of EA adoption. In addition, the respondents could leave open comments on every topic covered in the survey. This option was eagerly used, providing additional qualitative material and enhancing the reliability, as the open-ended answers were also analysed to contribute to the overall result. The structure of the survey instrument was inspired by the process of planned change (Kolb and Frohman, 1970), discussed in the previous section, and we will reflect our findings toward it in the next section.

The selection of survey respondents was based on purposeful sampling (e.g., Patton, 1990; Onwuegbuzie and Leech, 2007) in order to capture variation to represent the expertise in the Finnish public sector EA. Over half of the respondents assessed their expertise on the matter to be at the highest level (on a scale of Weak expertise, Intermediate expertise, Good expertise). Approximately 50% of the respondents represented central government organisations or municipalities, 25% of the respondents were actively involved in the EA development in higher education organisations that represent public sector in Finland, and another 25% came from private IT companies with experience in public sector EA consulting. 85% of the organisations represented by the respondents had started a systematic adoption of EA, yet only 17% had completed it by the time they took the survey. The survey was created 2013, a few years after the Finnish Act on Information Management Governance in Public Administration was passed. After an analysis of the initial results in 2015 we were prepared to refine the instrument. However, no need for major revision of the topical issues was found, and we recruited more respondents to acquire sufficient data for our quantitative analysis. The survey was completed by the end of 2016 by altogether 54 respondents. By the end of the data collection period, the EA adoption rates and maturity were still low in the central government and even lower in the local government organisations. Approximately, only 20% of the local government organisations have started the EA adoption. The final sample, after removing the incomplete responses, consisted of 50 respondents.
4. Results

Descriptive statistics of the data show that the items related to poor understanding of the purpose and goals of EA were most commonly identified by the respondents, and were considered as the most challenging. Adoption entails both individual and organisational learning for changed behaviour. On the other hand, the respondents were quite satisfied with the EA methods they were using, as well as the benefits the EA can provide to their organisations. The least significant item in the survey addressed the inflexibility and unsuitability of the EA method, a result that could be seen somewhat surprising. Such issues were encountered by 24% of the respondents and mere 3% regarded the EA methods to pose a high challenge to successful EA adoption.

We conducted an exploratory Principal Axis Factoring to identify underlying themes in our data. To improve the factorability, two items were removed, based on the examination of Anti-image correlation matrix. The removed items also appeared to be rather insignificant issues according to the preliminary descriptive analysis. We used Varimax with Kaiser Normalization as a rotation method and suppressed the item loadings less than .5. Kaiser-Meyer-Olkin measure of sampling adequacy was .658, which indicates that the sample’s factorability was mediocre. Bartlett’s test of sphericity was significant ($\chi^2 (325) = 559.186, p < .001$). It is noteworthy that the survey was specifically targeted to experts in the public sector EA domain. Therefore, the respondents represent a reasonable sample of the total population (EA experts working within the Finnish public sector, or representing IT providers serving it). The analysis resulted in the three-factor solution that explained 44.47% of the total variance.

4.1 The key issues in EA adoption process

The analysis revealed an underlying three-factor solution from our data. We consider these factors to represent the key issues of an EA adoption. The factors Resistance towards EA, Relevant EA goals, and EA practices in use can be mapped into the stages of the process of planned change as shown below. Figure 2 also presents the Eigenvalue and explanatory power of each factor, as well as the item loadings and communalities (borderline values underlined). We follow this order in the discussion following in the next sections.

![Figure 2: The three-factor solution mapped into the stages of planned change process](image-url)
4.1.1  Resistance towards EA

The first factor was loaded with four items and labelled as Resistance towards EA, since all the items concern the organisational change resistance, either as its cause, or an effect. In the context of this study, this factor represents specifically resistance towards the adoption of EAM as a policy in the public sector. The key issue is the organisational capability to undertake the change effort, the adoption project, which should appear in terms of the readiness and the willingness to change the status quo. This involves commitment at all levels, and the allocation of sufficient resources to implement the change.

Our respondents commented that EA appears heavily IT-oriented and therefore fails to reach all the relevant stakeholders.

“The enterprise architecting is still seen as something that only propeller heads would be interested in. The core business is not willing to participate and cannot see the benefits it could provide.”

Due to the IT-orientation, EA often suffers from a narrow mandate, which limits the viable area of its influence and impact.

“EA is considered as IT busywork and its mandate is too narrow.”

“Although our EA team consists of representatives of the entire organisation, they still see this work irrelevant and thereby are often ‘not able to participate’ the EA planning meetings.”

The lack of commitment manifests itself also in insufficient allocation of resources, which incurred several direct responses from our respondents.

“For us, it is not about the lack of EA skills, it is rather about the shortage of resources. And this is because of the management’s poor understanding about what we could achieve with EA.”

Interestingly, some respondents commented that their organisation acknowledges the need for systematic EA planning and management, yet they still fail to connect the dots.

“In our IT department, the EA work is desperately needed, and they understand it. In the business units, the EA is needed at least as much, but they haven’t realized it. Between the lines you can read their need for the holistic long-term planning, the architecture documentation, connecting the target-state with the strategy, and so on.”

4.1.2  Relevant EA Goals

Three items loaded onto the factor labelled as Relevant EA goals. This is related to the EA benefits, and the factor captures that organisations are often unable to recognize beneficial use cases for the EA and problems it could help to solve. Our study, however, cannot reveal whether the root cause is the missing mandate, the inability to agree on shared strategic directions, the lack of skills needed in their operationalization, or something else. The data gives hints toward all of these directions. Kolb and Frohman (1970) call for recognizing the desired state toward which the organisation is striving and then defining the operational goals, which can be placed in the context of organisation’s total development to give a direction to a meaningful solution. Also, the goals should be set acknowledging the different subsystems of an organisation, which may have different priorities or even conflicting objectives. If the goals are poorly set, e.g., they would not lead into the desired objectives, there is a need to return to adjust them. Our respondents argued that their EA efforts, overall, are lacking clear, relevant, and measurable objectives.

“It would be very important to have relevant goals accompanied with some kind of indicators that would help us to visualize the achieved progress to management as well as employees. This would greatly help the overall commitment to EA.”

It was noted that the objectives should be divided into manageable sizes.

“Problems can be avoided by dividing the objectives into smaller pieces that are easier to cope with. I mean sub-goals. It is also important to learn to tolerate the incompleteness.”
Furthermore, it was argued that the objectives should be tightly aligned with the existing practices of project portfolio management.

“I think that the architectural requirements must be aligned with the project management models. This would make it possible for the EA to oversee, and especially to help, the development projects so that they could understand the architecture requirements and perform accordingly.”

According to respondents, there are also problems in the strategic organisation management.

“The problem of defining the target-state is not due to difficulties of finding the relevant information. Rather, the problem is that our organisation as a whole cannot agree the direction we should be heading to.”

4.1.3 EA Practices in Use

Six items loaded onto the factor we labelled as the EA practices in use. First, this factor characterises the lack of skills that are required in modelling and designing organisation’s architectural structures. The factor emphasizes the importance of that the enterprise architects must have not only methodological but also social skills. The practices centering around blueprints and other artefacts cannot guarantee the success, if these are not useful for the dedicated purposes: informing and negotiating on architecture solutions, evaluating them, making decisions on, and further designing and developing solutions. Continuous evaluation enables defining if there is a need to return to adjusting the action plan. The obstacles in adoption are related to both individual and organisational learning – the communication and negotiation skills mean facilitation of the learning to diffuse the information and support the reception of it.

Our respondents noted that EAM at an organisation-wide level is by no means a trivial task. The existing professional skills may not translate into the specific purposes of EAM.

“[...] it is still challenging to step outside of our own silos and to transfer these skills into the context of EA.”

The respondents were generally satisfied with the EA methods and tools they are using. However, they identified the need to improve the presentation of EA artefacts to make them usable for wider audiences.

“Methods and modelling languages are flexible enough and offer decent tools for planning and modelling. But they are not commonly readable and understandable, and therefore require vernacular translations before the full benefits can be reaped.”

Our respondents noted that the methods and tools have to conform with the domain specific requirements and the modelling must be prudent.

“Methods and tools must be adjusted to fit the need. It makes no sense to model the whole world.”

Respondents also considered the realization of benefits to be challenging.

“Making plans is quite easy but it gets difficult when you try to operationalise those plans. It requires real work and that the organisation is willing to change.”

This may be due to that the EA benefits realization is a complex phenomenon that involves several interrelated concepts, which include also the social environments. Verification and measuring of benefits was also addressed by our respondents.

“Overall, it is difficult to measure the operations development. Indicators are fabricated afterwards, and they are vague.”

Some respondents argued that the vocabulary used by the enterprise architects and EA consultants is filled with technical jargon, which causes problems in communications between the stakeholders.
Finally, in addition to that the EA-specific terminology and artefacts fail to communicate with the relevant stakeholder groups, the overall understanding about the purpose of EA seems to be lacking.

“General managers [...] don’t understand what the term enterprise architecture means.”

5 Discussion

In this study, we present results based on a survey among experts on the challenges of EA adoption in the public sector in Finland. Represented under the 54 respondents were a number of different public sector organisations, as well as IT providers working with the public sector. Based on the analysis of the survey study, aligned with the stages of the generic model of planned change in organisations, we propose three key issues in the adoption of EA in the public sector.

For the most parts, our results comply with previous studies. However, compared to studies on private companies, it appears that the resistance towards change plays a more considerable role in the public sector, characterised by inertia likely caused by issues typical of the public sector, as bureaucracy. For example, in Finland EA is mandated by law; nevertheless only in 17% of the organisations represented the adoption was completed. It is important to get the management to commit to the EA and to ensure fluent communication between the stakeholders. This is reflected in the previous research (Lucke, Krell and Lehner, 2010; Lucke et al., 2012; Jusuf and Kurnia, 2017). Janssen and Klievink (2012) also note that the starting points of a project are crucial and inability to solve the failure factors at the beginning will likely result in a failure at the end. First, their results emphasize the importance of knowing the potential issues in advance. Our study contributes to the practitioner community by identifying such issues. Second, the results of Janssen and Klievink (2012) are in accordance with the analysis we present.

If examined per item, our data indicates that the most commonly encountered and the most challenging problems appear during the early stages of an EAM adoption process. We were able to find only one study on the public sector EA that specifically suggests factors that influence the adoption phase. In their case study, Dang and Pekkola (2016) identified five major problem areas, namely responsibility and credibility, objectives, readiness and awareness, EA work and output, and stakeholders’ different views. Although they applied slightly different perspectives in the conceptualisation, our results are in line with theirs. Table 1 summarises notable observations from the previous studies in relation to the key issues constructed from our data.

Table 1: The key issues in relation to the previous research findings

<table>
<thead>
<tr>
<th>Key issue</th>
<th>Observations from literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance towards EA</td>
<td>EA often lacks the top-level sponsorship, or the entry representative. This compromises the mandate that is necessary for the successful adoption and for the benefits realization. (Armour and Kaiser, 2001; Dreyfus, 2007; Lucke et al., 2012; Roth et al., 2013; Kaiser and Armour, 2017)</td>
</tr>
<tr>
<td></td>
<td>EA’s IT-orientation causes resistance in other stakeholder groups (Isomäki and Liumatainen, 2008; Seppänen, Heikilä and Liumatainen, 2009; Asfaw, Bada and Allario, 2009; Penttinen and Isomäki, 2010; Poutanen, 2012).</td>
</tr>
<tr>
<td></td>
<td>Public organisations are often characterised by inertia in the sense that institutional structures and professionalism constrain and channel new arrangements (c.f., Scott, 2005; Isomäki and Liumatainen, 2008).</td>
</tr>
<tr>
<td>Relevant EA goals</td>
<td>The EAM should be driven and guided by the organisation’s strategic objectives (Dang and Pekkola, 2016; Rahimi, Gatze and Muller, 2017).</td>
</tr>
<tr>
<td></td>
<td>The failure in setting goals may lead to local optimization with global ramifications (Dreyfus, 2007).</td>
</tr>
<tr>
<td></td>
<td>EA development should be organised with manageable sized objectives that enable ‘quick wins’ (c.f., Niemi, 2006; Hopkins and Jenkins, 2008).</td>
</tr>
<tr>
<td></td>
<td>EA should be aligned with the practices of project portfolio management (Aier and Schelp, 2010).</td>
</tr>
<tr>
<td>EA practices in use</td>
<td>Specialized skills and capabilities are required to discern and manage large and complex structures (James, 2002; Strano and Rahmani, 2007; Hauder et al., 2013; Dang and Pekkola, 2016).</td>
</tr>
<tr>
<td></td>
<td>Practice of EA requires a combination of both hard and soft skillsets (e.g., Strano and Rahmani, 2007; Hope, Chew and Sharma, 2017; Banaeianjahromi and Smolander, 2017).</td>
</tr>
<tr>
<td></td>
<td>Stakeholder groups outside the IT domain fail to utilize EA artefacts (e.g., Lucke, Krell and Lechner, 2010).</td>
</tr>
<tr>
<td></td>
<td>The majority of potential benefits of EA are either strategic, indirect or intangible, and therefore difficult to measure and even attribute as the results of EA (Niemi, 2008).</td>
</tr>
<tr>
<td></td>
<td>There is a lack of shared vocabulary (Lapalme, 2012) and confusion regarding the understanding of EA and its concepts (Lemmetti and Pekkola, 2012).</td>
</tr>
</tbody>
</table>

To summarize, our study aims at drawing a more consistent and aligned picture of the problem area than could be found in the literature on the obstacles encountered in adoption of EAM practices in public sector
organisations. Firstly, starting out with the existing body of knowledge, earlier findings were tested and mainly confirmed (see Table 1), but also extended theoretically, with the organisational change process. Prior studies largely rely on small scale or qualitative data, as case studies. Testing the findings in a quantitative study provides in our view a confirmed baseline for the whole area of research and practice. This is helpful for the future developments in both research and practitioner fields, in finding solutions for the known problems.

