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DIGITAL STRATEGIES FOR GOVERNMENT & BUSINESS

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Editorial: Digital Strategies for Government and Business



Trond Arne Undheim

Taking a strategic view of ICT has never been more important than now. Most governments would say they do, but do they really? What does it take to transform government by ICT? Or, should the ambitions be lowered? What can realistically be achieved and what cannot? Whether you are a policy maker, strategist, researcher, or consultant, in this special edition of the European Journal of ePractice, we called on you to share your experiences with high-level digital strategies.

Lessons can be learnt from the past and present - from the strategies of the private sector and the experiences of previous public sector strategies. How do private sector strategies compare, and what are the lessons of deploying ICT-based solutions at corporate level? What can be concluded from European-level strategies (such as the Digital Agenda, i2010 and eEurope 2005), or from national mirror plans and initiatives? What kind of infrastructures need to be in place to facilitate truly transformative digital strategies?

These lessons can inform the strategies of the future. Digital strategy is always evolving, but where is it heading now? Which strategic frameworks should inform the deployment of ICT-based solutions in government? Whereas in the past, European digital strategy has been quite tightly tied to bureaucratic governance, in the future this will probably not be sufficient, so how will it evolve? Currently eGovernment strategies are largely top-down, but the evolution of technology influences strategy from below. Given this, what factors, internal or external, will influence the concept of digital strategy?

The first paper looks at the planning of eGovernment initiatives. **Kristina Lundevall**, **Anette Hallin**, **Mikael Lagergren** and **Magnus Wretlung** argue that whereas there is considerable coverage of the implementation phase of eGovernment change management, the planning phase which precedes this has generally been overlooked. Analysing a case study of the work done at a local Swedish governmental authority in the city of Vasteras, they identify three key aspects of change management in the planning phase of an eGovernment initiative, namely stakeholder management in the initiative, the support provided to the initiative by the organisational set-up, and the strategic alignment of the initiative with the authority's long-term goals and strategies. Their work is nevertheless seen as merely an initial step in devising a comprehensive theory of the change management process, which can only be completed once full evaluation of the implementation has been evaluated.

Aleida Alcaide García, Emilio García García and Aitor Cubo Contreras survey the eGovernment strategic initiatives undertaken by the government of Spain over the last ten years, and into the future. Following the passing of a law that guarantees a citizen's right to interact with the Public Administration by electronic means in 2007, an overhaul of the eGovernment infrastructure followed. As the effects of the current economic crisis have begun to bite, the focus has shifted, with the aim to maintain the same level of service at much reduced cost. The new strategy moves towards a more citizen-centric service delivery, which requires going beyond ICT and embracing cultural and

organisational changes. It is also striving to strengthen the relationships not only between government and citizens, but also between regional and local governments. The ultimate goal is a more open and efficient government.

The third paper, by Koen Huijsman, Marijin Plomp and Ronald Batenburg, focuses on the importance of relationships between organisations. They develop a 'maturity model' to analyse the degree of interoperability and interorganisational collaboration in government networks that implement eGovernment functions. This model is derived from a literature review, and describes the levels of interorganisational collaboration in government networks on three dimensions: system, information and process. It is then validated by applying it to three existing networks in the Dutch public sector. The authors believe that the maturity model has practical application, in that it can measure the maturity level in a network and be used to develop a roadmap to develop future interorganisational collaboration in government eGovernment services.

In the fourth paper, **Nico Kaptein** focuses on eGovernment strategies in the sector of law enforcement and public security. Despite the benefits afforded by digital technologies - increased collaboration, improved crime fighting, information-led policing and a faster response to change - the digitisation of this sector has been relatively slow. The utilisation of technological resources resulting in such phenomena as cloud computing and social media has received a hesitant response from law enforcement and security actors. While much of this hesitancy is due to security concerns, it is also important to note that many aspects of these resources such as transparency and the emphasis on sharing is totally counter to the current culture and operational practice of the sector. The author nevertheless concludes that the reluctance of this sector to embrace the opportunities of eGovernment may ultimately be advantageous, since they will be able to take all the ongoing social changes more fully into account once the nature of these changes is more apparent.

The paper by **Mohd Heikal Husin**, **Gaye Deegan** and **Nina Evans** compares the deployment of Web 2.0 technologies in the private and public sectors - Enterprise 2.0 and Government 2.0 respectively. Using an analogy of 'social twins', they investigate the internal and external factors which impact on these environments. Although both environments employ the same technology (analogous to the twins' DNA), they differ in terms of their operational cultures (analogous to the twins' personalities). The result is that Enterprise 2.0 and Government 2.0 have evolved different approaches and research focuses, and these differences enable both to learn from the other. The public sector tends to lag behind the private sector in terms of technology implementation and adoption, and so can derive guidance and inspiration in this direction. Conversely, the authors find that the research focus of Government 2.0 on implementation issues such as policy development can be utilised by private enterprise to maximise the benefits delivered through new Web 2.0 technology implementations.

Athina Trakas, Lance McKee, Steven Ramage and the Open Geospatial Consortium focus on the strategic benefits provided by the implementation of open standards. To support their position, they discuss in detail the 3D Pilot NL, a project promoting the use and reuse of geospatial data available in the public sector in the Netherlands, and freeing up the financial benefits that this open data can bring. A premise here is that open data depends on open standards for ICT interfaces and encodings. The 3D Pilot NL involved over 65 private, public and scientific organisations, and so its success depended on the provision of a good model for institutional team building. They conclude that maximising the potential of the use of geospatial data - through such visions as Smart Cities, Smarter World and the Internet of Things - requires open access to the vast infrastructure of 3D data and services. Thus the promotion of open standards accelerates uptake of the standards that make such open access possible.

In the seventh paper, **Evgeny Styrin** and **Artem Kostyrko** discuss another case, namely the Citizens eCard project in Russia, and its interrelationship with the administrative reforms which the country is undertaking. The Russian Government is aiming to establish public confidence in eGovernment processes by delivering high quality services in a secured and comfortable environment. The implementation of the project required a range of infrastructure changes. New laws regulating electronic security and interaction between Government and citizens were passed to facilitate public-private partnerships with banks and other organisations. In addition, interactions between federal and regional agencies had to be developed and the quality of electronic data registers (cadastre, enterprises, property rights, addresses which underpinned the national eGovernment system had to be improved. The implementation the eCard service is intended to establish the infrastructure on which the eServices system for citizens can be developed.

Haroula Delopoulos stresses the distinction between the provision of eGovernment services and the uptake of these services in the EU, and examines the reasons why these diverge. Noting that only 32 % of EU citizens use eGovernment in a three-month period, she asserts that the barriers to usage should be actively tackled if strategic goals such as the Digital Agenda are to be realised. These barriers include low computer and internet skills, a low level of Internet access and prohibitive costs. Going forward, the author argues that it is important for the EU to create a 'Framework of Adoption of eGovernment services' which will enable citizens to use the services on an everyday basis. This could be realised, she concludes, if the design of the eGovernment services the barriers to adoption are taken into account.

In the final paper, Ali Al-Khouri examines the role of the Government-owned identity management system in the establishment of the forthcoming eGovernment