Secondly, in our quantitative study, we draw together the individual items to three main clusters and align them with the generic organisational change process. This gives in our view a fitting theoretical frame for a more consistent theoretical base for future research. Additionally, it is important to clarify the setting from a theoretical point of view. As one of the benefits of EA, support for organisational change does get mentions. However, to be able to support organisational change, practices related to EA must be introduced and adopted in an organisation in due course. This is a stage prone to the numerous problems as discussed in this study. It appears that EA is often perceived solely as an IT artefact and as such, it evokes similar reactions as information technology induced changes.

Further, the individual items confirmed in the survey, and their relative importance can be translated to action points in organizations, both in new adoptions and in organizations with adoption stage behind but still experiencing problems. Here, maybe the most prominent overall result is the importance of issues other than tools and techniques, but related to the footing of the necessary changes in the organizational practices. This supports the views of recent literature on EA management that stresses the involvement of the organization business management.

5.1 Reliability and validity

In regard to the reliability of this study, an obvious limitation is the sample size. However, the recruited respondents were carefully chosen experts who not only show merits in practice of our research topic, but also represent a notable portion of experts in the Finnish government EA scene at the time of the data collection. In addition, the respondents came from tens of different organisations, giving the data quite diversified sources. The qualitative data we have previously collected as participant observers in EA adoption projects (Seppänen, Heikkilä and Liimatainen, 2009) also supports the identified factor solution.

The survey instrument was built on the issues that were found in the published research literature. Condensing the 80 issues mentioned to the 28 in our survey instrument, involves some subjective judgment. However, the open-ended questions gave an opportunity also to test the validity of the set of issues used in the survey. The survey instrument used a three-point scale to allow the evaluation of EA problems’ criticality. While we believe that this scale was suited for the purposes of this study and did not result in significant decrement in reliability or validity (c.f., Jacoby and Matell, 1971) it may not always allow optimal differentiation between the respondents’ opinions.

To evaluate the generalizability of our results, and to further broaden the understanding on the problems of EA adoption, additional research cases and data, preferably from other countries, would be needed.

5.2 Implications for research and practice

The current research seldom attempts to make the distinction between public and private organizations explicit. Concentrating on the public only, we found that there are differences. hence, further research on differences and commonalities would be an interesting research avenue. The use of EA has longer tradition and is more tightly rooted in the private sector, giving deeper insights, from which again government organisations could profit. Also, our study focused on the adoption phase, which, in our terminology, adherent to that of Goodman et al. (1979), may or may not lead to the actual institutionalisation. Therefore, follow-up studies on the success of institutionalisation, i.e., positioning EA as a practical and even social norm in the organisational development activities, that can be observed only through time (Barley and Tolberg, 1997), would be interesting. Further, the success factors, as the other side of the coin, could be reflected on the problematic issues.

Due to the continuous pressure to save on administrative costs, to improve the quality of public electronic services, and to reap the benefits of digital transformation, the EA adoption is currently on the agenda of many public organisations and more so in the future. Our results can be used to improve the preparedness to cope with problems that are likely to be encountered and the readiness for related organizational change, adopting
EA and supported by it, continue the organizational transformation in desired areas. Therefore, this study is of interest to the IT professionals and enterprise architects serving in public organisations as well as the consultants who participate in government EA projects.

6 Conclusions

We suggest that the three key areas, namely Resistance towards EA, Relevant EA goals, and EA practices in use proposed in this paper, should be in the focus in any EA adoption project. The organisation and the relevant stakeholders should establish a common understanding and will to commit themselves to the process of change that the adoption and utilisation of EA and adoption of EAM practices require, to find the agreement on the goals, and to develop a capability to implement.

We argue that the present understanding shows that there is no need to get stuck in the details, such as versioning and fine-tuning the EA methods, as these are the areas that thirty years of accumulated practical experience and research have already covered. Rather, we should focus on establishing ‘architectural thinking’ (c.f., Winter, 2016) and while the benefits of EA are unquestionable, they cannot be realised without moving from words to deeds.

As also ample methodical support exists for organizational change, the alignment of the EA adoption problems to the organizational change process supports in our view the practitioners, where seeking to avoid problems and mitigate risks in the adoption efforts. Beyond the EA practice, our study is a message to the organization management interested in the benefits from a managed EA, and leading the change efforts.

References


Degree of Digitalization and Citizen Satisfaction: A Study of the Role of Local e-Government in Sweden

Irene Bernhard, Livia Norström, Ulrika Lundh Snis, Urban Gräsjö and Martin Gellerstedt
School of Business, Economics and IT, University West, Trollhättan, Sweden
Irene.bernhard@hv.se
livia.norstrom@hv.se
ulrika.snis@hv.se
urban.grasjo@hv.se
martin.gellerstedt@hv.se

Abstract: The aim was to investigate whether there is a relationship between degree of e-government in Swedish municipalities and perceived satisfaction among citizens generally. This is a large-scale quantitative study based on valid and reliable Swedish national surveys. Based on these surveys, a new comprehensive index for measuring degree of digitalization was constructed. Citizen satisfaction was measured using established indices covering three dimensions: satisfaction with living in the municipality, satisfaction with performance of government activities (delivered services), and satisfaction with transparency and influence. The results show that there is a relationship between the degree of digitalization in a municipality and the perceived satisfaction among its citizens. The degree of digitalization is related to all three dimensions of citizen satisfaction. Additionally, this study indicates that the strength of this relationship is in parity with or even stronger than the relationship between citizen satisfaction and other crucial factors such as educational level and median income.

Keywords: degree of digitalization, satisfied citizens, local e-government, municipality, Sweden

1. Introduction

E-government is supposed to increase administrative effectiveness as well as bring benefits such as promotion of democratic values and inclusion of citizens (e.g. Bannister and Connolly, 2014; Cordella and Bonina, 2012). In the digital era the use of information technology (IT) has the potential to improve the quality of public service, and successful implementation of IT in local government (e-government) has been reported in a number of studies (e.g. Gil-Garcia and Pardo, 2005; Yun and Opheim, 2010; Bernhard, 2015). IT can be used by municipalities to more efficiently provide up-to-date information to residents, potential residents and visitors. E-government also involves offering many municipal services online, with easy access outside regular office hours. According to the Swedish Association of Local Authorities and Regions (SALAR, 2014), efforts to support, encourage and inspire the mutual relationship between the municipality and its citizens include implementing a variety of technology-enabled services, such as apps, websites and various tools for citizen dialogue. In general such tools are meant to improve transparency and accountability, and to increase citizen participation in administrative and political processes (Pratchett, 1999; Dimitriu, 2008). According to Demchak et al. (2000) and Kim et al. (2005) this might consequently increase trust and citizen satisfaction with local governance.

Use of IT to deliver e-government services does not specifically address citizens’ quality of life (Fischer, 2015). Instead the focus is still on “pushing” these e-government services to citizens, thus failing to accommodate current and future societal challenges in an innovative way (Susskind and Susskind, 2015; Fischer, 2015). Local government must strive to be administratively efficient, while continuing to provide essential public services to all (Bertot et al., 2016).

Arguably, the quality of e-government implementation needs to be better understood in relation to what value citizens perceive in the overall transformation of local e-government efforts (Bannister and Connolly, 2014; Axelsson, et al., 2013), i.e., in terms of quality of life. Quality of life covers a broad range of issues such as economic welfare situation, job quality, health status, civic engagement, governance, public safety and leisure (OECD, 2013). Many of these important factors are local, that is, they are related to the citizen’s particular municipality and its governance. Our society is being “digitalized” and sectors crucial to our quality of life are taking advantage of its opportunities, e.g. education (e-learning) and health (e-health). In the same manner, governance is turning into e-government. Naturally, an important research question is to study the benefits from this digitalization, i.e., whether e-government is a change for the better. Many stakeholders could benefit from digitalization, and such gains could be assessed in terms of productivity and efficiency.
argue, however, that the most important stakeholders in local governance are citizens, and benefit should be measured in their perceived quality of life. Consequently, it is of great value to find the answer to the question: Is there an association between the degree of e-government and citizen satisfaction?

Thus, in this article we focus on the relationship between government and citizens. E-government has the potential to improve three dimensions of importance for citizens. Firstly, e-government has the possibility to improve information, awareness and guidelines regarding “general living conditions,” e.g. schools, infrastructure and leisure activities. Secondly, many of the services that citizens expect could be digitalized and offered “24/7” (e.g. Nam, 2014; Mergel, 2013). Thirdly, transparency and influence could be increased by using digital technology and social media. Transparency and influence refer to the process of opening up government activities and decision-making processes to public scrutiny and creating spaces for citizen deliberation and discussion (Bertot, Jaeger and Hansen, 2012; Charalabidis and Loukis, 2012; Ellison and Hardey, 2013).

The relationship between e-government and citizens’ perceived satisfaction is particularly interesting to study at the local level. In Sweden the municipality is the level of government with the closest, most immediate relationship to citizens, in the geographical location in which citizens live and spend most of their time (Bernhard, 2015; 2014a; 2014b; Briggs, 2008). Changes in local governmental activities or services might directly affect citizens’ everyday quality of life in a number of important aspects.

Given these potentials with local e-government, an important overall concern is to what extent these efforts pay off in terms of greater citizen satisfaction. Is it worth the effort to develop and adopt e-government services? To our knowledge, there is no previous research that actually demonstrates that municipalities’ efforts with digitalization are related to citizen satisfaction at large. Our point is that e-government should strive for higher, more innovative and important aims such as providing products and services that are developed based on the needs and requests of citizens, local democracy and increased civic engagement. Certainly a great challenge of the digital age is to find out how people-centered IT can be used to improve quality of life (Fischer, 2015).

In this paper the aim is to study if there is a relationship between degree of digitalization in municipalities and perceived satisfaction among citizens at large. The degree of digitalization will include the following four aspects: Does the municipality work strategically with e-government?; Does the municipality provide information and enable transparency? Does the municipality provide e-services? Does the municipality provide possibilities for interaction, i.e., digital forms of participation? These aspects are also highlighted in the United Nations E-Government Survey (United Nations, 2016). The variables included in our operationalization of the degree of digitalization are however more explicit measures of the current state in the municipalities.

As pointed out above, local governance affects our everyday lives and a broad range of issues important for our quality of life. Citizen satisfaction can be categorized into three different dimensions according to a well-established national model. With the arguments given above regarding promising potentials with digitalization, we hypothesize that the degree of digitalization is related to all three dimensions (shown in italic below):

Firstly, e-government enables the possibility to inform citizens about what it is like to live in the municipality. This may include leisure activities, schools, housing, public safety, commerce and transportation, i.e., living conditions important for citizens’ everyday quality of life. If digitalization could enhance information and market the merits of a municipality, we theorize that citizen satisfaction should potentially increase. Thus our first hypothesis is:

$H_1$: The degree of digitalization is positively related to how satisfied citizens are with living in the municipality.

Secondly, we are accustomed to online services such as shopping, filing taxes, buying tickets, and finding information, and now more or less expect services with 24-hour online access. Citizens expect municipal information and services to be available when needed, which makes continuously updated information and online services essential. Furthermore, digitalization enhances the possibility of keeping citizens updated regarding services provided and public safety efforts. The municipality can also respond to complaints and show graphically how they have solved problems and made improvements. The municipality could also use
social media as an accessible forum to promote and explain specific services, e.g. how to recycle, which may lead to improved functionality and usage. In sum, digitalization makes it easier for the municipality to describe and visualize its provided services and efforts, i.e., its performance. Therefore, our second hypothesis is:

\( H_2: \) The degree of digitalization is positively related to how satisfied citizens are with the performance of government activities – delivered services.

Thirdly, e-government enables a higher degree of transparency and openness, which are important factors for trust and democratic values, and therefore the third hypothesis is:

\( H_3: \) The degree of digitalization is positively related to how satisfied citizens are with the transparency of and the influence they have on their local government.

To study these hypotheses we use a large-scale quantitative study based on valid and reliable national surveys, including the vast majority of Swedish municipalities. We will develop an index for measuring the degree of digitalization (DoD) and analyze potential correlation to the indices measuring citizens’ perceived satisfaction following the dimensions given above. Ultimately this study may offer evidence-based relationship between municipalities’ efforts with digitalization and citizen satisfaction at large.

2. Related Research

There is currently a perceived need to rethink the relationship between government and citizens (Mossberger et al., 2013; Bonsón et al., 2012; Bernhard, 2014b). In recent years municipalities have succeeded in making administration more efficient in their efforts towards 24-hour services. These developments have led to more interactive services with online access, connecting citizens with the municipality in a more mutual relationship (Yun and Opheim, 2010; Meijer and Bekkers, 2015; Reddick and Anthopoulos, 2014; Bélanger and Carter, 2012) However, research indicates that it is important to know what citizens perceive as important or valuable in the overall transformation of local e-government (Bannister and Connolly 2014). Helbig et al. (2009) stress that current e-government research needs to discuss “effects related to the recursive relationship between social, organizational, political and technical factors with respect to the success and failure of projects” (p. 5). The authors, referring to Orlikowski and Iacono (2001), suggest that “e-government is thought of as enacted by complex relationships between social actors and the context in which they are embedded” (Helbig et al., 2009:92). Bernhard (2014b) has developed an actor-oriented triangle of e-government in general based on Grönlund (2005) and Giritli Nygren and Wiklund (2010). It illustrates three key actors and their relationships and activities that are to be performed. The relationships are e-democracy (relationship between the electorate and the elected, i.e., the political interplay and communication of citizens and elected officials), e-services (in the relationship between public administration and citizens, firms and other organizations), and e-administration (for the internal usage of information technology tools within governmental organizations to provide reports and support for decision-making).

Previous research indicates potential for digitalization of local governance (e.g. Bernhard 2014b; 2015; Bonsón et al., 2012; Bonsón, Royo and Ratkai, 2015). In recent years digitalization initiatives that focus on citizen participation and e-democracy are emerging both in practice and in the scholarly literature. The use of digitalization for citizen participation – or e-participation – is believed to motivate and lower the barriers for citizens to access and engage in government policy decision-making (Mossberger, Wu and Jimenez, 2017). E-participation is important in order for the government to be relevant to citizens and to build trust. To be relevant government has to be responsive to citizens’ needs and wishes, for example by opening up spaces such as social media channels to gauge opinion and promote discussion (Ellison and Hardey, 2013; Bonsón, Royo and Ratkai, 2015). Monitoring online platforms beyond governments’ own platforms, becomes an important task for the municipalities since it is on those platforms much civic discussion and collaboration takes place (Medaglia and Zhu, 2017).

Linders (2012) talks about a trend that goes from e-government (citizens as customers) to we-government (citizens as partners). That means transformation of the role of government as a provider of services, to a partner that enables citizens and organizations to create services, applications and content by themselves, independent of direct contact with local e-service providers. This can be done by opening up networking opportunities for different users and user groups where they can meet and collaborate. The concept of we-
government also implies a shift in responsibility. In we-government citizens are equally responsible for the development of government and they are equally responsible to engage in the relationship with the government in order to be informed and take advantage of possibilities related to their own and others’ quality of life (Linders, 2012).

A major problem faced by government leaders globally is lack of citizens’ offline as well as online participation (Mossberger, Wu and Jimenez, 2017) which may be a democracy problem. Hence, there are many expectations and promising formulations about how to achieve democratic values but there is no evidence-based research that fills the gap of such research and developments (Giritli-Nygren and Wiklund, 2010). Nor is there any substantial research on the effect of e-democracy for citizen satisfaction (Khan et al., 2012; Dixon, 2010). Furthermore, we can identify a gap of connecting e-government with real facilities and structures in order to improve actual quality of life. Matters and possibilities relevant to everyday quality of life raise the potential motivation to participate in a discussion with local government (Simmons, 2014; Wang and Wart, 2007; Taylor-Smith and Lindner, 2010), and this feedback is crucial for government agencies to fulfill their ambitions (Bertot and Jeager, 2008; Ellison and Hardey, 2013). Hence, more research is needed that brings together the perspectives of government and citizens respectively, in order to understand how e-participation can be conceptualized and adopted.

3. Research Setting and Design

The study is conducted in Sweden. The Swedish multi-level government system is based on national, regional and local/municipal levels. Local government is the level closest to citizens in terms of public services, and together with regions and counties accounts for about 70% of all citizen contacts (SALAR, 2011). This implies a challenging position between the regulations of the central government and demands of citizens. There are 290 municipalities in Sweden, each with strong constitutional autonomy (Montin, 2007). This aims to relate democracy and public administration to local distinctiveness and the interests and ideas of citizens. Trust in local government is promoted by being inclusive, open, accessible and anchored in the local culture (Erlingsson and Ödalen, 2013; Montin, 2007).

In recent years, access to the Internet among Swedish inhabitants has been stable (and high), with just over 90% use in 2015 and 2016. However, even if the digital divide has been reduced, about 7% (630,000 people in 2016) of the Swedish population does not use the Internet (Davidsson and Findahl, 2016). Most of these are elderly, although other reasons not to use the Internet are lack of interest and complicated technology. The use of social media has increased over the past six years and was 77% in 2016 (Davidsson and Findahl, 2016). According to the United Nations survey Sweden ranks number six regarding the E-government Development Index and number 27 regarding the E-Participation index, out of 193 countries (United Nations, 2016).

3.1 Study Design: Using Secondary Data

This is an observational study, conducted in 2017, based on the following three Swedish different secondary data sources:

- Survey: “E-services and apps” (The Swedish Association of Local Authorities and Regions, SALAR, 2014)
- National Survey on Democracy (SCB, Statistics Sweden) (2012)

3.1.1 Measuring Citizen Satisfaction

Satisfaction among citizens is studied in a national survey which is performed twice annually by Statistics Sweden. The number of randomly selected individuals per municipality is usually 600 in smaller municipalities and 1200 in larger municipalities. The survey normally includes roughly 130 municipalities out of the 290 municipalities in Sweden. Some municipalities participate nearly every year, while other municipalities never participate. We gathered data from the surveys conducted from 2011-2015 and included the latest completed survey for each municipality during this time period. Altogether we have included 239 municipalities from this survey. The survey is comprehensive and includes a large number of questions. The complete survey and the underlying model is based on research developed by the marketing authority Claes Fornell, who developed the Swedish Customer Satisfaction Index (Fornell, 1992) and the widely used American Customer Satisfaction Index (Fornell et al., 1996). These indices are developed using multiple-item scales and partial least square
analysis. The indices are mainly composed of three items (questions) each. In this study, we include the three main indices included in the national survey. The first index measures “satisfaction with living in the municipality,” the second “satisfaction with performance of delivered government services” and the third “satisfaction with influence on and confidence in governance.” All indices are based on three items as described below. The calculations of indices and transformations of scores as described below were already done by Statistics Sweden.

**Satisfaction with living in the municipality**

This index is based on the following three questions:

1. Overall how satisfied are you with living in this municipality? (Score from 1-10).
2. How well have your expectations about living in this municipality been fulfilled? (Score from 1-10).
3. Imagine the ideal municipality. How close to such an ideal do you think your municipality is? (Score from 1-10).

The index is constructed using the average score of the three questions above, and this average is then transformed to a scale from 0-100, according to the following:

<table>
<thead>
<tr>
<th>Score</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>0</td>
<td>11.1</td>
<td>22.2</td>
<td>33.3</td>
<td>44.4</td>
<td>55.6</td>
<td>66.7</td>
<td>77.8</td>
<td>88.9</td>
<td>100</td>
</tr>
</tbody>
</table>

For instance the scores 4, 5 and 6 would give an average of 5 and thus an index equal to 55.6. This index will henceforth be referred to as the Satisfaction with Living Index (SLI).

**Satisfaction with performance of government activities**

This index is based on the following three questions:

1. Overall how satisfied are you with the performance of government activities (delivered services)? (Score from 1-10).
2. How well have your expectations about performance been fulfilled? (Score from 1-10).
3. Imagine the ideal municipality. How close to such an ideal do you think your municipality performs? (Score from 1-10).

This index will hereafter be referred to as: Satisfaction with Performance Index (SPI) and it is calculated in exactly the same manner as SLI.

**Satisfaction with transparency and influence**

This index is based on the following three questions:

1. Overall how satisfied are you with the transparency and influence you have as a citizen in this municipality? (Score from 1-10).
2. How well are your expectations about transparency and influence fulfilled? (Score from 1-10).
3. Imagine the ideal municipality. How close to such an ideal do you think your municipality is regarding these attributes? (Score from 1-10).

This index will be referred to below as: Satisfaction with Transparency and Influence Index (STII) and it is calculated in exactly the same manner as SLI.

3.1.2 **Measuring the Degree of Digitalization**

To our knowledge there is no existing established instrument for measuring to what extent a municipality is digitalized. In this study we put a lot of effort into developing a comprehensive degree-of-digitalization index. Internal digitalization within the organization, i.e., e-administration was excluded, and instead e-service and e-democracy were in focus. By scrutinizing official databases and through discussions with responsible researchers at Statistics Sweden and the Swedish Association of Local Authorities and Regions (SALAR), two existing surveys that matched our objective were identified. One of the studies was done by SALAR aiming to
describe the current situation and level of digitalization in Swedish municipalities. This study mainly focuses on two dimensions: strategies and management of the digitalization, and the current number of e-services and smart-phone apps offered by the municipality. The study, conducted in 2014, included 129 of the 290 municipalities in Sweden. The study encompassed indices for “e-strategy” and “e-services and apps,” calculated by weighting a number of items (sub-questions) together. A more detailed description is given in Table 1.

The second study identified was a national survey on democracy made by Statistics Sweden in 2012. The purpose of this survey was to produce statistics on the development and functioning of local democracy in municipalities and regions. The survey was responded to by 254 of the 290 municipalities in Sweden. It was a comprehensive study including many dimensions, and all questions were scrutinized by independent researchers. Each researcher marked questions that were judged relevant to this study, i.e., questions concerning digital information or interaction. Thereafter, the researchers analyzed the combination of all questions. They found that the questions either considered one-sided information/concerns about transparency or two-sided interaction. It was decided to use this categorization and to develop the indices: “e-information/transparency” and “e-interaction,” see details in Table 1.

In sum, by using the existing national surveys, we were able to identify and construct four different indices: e-strategy, e-services, e-information/transparency and e-interaction. The research group evaluated the questions used by Statistics Sweden and SALAR and judged the face validity to be high. Furthermore, the dimensions covered by the four indices give a good content validity, even though the use of social media could have been highlighted more. A description of the items included in each of the four different e-indices is described in Table 1.

Table 1: The four e-indices and items included.

<table>
<thead>
<tr>
<th>E-strategy</th>
<th>E-information/transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A score (0-8 points) is given based on the following questions (yes=1 point, no=0 points):</td>
<td>A score (0-12 points) is given based on the following questions (yes=1 point, no=0 points):</td>
</tr>
<tr>
<td>• Does the municipality have a strategy for the development of e-government (Yes/No)?</td>
<td>• Are these things available on the municipal website (Yes/No)?</td>
</tr>
<tr>
<td>• Has the municipality appointed a manager for the development of e-government (Yes/No)?</td>
<td>o city council calendar, minutes and meeting documents</td>
</tr>
<tr>
<td>• What priority does the work to develop e-government in your municipality have (&quot;very low&quot; to &quot;very high&quot;)? (Points from 1 to 5 for this item)</td>
<td>o municipal regulations and digital/open register</td>
</tr>
<tr>
<td>• Does the municipality participate in cooperation on a regional digital agenda (Yes/No)?</td>
<td>o information about citizen proposals</td>
</tr>
<tr>
<td></td>
<td>• Are there any TV, radio or webcasts (live or recorded) from council meetings (Yes/No)?</td>
</tr>
<tr>
<td></td>
<td>• Does the municipality use social media or Internet to inform citizens (Yes/No)?</td>
</tr>
<tr>
<td></td>
<td>• Is there opportunity to take note of public documents and service declarations (Yes/No)?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E-services (tools)</th>
<th>E-interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>A score (0-14 points) is given based on the following questions (yes=1 point, no=0 point):</td>
<td>A score (0-12 points) is given based on the following questions (yes=1 point, no=0 points):</td>
</tr>
<tr>
<td>• Does the municipality provide e-services (Yes/No)?</td>
<td>• Are these things available on the municipal website (Yes/No)?</td>
</tr>
<tr>
<td>• Does the municipality provide any mobile applications (Yes/No)?</td>
<td>o discussion forum with the ability to read and write posts</td>
</tr>
<tr>
<td>• Does the municipality provide e-services with the following features (Yes/No)?</td>
<td>o opportunity to make comments/complaints about municipal services</td>
</tr>
<tr>
<td>o that require two-factor authentication (e.g. eID/BankID)</td>
<td>o ability to send messages to elected representatives on the council</td>
</tr>
<tr>
<td>o that have a function for digital signatures</td>
<td>• Does the municipality use social media or internet to (Yes/No)?:</td>
</tr>
<tr>
<td>o with the possibility to track the status of the matter and get feedback</td>
<td>o make contact with citizens</td>
</tr>
<tr>
<td>o that is integrated with a business system that is connected to a payment</td>
<td>o give citizens the opportunity to influence political decisions</td>
</tr>
<tr>
<td>• How many e-services does the municipality offer? (For this item: 0=0 points, 1 to 5=1 point, 6-10=2 points, 11-15=3 points, 16-20=4 points, 21-30=5 points, 31-50=6 points, &gt;50=7 points)</td>
<td>• Is there any web portal or call center/customer service (Yes/No)?</td>
</tr>
<tr>
<td></td>
<td>• Is there an established procedure for collecting and managing complaints about municipal services (Yes/No)?</td>
</tr>
<tr>
<td></td>
<td>• Is it possible to attend a citizen dialogue via the municipal web portal (Yes/No)?</td>
</tr>
</tbody>
</table>
Since the four indices described above were in different metrics, e.g. e-services range from 0-14 while e-interaction ranges from 0-12, we had to standardize the scales. This was done by calculating standard scores (Z-scores). For each index the mean and standard deviation were calculated. Thereafter, from each value the mean was subtracted and the obtained difference was divided by the standard deviation. This transformation was done for all four indices, resulting in Z-scores, i.e., all indices have the average 0 and standard deviation 1, and thus are on the same metric. Thereafter, we constructed the overall degree-of-digitalization index (DoD index) simply by calculating the mean of the standardized e-indices. This was done for all municipalities with values on at least two of the four sub-indices.

In this way the DoD index constitutes a compound score covering strategy/management perspective, number of e-services offered, information and transparency issues, and the possibility to interact online.

3.2 Statistical Methods – Analytical Considerations

The primary variables (satisfaction indices and DoD index) are summarized with descriptive statistics, as are the sub e-indices. We found that the distribution shape for these variables was symmetric, hence the mean and standard deviation was used as measures of location and spread.

We transformed the e-indices into standard scores (Z-scores). This was done in order to achieve the same metric for all e-indices. The Cronbach’s alpha for these four sub-indices was 0.74, which is an acceptable internal consistency legitimizing the calculation of the mean as an overall measure of DoD index.

As an exploration of whether the sample of municipalities could be considered representative or not, we analyzed response rate in municipalities with different regional characteristics. To do this we used a classification of municipalities suggested by the Swedish Agency for Economic and Regional Growth Analysis (2014). The classification into different groups of municipalities is based on a typology used by Eurostat and the OECD and can therefore enable international comparisons. The basic classification contains three types of municipalities: rural, intermediate and urban. This division into three municipal categories correlates to a large extent with regional characteristics such as income, unemployment and education level, income distribution and gross pay per capita.

For analyzing potential relationships between the primary variables the classic Pearson correlation coefficient was used.

Naturally, citizen satisfaction with a municipality is potentially affected by a number of other variables, such as population density, proportion of immigrants, proportion in employment, educational level, median income, Gini coefficient (distribution of income, values between 0 and 100, where 0 = totally equal distribution and 100 = totally unequal distribution), and sickness rate (the total amount of days with sick pay divided by the population aged 16-64). As a measure of education level we use the proportion of people with at least post-secondary education (three years or more). All these variables were found in national data repositories and were included in our database for 2014. As pointed out above, these variables are also closely related to the three categories of municipalities. Several of these variables may also be related to the e-indices. For instance, a wealthy municipality may have more money for investments in IT while wealthy municipalities are also more likely to have satisfied citizens than less wealthy municipalities. Consequently, due to the confounding factor situation described above, multiple regression analyses where relationships between e-indices and satisfaction are studied, but with adjustment for the covariates mentioned above.

Furthermore, we added zero-order correlation (equal to the Pearson correlation coefficient) and the partial correlation coefficient (correlation adjusted for the confounding with other explanatory variables). These results are presented in adjacent columns, allowing a comparison of correlation both with and without adjustment. The partial correlations are considered to be the main results in this study. Generally, 5% was used as significance level.

4. Results

4.1 Primary Variables – Descriptive Statistics

Descriptive statistics indicate that citizens, on average, are more satisfied with “living” than “performance” and “transparency/influence,” as seen in Table 2. It may also be noted that the score for e-interaction is rather
low compared to the other sub-indices. During the time of the study, the flourishing era of social media and interaction was still in its early stages.

Table 2: Basic descriptive statistics for the primary variables and sub-indices.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Sd</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLI</td>
<td>239</td>
<td>59.7</td>
<td>6.7</td>
<td>41</td>
<td>78</td>
</tr>
<tr>
<td>SPI</td>
<td>239</td>
<td>53.8</td>
<td>6.0</td>
<td>37</td>
<td>69</td>
</tr>
<tr>
<td>STII</td>
<td>239</td>
<td>40.0</td>
<td>5.7</td>
<td>25</td>
<td>58</td>
</tr>
<tr>
<td>DoD index</td>
<td>271</td>
<td>0</td>
<td>0.8</td>
<td>-2</td>
<td>2.1</td>
</tr>
<tr>
<td>E-strategy</td>
<td>228</td>
<td>5.7</td>
<td>1.5</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>E-services</td>
<td>186</td>
<td>6.0</td>
<td>4.4</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>E-information/transparency</td>
<td>254</td>
<td>7.1</td>
<td>1.9</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>E-interaction</td>
<td>254</td>
<td>4.4</td>
<td>2.6</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

In Table 3, the response rates for the three types of municipalities are presented divided by the municipalities who responded to the satisfaction questionnaire and the municipalities with enough data to calculate the DoD index. The distribution of responders in different categories of municipalities resembles the overall distribution in Sweden. Thus, the samples are representative from this point of view (p-values: 0.464 and 0.869 respectively, chi-square test).

Table 3: Distribution of responding municipalities by categories of municipalities (Eurostat and OECD categorization)

<table>
<thead>
<tr>
<th></th>
<th>Rural (n=130)</th>
<th>Intermediate (n=131)</th>
<th>Urban (n=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responders satisfaction</td>
<td>41.0%</td>
<td>49.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Responders DoD</td>
<td>43.2%</td>
<td>46.5%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Total (n=290)</td>
<td>44.8%</td>
<td>45.2%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

4.2 Main Analysis: Correlations between Degree of Digitalization (DoD) and Satisfaction

In Table 4-6 we present regression results and correlations, with and without adjustment for covariates, for the three satisfaction indices.

Table 4: A regression model for SLI with DoD as explaining factor, adjusted for covariates (R-square = 0.51).

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Std Err</th>
<th>t</th>
<th>p-value</th>
<th>zero-order correlation</th>
<th>Partial correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>68.4</td>
<td>16.1</td>
<td>4.23</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhabitants/km²</td>
<td>0.001</td>
<td>0.001</td>
<td>0.59</td>
<td>0.555</td>
<td>0.27</td>
<td>0.04</td>
</tr>
<tr>
<td>Proportion immigrants</td>
<td>-0.324</td>
<td>0.0753</td>
<td>-4.30</td>
<td>0.000</td>
<td>-0.20</td>
<td>-0.28***</td>
</tr>
<tr>
<td>Education level</td>
<td>0.666</td>
<td>0.157</td>
<td>4.23</td>
<td>0.000</td>
<td>0.61</td>
<td>0.28***</td>
</tr>
<tr>
<td>Proportion employed</td>
<td>-0.279</td>
<td>0.204</td>
<td>-1.37</td>
<td>0.173</td>
<td>0.36</td>
<td>-0.09</td>
</tr>
<tr>
<td>Median income</td>
<td>0.066</td>
<td>0.024</td>
<td>2.76</td>
<td>0.006</td>
<td>0.56</td>
<td>0.19**</td>
</tr>
<tr>
<td>Gini coefficient</td>
<td>-0.365</td>
<td>0.244</td>
<td>-1.49</td>
<td>0.137</td>
<td>0.34</td>
<td>-0.10</td>
</tr>
<tr>
<td>Sickness rate</td>
<td>-0.12</td>
<td>0.10</td>
<td>-1.15</td>
<td>0.253</td>
<td>-0.53</td>
<td>-0.08</td>
</tr>
<tr>
<td>DoD</td>
<td>1.75</td>
<td>0.482</td>
<td>3.64</td>
<td>0.000</td>
<td>0.33</td>
<td>0.24***</td>
</tr>
</tbody>
</table>

*** Significant at the 0.001 level, ** Significant at the 0.01 level, * Significant at the 0.05 level
As can be seen in Tables 4-6, there was a statistically significant positive relation between DoD and the three satisfaction indices. When adjusting for different covariates, the partial correlation between DoD and SLI (Satisfaction with living in the municipality) was 0.24. The same value can be found between DoD and SPI (Satisfaction with performance of government activities). A slightly weaker partial correlation (0.16) was identified between DoD and STII (Satisfaction with transparency and influence). So, our results showed that DoD and satisfied citizens are correlated. This was the case even if we control for other factors that can influence citizen satisfaction. There was no problem with multicollinearity among the explanatory variables. The highest variance inflating factor (VIF) was 4.95 (educational level), while the smallest VIF was seen for DoD at 1.28. This means that DoD independently relates to satisfaction and that variation in DoD cannot be explained by variation in the other explanatory factors.

The model fit (R-square) was 0.51, 0.31 for SLI and SPI, respectively. The satisfaction with transparency and influence had the lowest R-square, i.e., the including factors explain only a small part (roughly one-fifth) of the total variation in satisfaction. The residuals were shaped as expected from a Gaussian distribution and there were no indications of heteroscedasticity, which confirms basic assumptions for our analyses.

In sum, the results showed that our three research hypotheses are all confirmed. Thus we have confirmed that the degree of digitalization is related to citizen satisfaction. Furthermore, the results showed that DoD, in
comparison to other important factors, had a comparatively strong relationship to satisfaction. It is worth noting that the partial correlations for DoD were in parity to factors like educational level and income, even though the correlations were of moderate size from a statistical point of view. As a matter of fact, for satisfaction with living, DoD turned out to be the third strongest partial correlation. Regarding satisfaction with performance of government activities DoD was the strongest partial correlation, and finally for transparency/influence DoD was the second strongest.

5. Discussion and Suggestions for Further Research

This study relies on well-established indices for measuring citizen satisfaction, which have been conducted in Sweden, twice a year, for more than a decade. Regarding the degree of digitalization we constructed a new index called DoD index based on a mean of four sub-indices measuring e-strategy, e-services, e-transparency/information and e-interaction. The fact that the sub-indices showed internal consistency implies that municipalities with high/low degree in one dimension also have high/low degree in other dimensions. For instance, if a municipality has a high degree of digitalized services, it is also likely to have a high degree of e-strategy, e-information/transparency and e-interaction. In other words, the different dimensions go hand in hand.

We are confident that our compound index is a valid operationalization of the degree of digitalization of a municipality fulfilling the aim with this study. We were fortunate in this study to be able to use existing surveys for constructing this purposeful index. However, the index includes information that may not be routinely available. It is therefore vital for both research and practice to develop more generic standardized instruments. Such an instrument should preferably be based on information that is relatively easy to collect. This would make it possible to investigate the development of digitalization over time. In Sweden, SALAR (2016) has already suggested such an approach called “eFlowerbin” as an online tool offering municipalities self-evaluation of their digital service and organization related to digitalization. It is meant to identify areas of improvement and serve as a ground for prioritization. It is important to develop practically applicable, reliable and valid instruments, i.e., instruments that measure citizen satisfaction and engagement. It may be tempting to use automatically generated measures found by using Google analytics or standard algorithms for measuring Facebook success (e.g. number of thumbs up), but such measures are not valid measures for values such as local democracy, engagement and satisfaction.

However, we believe that existing instruments focus too much on delivery of e-services, with a perspective of citizens as customers (e.g. “How well do e-services support citizens to: submit error reports; find public documents and protocols; hand in and follow up proposals?”). To develop a more generic index for DoD, we suggest that a more partner-like perspective on citizens (Linders, 2012) is required. Aspects such as participation, engagement and responsibility would need to be included in relation to new digital infrastructures such as e.g. social media. Hence there is a need to consider social media to a greater extent. Using data available from Facebook, Twitter, and big data analyses could give valuable information about the number of unique users being active, degree of activity, spread of discussions, likes, etc. This may be one way of receiving information about citizen engagement (Bonsón et al, 2015; Mergel, 2013) which may be one important aspect of a “we-government” approach. We believe that tensions like this between independent service providers’ business logic and e-government logic will be an important issue to discuss within the e-participation research community as well as in practice in the future in order to reconsider existing instruments and frameworks for local e-government. We also think there is a need to identify more qualitative metrics to define the mission (e.g. transparency, participation and collaboration) and evaluate the outcome (e.g. accountability, trust, consultation, deliberation, satisfaction, community building, creation of issue networks) of we-government (Mergel, 2013). In doing so, the approach to citizens may have to be changed towards a less formal and bureaucratic treatment, which further challenges the role of the public servant (Norström and Hattinger, 2016). Studies of such role change may also be of interest for the e-participation research community.

Notably, the correlation between DoD and satisfaction may change when e-services are further developed and possibilities for interacting with citizens become more advanced and refined. Influence like this is an important aspect of QoL and will most probably increase satisfaction. However, it is important to keep in mind that even if we-government is a likely outcome of increased interaction (Linders, 2012), it does not necessarily generate more satisfaction. Transparency and engagement can also reveal inaccuracies, mistakes or unpleasant
information. Handled carelessly, this can generate negative perceptions of a municipality, which might have a negative effect on citizens' satisfaction and their willingness to participate (see e.g. Bannister and Connolly, 2014; Bertot, Jaeger and Grimes, 2012).

All our hypotheses were confirmed and the degree of digitalization was related to citizen satisfaction for all the studied perspectives. We believe that the relationship to a large extent is causal, i.e., that digitalization increases awareness about good things about living in the municipality and the municipalities' efforts and intention to improve service and therefore has a positive effect on satisfaction. However, this must be confirmed in future studies, preferably interventional or at least longitudinal studies.

Furthermore, somewhat unexpectedly, DoD was the third, first and second strongest factor for satisfaction with living, performance of government activities and transparency/influence respectively. We believe that this indicates that municipalities have reached a certain standard regarding e-services and that citizens increasingly expect services to be digitalized, but that interaction and the possibility to take part in and influence local government to a higher extent is in a relatively immature phase. It is also worth pointing out that this study uses data on an aggregated level, i.e., with municipalities as objects. Naturally, there could be variations within a municipality due to demographic variables. An important aspect is how digitalization could be used in order to increase equality and also reach its full potential in vulnerable demographic areas.

Our results relate to digitalization as something beyond public system performance and administrative operations which might be considered a significant contribution at the age of public digital transformation. Public authorities have to go beyond digitalization as means for enhanced services and improved performance; they need to think globally about the impact of digitalization on citizens' well-being. To have satisfied citizens must be a main concern for all municipalities. Satisfied citizens are of course related to the desire to continue living in the municipality and a municipality with high citizen satisfaction may also attract new citizens and thereby grow. As showed in this study, DoD has a correlation in parity with other crucial factors such as education and income. Naturally, a municipality must judge how to use its financial resources as efficiently as possible. We did not include any economic aspects in this study, but the technical investments needed for digitalization may not be of the same magnitude as resources needed for improving other factors, e.g. educational level and some of the other factors more or less beyond government control. However, technical investments must go hand in hand with strategy, management and new competence as pointed out above. Thus, a challenge for municipalities and SALAR is, together with researchers in joint projects, to increase the understanding for successful digitalization, develop policies and identify the need for new competencies.

6. Conclusion

In conclusion, there is a relationship between the degree of digitalization in municipalities and the perceived satisfaction among their citizens. The degree of digitalization is related to all three studied dimensions of citizen satisfaction: satisfaction with living in the municipality, performance of government activities (delivered services) and transparency and influence. Additionally, this study indicates that the strength of this relationship is in parity or even stronger than the relationship between citizen satisfaction and other crucial factors such as educational level and median income.

Based on our conclusions, it would be interesting to study more in depth how different digital strategies, e.g. digital services or communication via social media, relate to citizen satisfaction and to what extent. With such knowledge it would be possible to further refine the digitalization and increase satisfaction. This is especially crucial for the transparency/influence dimension which had the weakest relationship in this study. How could we enable and increase engagement and influence further? To enable continuous improvement in the digitalization process, standardized instruments for measuring DoD in a practically applicable way and with variables relating to important dimensions like satisfaction, engagement and local democracy would certainly be helpful.

References


---

**www.ejeg.com** 70 ©ACPIL


Exploring User Participation Practice in Public E-Service Development – Why, How and in Whose Interest?

Jesper Holgersson¹,², Ulf Melin², Ida Lindgren² and Karin Axelsson²
¹University of Skövde, Sweden
²Linköping University, Sweden
ulf.melin@liu.se
karin.axelsson@liu.se
ida.lindgren@liu.se
jesper.holgersson@his.se

Abstract: User participation is seen as an important enabler for successful public e-service development. However, at the same time development of public e-services is still often characterised by an internal government perspective with little consideration for external users. This paper challenges the overly positive attitude that is surrounding user participation in e-government research. The paper aims to illustrate and problematize various aspects that influence why, how, and in whose interest user participation is conducted in public e-service development projects. First, via a literature review, we identify a set of dimensions for critically exploring how, why, and in whose interest user participation is conducted in public e-service development projects. Second, we use these dimensions in order to characterise and analyse three empirical public e-service development cases in order to test the utility, usefulness, and feasibility of the identified dimensions. Our findings highlight the importance of questioning and elaborating on the motives behind user participation (the why) in public e-service development. We also identify two basic forms of how user participation is addressed in public e-service development projects: 1) veneered participation, and 2) ad-hoc participation. Furthermore, we argue that any decisions made regarding user participation in public e-service development should be based on conscious and informed choices concerning why user participation is needed and what it may bring for different stakeholders and their interests.

Keywords: E-government, User Participation, Public e-service development

1. Introduction

For the last decade, e-government research has been influenced by an increased attention towards an external user perspective in public e-service development. The underlying assumption is that increased attention towards e.g. citizens enhance the probability for successful development and deployment of public e-services (Holgersson and Karlsson, 2014, Sæbø et al., 2011). Still, despite these efforts towards increased centeredness in public e-service development, no substantial changes in how public administrations develop public e-services can be seen. As observed by Axelsson et al. (2013), many public e-services are still being developed from an inside-out perspective, from which external user considerations are given little attention. At best, it can be said that those responsible for developing information systems (IS) and e-services in public administration are guessing or assuming the needs and considerations of external users, rather than thoroughly analysing and understanding them (ibid.). It is apparent that there is a gap between e-government research and recommended best practices and how user participation is conducted in practice. The question is why this is the case; why do not public administrations adjust and expand their development processes to include the future end users of public e-services? It is evident that user participation in public e-service development is considered to be a critical success factor in research and in practice (see e.g. Gil-García and Pardo, 2005), yet there are very few reported projects in which users have been actively involved in the development process. In contrast, we also receive reports on public e-service development projects that are perceived as successful in terms of high usage frequencies and measurable internal winnings (e.g. Rexhepi et al., 2015), even though no significant involvement of external users took place in the development process. These success stories spur questions on the practice, validity and usefulness of user participation in public e-service development. Can it be so simple that there is just a general lack of resources that prevents user participation, as described in Holgersson et al. (2017), or are there perhaps also other reasons to why external users are kept out of public e-service development processes? Is it possible that e-government researchers in general are too vague and imprecise when providing public administrations and decision makers with knowledge, guidelines and frameworks for how and when user participation should be put into practice in public e-service development? Maybe there are even cases when user participation in public e-service development could be perceived as counterproductive?
We argue that some answers to these questions can be found by looking at the general IS literature on systems development. The need for user participation in the development of technology in general is not a new line of argument in the IS field; here, active interaction with future users in the development of the technology has been promoted (under various labels) since the 1960s. Interestingly, the literature on user participation is prone to highlight the positive aspects of user participation, but the evidence for the benefits and effectiveness in practice, however, is both unclear and contradictory (Lynne-Markus and Mao, 2004, Subramanyam et al., 2010, Cavaye, 1995). There is considerable empirical evidence for its benefits, and there is near consensus on the importance of user participation among researchers, but much research has focused on different techniques rather than on questioning the value of participation in itself (Heeks, 1999). This situation can be illustrated practically in terms of that if user participation is organised, it is often conducted in an uncritical or even naïve way, not asking why and for what purposes it is conducted. For example, Heeks (1999) illustrates how user participation in IS development sometimes is used without any notion of its political and cultural context. He argues that contextual factors are important to address in any development project and, thus, user participation cannot be considered to be a universal approach that suits all projects. Some arguments for this standpoint are that participation processes can be ‘veneered’, inequitable, and skewed (ibid.). This means that participation might be enforced to a development project, but that participation per se does not take away injustice in organisations, and that the selection of participants might involve those who already have power (Heeks, 1999). Heeks (1999) argues that these problems call for certain awareness about three aspects when deciding if participation should be suggested; 1) what is the political and cultural context? 2) who wants to introduce participation, and why? and 3) who is participation sought from? Do these persons want to, and can they, participate? We take these questions as our point of departure in this paper searching for a better understanding of external user participation in public e-service development.

The aim of this paper is to illustrate and problematize various aspects that influence why, how, and in whose interest user participation is conducted in public e-service development projects. This is done by characterising and comparing a set of public e-service development case studies taken from various levels of government (local, regional and national). In order to perform the comparison, we review e-government and general IS literature to develop and present a set of dimensions representing different aspects of the public e-service development process. Based on these dimensions we characterise how user participation has been treated during the development process in each public e-service development project, as well as test the utility, usefulness, and feasibility of the dimensions.

The paper is structured in the following sections; in Section 2 we present and discuss previous studies of user participation in public e-service development. In Section 3 the research design is described, followed by our derived dimensions characterising user participation in public e-service development projects in Section 4. The cases are presented and discussed in Section 5 and the paper is concluded in Section 6.

2. User participation research in public e-service development

There is a vast amount of literature within the IS development research field discussing user participation as a concept, as well as whether user participation has a positive or negative influence on IS development. The initial idea with user participation was that the manufacturing industry should incorporate the same basic democratic principles in IS development as in the surrounding society. This was e.g. evident in the Scandinavian strand of IS literature (Bjerknes and Bratteteig, 1995). By doing so, individual engagement among employees was meant to increase, which in turn was meant to increase productivity and efficiency in systems development (Bjerknes and Bratteteig, 1995). Simply spoken, this means that users that somehow will be affected by, or have an interest in, the information system being developed should be actively present within the development process. As discussed by Karlsson et al. (2012), the degree and scope of participation may vary from time to time, but user presence should be seen as a natural component of the systems development team. In this paper, user participation represents a user centred development approach in which needs and demands from future end users play an important role. User participation is generally associated with a set of features that has a positive influence on the development process. Increased knowledge of e.g. users and domain which in turn enhance the possibilities for more concrete and accurate requirements are often put forth by scholars (see e.g. Kujala, 2008, McKeen et al., 1994). Another frequently mentioned argument favouring user participation is eased implementation and increased user acceptance, based on more realistic expectations from users (see e.g. Bjerknes and Bratteteig, 1995, Cavaye, 1995).
Unlike general IS development research, the number of studies of user participation within the more recently established e-government research area is limited, and even fewer have been focusing on the relationship between user participation and public e-service development. However, a number of research studies can be found that emphasise the need for and the value of user participation in public e-service development. An important contribution to an increased focus on external public e-service users is made by Carter and Bélanger (2005) who highlight the importance of analysing and understanding the factors that influence citizens’ adoption of public e-services. Factors indicate that perceived ease of use, compatibility, and trustworthiness are significant predictors of citizens’ intention to use public e-services. Melin et al. (2008) underline the importance of public administrations to understand the tasks and needs of users in public e-service development and present case study findings showing that such knowledge has positive effects for public e-service adoption among citizens. Jones et al. (2007) report on findings from a case study conducted in the UK, highlighting the importance of engaging citizens in public e-service development on subjects that matter to them. Similar findings can be found in Schedler and Summermatter (2007) and Goldkuhl (2007) who discuss the importance of public administrations to understand the tasks and needs of users in public e-service adoption and present case study findings showing that such knowledge has positive effects for public e-service development. However, a number of research studies can be found that emphasise the need for and the value of user participation in public e-service development and present case study findings showing that such knowledge has positive effects for public e-service adoption among citizens. Jones et al. (2007) report on findings from a case study conducted in the UK, highlighting the importance of engaging citizens in public e-service development on subjects that matter to them. Similar findings can be found in Schedler and Summermatter (2007) and Goldkuhl (2007) who discuss which actors should be served by public administrations and what it means for public administrations to serve citizens via public e-services. It can be concluded that user participation in e-government research is seen as an important component in order for public administrations to provide public e-services that will be used by citizens once introduced.

However, research on user participation also reveals potential drawbacks. Even though the connotation around user participation often highlights the positive aspects of participation, these do not always outweigh the associated problems. Heeks (1999) illustrates the potential negative sides of user participation by discussing how it sometimes is used without any notion of its political and cultural context. He argues that contextual factors are important to address in any IS development project and, thus, user participation cannot be considered to be a universal approach that suits all projects. It should be noted that the findings presented by Heeks concern IS development in general terms. Howcroft and Wilson (2003) continue this line of thought by advising end-users to carefully consider the objectives of the project and the expected results’ potential influence on their future situation, before accepting to participate. However, as highlighted by Lindgren and Jansson (2013), e-government and public e-service development exhibit differences if compared with traditional IS development concerning e.g. the need to acknowledge citizens’ legal rights and obligations. In their literature review on user participation in IS research, Axelsson et al. (2010) build on the findings presented by Heeks (1999) and formulate a need to elaborate on the context of participation. The context is important in order to understand when user participation should be proposed in public e-service development, for what reasons participation is suggested, and by whom. However, in order to advance these findings further there is a need to explore how user participation is conducted in practice in public e-service development initiatives. It is clear that the current practice of user participation in public e-service development is not in line with research and recommended best practices; a gap exists. It is also clear that existing research on user participation in public e-service development provides little directions regarding why, how, and in whose interest user participation is applied in public e-service development projects. This represents a two-fold gap in the IS and e-government literature on participation; a gap this paper aims to highlight and mitigate.

3. Research Design

This paper combines theoretical insights from e-government and general IS research with empirical data from a set of case studies covering how user participation has been applied in public e-service development projects in Sweden. The theoretical insights have been obtained via a literature review that was designed as a hermeneutic process (Boell and Cecez-Kecmanovic, 2014). The hermeneutic process is iterative in its nature and is initiated with a search for publications (e.g. research papers, government steering and policy documents, and standards) on one or several central concepts. In its essence, the hermeneutic process aims to identify themes, contrasts and knowledge gaps (Boell and Cecez-Kecmanovic, 2014). The main incentive in this paper was to obtain a solid understanding and overall picture of user participation within the unique context of e-service development in the public sector and how user participation may come into play, either directly or indirectly. In this study, the basic concept(s) of user participation in public e-service development, and underlying insights from the IS research area, served as a starting point for our analysis. During the process, the initial search criteria were complemented; since central concepts often are coined differently, and starting the search on one specific concept often lead to finding related concepts. Continuously during this process, we searched for general themes or dimensions from the collective experience of research on user participation in...
public e-service development. As will be presented in detail below, we identified a set of dimensions which can be used in order to characterise public e-service development projects per se, as well as characterising when, how, and in whose interest user participation may come into play in public e-service development projects.

As a second step, we used the identified dimensions in order to characterise and analyse three different public e-service development case studies as a means to test the utility, usefulness, and feasibility of the dimensions. Public e-service providers in Sweden is classified in three tiers: 1) National, 2) Regional, and 3) Local. All case studies analysed in the paper (see table 1), each representing one of the three tiers, can be characterised as interpretive (Klein and Myers, 1999, Braa and Vidgen, 1999). This means that they are based on qualitative empirical data collected via e.g. interviews, workshops, and focus group meetings which have been analysed with the main purpose of understanding and exploring how public e-services are developed and how user related aspects have been dealt with during the development process.

Table 1: the cases analysed.

<table>
<thead>
<tr>
<th>Case</th>
<th>Methods used</th>
<th>Tier</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustains</td>
<td>Interpretive research via interview study, Action research</td>
<td>Regional</td>
<td>(Scandurra et al., 2013b)</td>
</tr>
<tr>
<td>Anonymous exams</td>
<td>Interpretive research via a mix of interviews, observations and focus group meetings</td>
<td>Local</td>
<td>(Axelsson et al., 2010, Axelsson et al., 2013, Lindgren, 2013)</td>
</tr>
<tr>
<td>Driving license</td>
<td>Interpretive research via focus group meetings, Action research</td>
<td>National</td>
<td>(Axelsson and Melin, 2012, Melin and Axelsson, 2009)</td>
</tr>
</tbody>
</table>

Within each of the case studies, the authors of this paper have been extensively involved as researchers, thus assuring in-depth insights. This gives us insights and contextual knowledge valuable for the analysis when revisiting the empirical data, but also presents a risk of a limiting preunderstanding of the participation processes in the cases. However, sharing, discussing and comparing the insights with what is found in the literature is a way of handling the negative sides of our previous involvement in the cases. For each of the selected case studies, we have used the previously identified dimensions as the base for our analysis. Our analysis of the cases can be characterised as hermeneutic (Klein and Myers, 1999) which in this case means that qualitative textual data from the cases has been interpreted by the research team. For example, we have analysed if and how user participation has been applied in the development process, as well as the reasons behind decisions being made by various stakeholders involved in the development process. This makes the cases valuable to revisit and explore further in this paper. Each of the case studies has been published previously in different research outlets, such as at research conferences as well as in scientific journals, in different constellations of researchers (including the authors of this paper). As such, we have chosen to only include information from the case study directly related to the aim of this paper. The remaining information about each of the case studies can be found in a selection of the already published research outlets.

4. The dimensions – characterising public e-service development and user participation

As a result of the literature review, a set of dimensions characterising public e-service development projects in general, and user participation in particular, has been derived. If considering a classic IS development life cycle representing the development process as a linear sequence of activities (see e.g. Avison and Fitzgerald, 1995), the dimensions can be divided into three stages. The first three dimensions (triggers, incentives, and development approach) are focusing on project specific decisions made before the development project starts, i.e. what preconditions and identified incentives that initiate the project and what, if any, development approach that is planned to be used. The following three dimensions (user influence, barriers hindering user participation, and level of informed decisions) are focusing on project specific decisions made before the development project starts, i.e. what preconditions and identified incentives that initiate the project and what, if any, development approach that is planned to be used. The following three dimensions (user influence, barriers hindering user participation, and level of informed decisions) represent decisions taken during the development process with respect to user participation. Such decisions indicate to what extent users are invited and allowed to influence the design process as well as if there are any implicit or explicit reasons motivating different choices being made with respect to user participation. The remaining dimensions (impact and user participation) deal with two things; (1) the impact of the user participation approach used on the public e-service being developed (here referred to as ‘impact’), and (2) the impact of the project and the e-service developed on the organisation (here referred to as ‘project impact’), thus concentrating on what happens after the development process.
4.1 Triggers and incentives

Triggers and incentives are focused primarily on conditions that initiate public e-service development projects from the very beginning. Obviously, the decision to launch a public e-service development project is initiated by someone, based on some prerequisite, e.g. in terms of a more or less distinct need. Here there are different triggers identified in the literature. Heeks (2006) for example, points out that every public e-service development project should be based on someone’s explicit need for a service in order to solve a problem, i.e. there must be a clear motivation for why a public e-service development project is initiated. Such initiatives may stem from political exhortations (Holgersson et al., 2017), which in turn may be based on needs that can be formulated from an institutional perspective and context (Scott, 2014, Gil-García and Pardo, 2005), or incentives linked to the willingness of being fashionable or modern (Wang, 2010). Furthermore, there are also reported examples of public e-services developed without a clear initial agenda, or as Heeks (2006, p. 162) puts it: “[...] identification of an opportunity which could be seized”.

In addition to someone initiating a public e-service development project, there are most often one or several incentives for doing so. Agency internal incentives, e.g. increased efficiency, are often highlighted in e-government research as the main motivator for public administrations to initiate public e-service development projects (Asgarkhani, 2005, Anthopoulos et al., 2007). Furthermore, incentives may also be based on problems and needs experienced by external stakeholders, such as citizens (Lindblad-Gidlund, 2012) or business organisations (Holgersson and Karlsson, 2012). Most often, such needs may stem from what Heeks (2006) refers to as a problem that needs to be solved; either problems within existing public e-services or problems experienced because a public e-service is lacking. Moreover, incentives may also stem from more societal, systemic and democratic values, such as a wish to improve transparency of government decision processes (Almarabeh and AbuAli, 2010), or to increase democratisation (Flak et al., 2003).

4.2 Development approach

Any public e-service development project has elements of a development approach, e.g. in terms of methodology. Established methods, more local (“homemade”) methods, or recurrent practice provided by external consultants or internal IT department etc. can be elements of a more or less deliberate and reflexive development approach. Different approaches can build on or acknowledge user participation to various extents. In IS development research, the importance of following a specific development method is emphasised (e.g. Alter, 2006, Avison and Fitzgerald, 2006, Brinkkemper, 1996, Fitzgerald et al., 2006) in order to provide guidance and support to information systems development (ISD) stakeholders during the development process (Cronholm and Ågerfalk, 1999). Although, as pointed out by (Karlsson and Ågerfalk, 2004), it is common that ISD methods are tailored to fit the unique situation for a specific ISD project and public e-service development projects are no different. As pointed out by Goldkuhl and Röstlinger (2010), it is common that public e-service development projects do not follow a unique or specific development method, mostly due to that traditional ISD methods are very extensive and detailed. Public e-service development projects are typically small and focused on specific web applications, and therefore fit poorly with the recommendations of the traditional ISD methods.

An important aspect of ISD is the division of labour between in-house and external resources; in practice, who develops, and who is invited to participate when e.g. testing prototypes, designing graphical user interfaces (GUIs) and the general quality of functions. These aspects are important also in public e-service development. As an example, Melin and Axelsson (2009) identified two different strategies when studying public e-service development; projects that dealt with a significant level of external (outsourced) resources, and projects with a significant use of in-house resources. This is also linked to the management of the development initiatives and their relative success (ibid.). They identified that extensive use of external resources, in combination with low in-house competence to procure and manage the project as such, caused major problems and challenges in the studied development project on a general level. In addition, the possibilities to involve users in the development project were affected in a negative way (ibid.). However, this does not have to be the case. Outsourced and external resources can be a driving force behind the development of public e-services, as well as a necessity for achieving useful and successful public e-services due to shortage of competent IT workers in the public sector (Moon, 2002, Chen and Gant, 2001). For these reasons, it is important to investigate the division of labour and the use of external and internal resources when analysing development approaches and user participation in this setting. For these reasons, it is important to investigate the division of labour and the
use of external and internal resources when analysing development approaches and user participation in this setting.

4.3 User influence

The user influence dimension is focusing on how users participating in public e-service development projects influence any decisions made. Depending on what perspective that underpins and dominates the development process, the degree of user influence may vary. As highlighted by (Cavaye, 1995), influence of participation refers to the degree to which participation really affects a development project, i.e., what effect user participation really has in the systems development process. As been underlined in sections 1 and 2, public e-service development projects by tradition have been heavily influenced by an internal perspective from which public e-services primarily have been seen as a means of enhancing administrative efficiency and effectivity (Asgarkhani, 2005, Millard, 2010). User considerations in such development efforts usually have been targeting in-house users, such as civil servants (Falstad et al., 2004) whereas external user considerations often have been missing (Axelsson et al., 2010). However, more recently, as been highlighted extensively in sections 1 and 2, the importance of addressing also an external perspective has been emphasized in e-government research, seeing this as an important enabler for successful public e-service development (Karlsson et al., 2012). As highlighted by e.g. Kotamraju and van der Geest (2011) and Holgersson (2014), there is a mutual dependency between internal and external perspectives, e.g. if citizens refuse to use a public e-service and instead will keep using other traditional ways of interacting with public administrations, there will be little internal winnings.

4.4 Barriers hindering user participation

There are several barriers that may hinder how user participation can be put into practice in public e-service development projects. Barriers can comprise several interrelated aspects, such as restrictions concerning available resources, the complexity of the development process, competence, the e-services being developed, and the underlying organisational processes that are affected by the public e-service under development. Such barriers may be categorised in three sub groups: 1) organisational barriers, 2) user barriers, and 3) legal barriers. However, these barriers are closely intertwined and should not be viewed in isolation.

Organisational barriers concern aspects related to the organisation that may prevent or hinder user participation in public e-service development projects. It is important to consider to what extent public administrations are willing to adapt to the needs and requirements from e.g. citizens. As highlighted by Keen (1981), changing perspectives and how things are done, e.g. how to adapt to a more user centred public e-service development process is not a trivial task since most organisational structures and behaviour exhibit varying degrees of social inertia, i.e. “[…] a complicated way of saying that no matter how hard you try, nothing seems to happen” (Keen, 1981, p. 24). As highlighted by Hedberg and Jönsson (1978), such believes are often based on assumptions (so called rationalized myths; cf. Meyer and Rowan (1977)). I.e. they are made without thorough investigations of their value and are as such a typical example of social inertia and resistance to challenge existing – institutionalized – ways of working and organisational “truths”.

User barriers focus on different aspects that may hamper external users’ possibilities to act as participants in a public e-service development process. A frequent example of such a barrier is how to motivate users to participate. As pointed out by Albinsson and Forsgren (2005), internal users, such as civil servants, can be somewhat forced to participate in development initiatives as a part of their job descriptions, whereas e.g. citizens cannot. Instead, they need personal incentives and motives for why they would participate (Axelsson et al., 2010), which may come in many forms, e.g. a general social commitment or expected personal winnings (Holgersson and Karlsson, 2014). Another frequently discussed user barrier is users’ ability to participate in terms of individual properties making them suitable as participants. According to Karlsson et al. (2012), not all users may fit as participants depending on how user participation is applied. Some approaches to user participation require lead user capabilities (von Hippel, 1986) whereas other approaches are less demanding but still implicitly require user prerequisites such as basic IT skills as well as basic domain knowledge.

Legal barriers focuse on whether the development project is affected by legal constraints. According to Gil-García and Pardo (2005), legal aspects make up one of the main challenges to e-government initiatives. They describe and highlight that laws and regulations restraining what can or cannot be done must be taken into account when developing e-government. Similarly, Axelsson and Melin (2009) emphasise that public e-services must be developed in a way that is coherent with the formulation of existing laws. In fact, in e-government
research, legal aspects are most often discussed as something that hampers public e-service development. According to Bekkers (2005), the extensive legal frameworks existing in the public sector challenge and constrain the very nature of public e-service, i.e. electronic information exchange between public administrations and citizens. On the one hand this conclusion is understandable from a change of perspective, but on the other hand the role of rules and regulations is to preserve and make processes stable, transparent and fair over time, as a part of a classic bureaucratic model (Rose et al., 2015).

4.5 Degree of informed decisions

The level of informed decisions dimension is focused on whether decisions related to user participation made during the development process have been informed or not, i.e. to what extent decision makers have been aware and informed of their choices related to organise user participation in the development process of public e-services. As can be seen in e-government research, the degree of awareness of such choices varies greatly. For example, Scandurra et al. (2013b) conclude that decision makers may perceive that decisions made are well informed. However, this does not necessarily mean that arguments for such choices are grounded in and aligned with current research, best practices, and development guidelines provided. Instead, as discussed by Lynne-Markus (1983), arguments may be influenced by power and politics which often preserve conservative values, as well as a general resistance towards change. As concluded by Holgersson et al. (2015), there is a clear relationship between awareness and resources available in public administrations; larger ones (e.g. public authorities) generally have more resources available and can therefore afford to spend more time and resources on issues related to users, which in turn results in higher awareness regarding user related aspects. Smaller public administrations, on the other hand, often have fewer resources available for interacting with users, which in turn is reflected as less awareness concerning user related aspects in public e-service development.

4.6 Impact

The impact dimensions take on a retrospective view of the development process, i.e. what happens once the public e-service is launched? The project dimensions pay attention to what extent the initial project dimensions were met, e.g. if the initial incentives were met or if there were any deviations or unexpected reactions. As highlighted in the discussion above, e-government research often reports on failure in public e-service development projects in terms of external users rejecting public e-services launched. Instead, the users have kept on favouring other traditional service channels, such as phone or mail, simply because they do not see the point in using a public e-service (European eGovernment Action Plan, 2011-2015, Verdegem and Verleye, 2009). However, when analysing the impact of user participation in the IS research field, it is clear that the relationship between successful development and user participation is questioned in many cases (Lynne-Markus and Mao, 2004, Ives and Olson, 1984). For example, there are reports arguing that user participation can be regarded as counterproductive (Lynne-Markus and Mao, 2004, McKeen and Guimaraes, 1997, Wilson et al., 1996, Heinbokel et al., 1996). On the other hand, there are also examples reporting the opposite (Lin and Shao, 2000, He and King, 2008). As concluded by (Kujala, 2003), user participation is not a panacea but rather one of several important components that altogether enhance the likelihood for successful public e-service deployment. Hence, we argue for the importance to analyse the actual impact of user participation and the finalised public e-service, i.e. 1) to what extent users were allowed to influence the development process if compared to initial goals and expectations set out before and during the development project, and 2) to what extent the public e-service launched can be considered as successful, i.e. whether the initial project incentives can be considered to be met or not.

5. Case study illustrations and analysis

Below we describe and analyse three case studies of public e-service development projects focusing user participation practice. As discussed in chapter 3, each case study has been published previously in several research outlets. We have chosen to keep the same naming format as in the previous papers. This mean that for one case (Sustains) the name of the target organisation is written out, whereas for the remaining cases the target organisations are kept anonymous. For each of the cases, the basic foundations are first described. Thereafter, each case is analysed with respect to the dimensions identified in section 4. The textual descriptions are followed by a table summarising the focused dimensions of the projects used for an analytical purpose.
5.1 The Sustains case

The SUSTAINS project is a European Union (EU) financed collaboration that aims to develop and deploy public e-services that makes it possible for citizens to access their own personal medical data (Sustains, 2016). The County Council of Uppsala (LUL) in Sweden is coordinating the project and the case studied is the development process of a public e-service making it possible for residents in LUL to retrieve their personal medical data from LULs electronic health records (EHRs). The development process as such, as well as how user participation have been addressed in the development process, has been described extensively in previous research (e.g. Scandurra et al., 2015, Scandurra et al., 2013b). The main trigger for initiating the development process in LUL was a response to political EU directives towards patients’ rights to access their own medical data online, i.e. the founding for the SUSTAINS research collaboration. As such, the main incentive for developing a public e-service used to access EHRs was based on an external perspective offering patients the possibility to be active agents in managing their own health by allowing them access to their medical records online, instead of having to request a paper copy of these records after a doctor’s visit. However, there were also internal incentives based on the assumption that online access to EHRs would help all involved parties to be prepared and updated in advance of meetings; hence leading to a more effective and efficient health care process. The development approach chosen was SCRUM. A commercial software development firm with a certified SCRUM master was managing the development process as well as systems development. LUL was the initiator of the development process and owner of the public e-service developed. During the development process, LUL played the role of customer and project owner and was continuously involved at requirements elicitation sessions and sprint demos. The user participation approach applied in the project can be characterised as informal. User centred activities were limited to the use of three fictional personas representing different segments of citizens. These personas were created and used at a late stage of the development process and were used mainly for interaction design features. Moreover, a set of planned focus group test days with patient organisations were held. However, the outcome of these test days was poorly recorded and it is not clear whether or how these test days were analysed enough to improve the e-service. One major reason for not involving users to a larger extent in the development process was the combination of organisational barriers and user barriers: users were not invited to participate based on the LUL’s assumption that the users did not know what they wanted; it was assumed that most people can be considered to be healthy which in turn means that they have little knowledge and interest in their particular needs regarding online access to EHRs. Furthermore, legal barriers hindered participating users who were not expected to be familiar with complex rules and legislations surrounding distribution of medical data. The arguments for why not including future end users to a larger extent in the development process indicate a medium level of informed decisions. However, at the same time, the arguments and motives for doing so have been questioned by scholars analysing the development process, e.g. Scandurra et al. (2013a). The impact of user participation in the SUSTAINS case is low. The three fictional personas were used mainly for interface design at a late stage of the development process. In addition, it is not clear how the outcomes from the focus group test days were actually analysed and used in order to improve the service being developed. Moreover, the e-service was only tested by employees at LUL and the tests can be characterised as non-systematic. Each employee was free to use the e-service without any preconditions and there was no systematic way of collecting responses from the test users apart from the optional possibility to send an e-mail to the project owner. Once the e-service was launched publically, no changes had been made if compared to the test version. However, as illustrated in Scandurra et al. (2015), the impact of the project is considered as high in terms of usage frequencies and fulfilment of incentives. In total, approximately 100 000 citizens within Uppsala county council have used the e-service to access their EHRs at least one time. From an external perspective, it has been found that online access to medical records gives the opportunity for patients to learn and understand more regarding their medical conditions as well as preparing for meetings with health care professionals in advance, which in turn makes such meetings more efficient for both parties (Rexhepi et al., 2015, Scandurra et al., 2015).

5.2 The Anonymous exams case

The ANONYMOUS EXAMS case concerns the development process of an IT system for enabling students at a Swedish university to write exams anonymously. The development process has been described in several publications previously (Axelsson et al., 2010, Axelsson et al., 2013, Lindgren, 2013). The main trigger for initiating the development process was a call from the students’ unions to improve the security and equity during the examination process by enabling students to be assessed anonymously. The university decided to answer the students unions’ call by developing and implementing a cluster of interconnected IT systems that could ensure that the entire examination process was mediated by IT, making the process anonymous and
more equal for the students. The main incentives for the university to develop these systems, however, were not only to increase the security and equity of the written examinations. In addition to these incentives, the university used this development project as a way to create a shared process for administrating written exams within the university as a whole. At the time of the development project, different departments at the university had different work procedures concerning how written examination was carried out. By developing shared IT systems, and thereby forcing the organisation into a shared work process, the university management wanted to streamline the process and simplify the internal handling of examinations. The development approach was not based on any formalised logic or method. In fact, the project leader was inexperienced in leading projects and the project members reported that they “made up” the development process as they went along. The lack of formalised work procedures created a stressful situation for the team members. The project affected several distinct (but internally heterogeneous) user groups within the university structure; mainly students, teachers, study program administrators, and examination supervisors. The project team consisted of persons representing different competencies in the organisation, creating a project team that had a large network within the university, and this set-up facilitated a high degree of user influence in the project. For example, one group of users, the examination supervisors, was even represented in the project team. Other important users, such as teachers, were not involved to the extent necessary; a decision based on the assumption that the new system would not affect this user group as much as it later turned out to do. Despite a high degree of user awareness, there were some barriers for successful user participation. Mainly, there was a lack of time and resources to engage with all relevant user groups to the same degree, making the user influence rather unbalanced. Another barrier was the heterogeneity of the organisation; it was hard for the project team to get a complete picture of all the various ways of administrating the examination process existing in the organisation. This resulted in that the importance of some user groups was downplayed by the project group. This unbalance was also mirrored in the level of informed decisions regarding design; meaning that some design decisions were based on a high degree of understanding and awareness of the users’ needs and work situation. Other design decisions, however, were not grounded in the same manner. It is therefore fair to say that the impact of the user participation varied. The group that had had the highest degree of participation, the examination supervisors, had a great influence on the final system design and was also very pleased with the result of the project. In contrast, other user groups (teachers and study program administrators) had hardly any influence on the system design, resulting in some user resistance (from these particular groups) when the new system was first introduced. As a whole, the project was perceived as a successful project in the organisation since the student unions’ demands were met, internal work processes were streamlined, and what was considered as the main user group, i.e. the examination supervisors, experienced better effectivity and efficiency in their daily work life situation.

5.3 The Driving license case

The DRIVING LICENSE case study concerns the development process of an inter-organisational (IO) e-service for handling provisional driving license applications. The development project has been previously described in (Axelsson and Melin, 2012). Three Swedish agencies were involved in the project; Sweden’s County Administrations (SCoA), which organises the 21 county administrative boards of Sweden, the County Administrative Board of Stockholm and the Swedish Road Administration (SRoA). In Sweden, anyone who wants to get a driving license first has to apply for a provisional driving license from his or her 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 safe way. This decision is based on part of the applicant’s health and crime records.

The main trigger for initiating the project was a possibility for SCoA to get funding for developing new public e-services from the Swedish government, which can be described as an opportunity that was interpreted as being possible to seize. The main incentive for choosing the provisional driving license application was that it seemed to be an easy process and service to digitalise. The development project aimed at implementing an e-service that made an automated decision in “green cases” (i.e., application cases that did not call for any extensive handling process before approval) in order to support case officers handling such cases. Instead, the agency would be able to reallocate these resources from handling “green cases” to more complex errands. By doing this, internal and external efficiency were on the agenda. The IO development approach followed a traditional and formal waterfall model. The project management can be characterised as rather weak and external consultants were extensively involved in several project phases; from requirements to design and implementation (and later on also as project manager). The user influence can be divided between internal users (case officers) and external users (citizens in the role of applicants). Internal users were represented in the project group and their previous way of working with applications was to a great extent used as a blueprint.
for the e-service; i.e. IT’s innovative potential was not caught. External users in the role of applicants were not involved in the project so the user influence and activity in the project were low. However, representatives from driving schools were approached once during the project in order to get the design discussed (Melin and Axelsson, 2009), but not as a part of a formal plan. The project experienced several barriers that delayed the result. The need to reformulate regulation text was a legal barrier that halted the project. Another barrier was problems with the identification technique used in the e-service. This decreased the usefulness and need for people less than 18 years old, which was an important target group for the e-service. The process also turned out to be more demanding to digitalise than expected which made the project complex in several different dimensions (e.g. scope, manning, competence, delivery, etc.). All these barriers had a negative effect on external user participation, as the delays in the project deliverables increased the already from the beginning strong internal agency perspective. The level of informed decisions can be assessed to be low as there was no informed decision of which e-service to develop, but more of a random choice based on a window of opportunity (described above) and an expected simplicity and easiness to digitalise the chosen process. Letting the internal user perspective be dominating indicates low awareness of how external user participation and involvement could have contributed to the project. Thus, the impact of the user participation in this case cannot be said to be high since the only users involved were internal case officers, even though the project outcome was an external e-service. When implemented, the citizens did not regard the e-service impact on decreased lead time for the application of provisional driving licenses to be that important. However, during the project the Swedish driving license regulation was changed so that education certificates for private driving supervisors became mandatory. The e-service handled these certificates also which made it successful regarding use frequency by persons (i.e. often parents) who applied to be a driving supervisor.

5.4 Summary of the case analysis

Table 1 below provides a summary of how the cases correspond to the dimensions identified. As can be seen, only one of the cases (the ANONYMOUS EXAMS case) is triggered by an explicitly expressed need for a service in order to solve an existing problem, whereas the other two cases are triggered due to political motives and available funding (opportunities). The incentives described in the cases all share a basic strive for improving internal routines and work processes (productivity), but at the same time all cases also take on an external perspective in terms of other user groups besides the ones directly affected in their daily work life, e.g. citizens and professionals in different working roles. The development approach varies between the cases and it is clear that project members’ previous experience from management of IS development also affects to what extent a more formalised development approach is adopted.

The way user participation has been viewed and applied is rather similar in the different cases. There are incentives addressing external users; although any initiatives to include external users in the development process can be considered as unstructured without any clear goals regarding what to achieve. Also, barriers used as arguments for not paying more attention to external users share common characteristics. Legal constraints hindering user participation have been identified in two of the cases, and organisational, as well as user barriers, have been identified in all three cases. It is also clear that the awareness of decisions made with respect to organising user participation is quite limited, often affected by how barriers hindering user participation are perceived within the development team. Regarding the impact of user participation in the cases, it is evident that initiatives towards letting external users participate in the development process are very limited. In the end, the cases have been proven successful in terms of high usage frequencies, as well as documented winnings both internally and externally. At the same time, user participation did not play a central role in the different development processes in the initiatives.
Table 2: Summary of the case analysis

<table>
<thead>
<tr>
<th>Project</th>
<th>User participation</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case</strong></td>
<td><strong>Trigger</strong></td>
<td><strong>Incentives</strong></td>
</tr>
<tr>
<td>Sustains</td>
<td>Political, striving for democratic values</td>
<td>Mainly external, partially internal</td>
</tr>
<tr>
<td>Anonymous exams</td>
<td>Political, striving for equity expressed by student unions</td>
<td>Mainly internal, partially external</td>
</tr>
<tr>
<td>Driving license</td>
<td>An opportunity which could be seized</td>
<td>Internal and external.</td>
</tr>
</tbody>
</table>

6. Discussion and conclusion

The aim of this paper has been to illustrate and problematize aspects that influence why, how, and in whose interest user participation is conducted in public e-service development. In doing so, we have characterised and compared three public e-service development case studies. In order to perform the comparison, we have reviewed e-government and general IS literature to develop and present a set of dimensions representing different aspects of the public e-service development process. Based on these dimensions we have characterised how user participation has been treated during the development process in each public e-service development project.

By analysing empirical data from the case studies used to illustrate user participation in practice, two basic forms of how to address user participation are identified: 1) veneered participation and 2) ad-hoc participation. Veneered participation is a phenomenon introduced by Heeks (1999) and refers to cases when an organisation (e.g. a public administration) feels forced to include user participation even if they believe it to be non-viable. This means that policies and internal regulations stipulate that user participation should be applied without context specific considerations, which in turn means that user participation initiatives in the development process are nothing but a checkmark, without no real value added. As can be seen in and illustrated by the SUSTAINS case, user participation activities were performed, but the results from the activities did not have any significant impact on the development process. User participation in the remaining two case studies (the ANONYMOUS EXAMS and the DRIVING LICENSE case) can be described as ad-hoc participation. This means that different user participation activities have been performed, but without clear directions and goals.

It can be concluded that there is a general understanding and belief that user participation is a “good thing” that should be applied, but there is no plan and little knowledge and competence for how to do it. Guidelines from researchers (Holgersson, 2014) and government initiatives (The Swedish delegation for eGovernment, 2014) are two different responses aimed to aid public administrations to avoid such ad-hoc participation by providing concrete advice for how to work with user participation in public e-service development in a more formalised manner. However, such attempts to aid public administration target all levels of public administrations which in turn makes them too general, vague, and imprecise to provide any concrete advice for how and when user participation should be used. We challenge the overly positive attitude that is surrounding user participation in public e-service development. Instead, we want to provide e-government
researchers as well as practitioners with a more nuanced picture of the expected benefits of user participation. We argue that it is important for public administrations to question researchers as well as practitioners with a more nuanced picture of the expected benefits of user participation. Most likely user participation is not applicable in every single case; and there is a need to find the right users – not just any users. What is important is that decisions made regarding user participation in public e-service development should be based on conscious and informed choices regarding why user participation is needed and what it may bring. We also argue that it is important to question how user participation should be applied. A practical implication of this is that there is a need to treat user participation as a strategic question, moving beyond practical e-service development situations. As highlighted by Karlsson et al. (2012), user participation should not be considered as a static concept. Instead, user participation may come in many different forms and it is important to realise that compromises must be done with respect to available resources as well as available and suitable users that may act as participants. Finally, we argue that it is important to question in whose interest user participation is promoted. Is there an explicit willingness to take user considerations seriously in the development process, or is user participation something that is forced into the development process by policies and guidelines influenced by political agendas and levies imposed by higher instances? As long as public administrations can answer why, how, and in whose interest user participation should be applied in a public e-service development project, we argue that public administrations have a basic awareness of what user participation should be used for or not, as well as when in-house knowledge and expertise is enough in order to be able to develop public e-services that are used once implemented.

The findings presented in this paper should be seen as a complement to the theoretical findings presented by Heeks (1999) regarding why, how, and in whose interest user participation is conducted in IS development. By analysing empirical public e-service development case study data we illustrate that such questions is proven useful, not only for theory development in the IS field focusing on user participation as a part of digitalisation, but also for public e-service development practice. As such, our findings add to the e-government research field by highlighting the importance of critically questioning the need for user participation in public e-service development, and its following practice, as a general component that should always be included in every public e-service development project. We argue that most research on user participation in the e-government field (See e.g. Kotamraju and van der Geest, 2011, Millard, 2010, Axelsson et al., 2010, Holgersson and Karlsson, 2014) has an overly positive attitude towards user participation and we urge e-government researchers to provide complementary case study findings which confirm or contradict our findings presented here. As an example, we have found two basic forms of how user participation may be addressed in public e-service development. However, analysing more cases might reveal additional forms. Our findings show that user participation is not a silver bullet in public e-service development, thus, conforming the conclusions made by He and King (2008) who state that user participation indeed is one of several important components for successful IS development.

In addition, we also present a set of dimensions for the characterisation and analysis of public e-service development projects. We have also tested the utility, usefulness, and feasibility of the dimensions by analysing three different public e-service development case studies. As such, the dimensions contribute to the existing e-government research field and could be used as a basic analytic template when characterising and understanding empirical data from future e-government case studies. Such a template would provide researchers and practitioners with a standardised platform which allows for increased transparency when comparing findings from case studies on public e-service development projects.

Furthermore, our findings also have practical implications for public e-service developers and providers; particularly those who are facing pressure to incorporate user participation as a mandatory component in public e-service development when, at the same time, suffering from limited resources. We want to urge public administrations to carefully analyse and question whether user participation should, or should not, be applied in a specific public e-service development project. As such, the pressure on public administrations to include user participation as a mandatory component in public e-service development may be eased in those cases where fair arguments for not doing so can be presented in terms of why, how, and in whose interest user participation should be applied.

The findings presented in this paper calls for further research on user participation in e-service development initiatives. This is motivated by a practical need to elaborate more on the practice of user participation linked to different public e-service contexts (e.g. in different countries with different governance systems, political
agendas, cultures, laws, and traditions) as well as linked to different artefacts building up the technical components of public e-services and their interplay. Such aspects might for sure affect the underlying motives and arguments for developing public e-services in the first place as well as the role of the future users of such services. The fact that this paper focuses on a few case studies is of course a limitation and we encourage the e-government research community to advance our findings further, not at least also include case studies in other Scandinavian countries and beyond. Furthermore, we encourage researchers from other research contexts to elaborate further on the dimensions provided in order to, if possible, add further nuances to the perspectives presented. As highlighted by Karlsson et al. (2012); the main objective in public e-service development should always be to develop public e-services that are used once implemented. User participation may in many cases contribute to this goal, but it should not be used without questioning what it may bring into a particular development project.

References


Lindgren, I. (2013), "Public e-service stakeholders - A study on who matters for public e-service development and implementation", Faculty of arts and science, Linköping, Linköping University.


Sustains (2016), "Support users to access information and services".

The Swedish delegation for eGovernment (2014), "Vägledning för digital samverkan, version 3.0."


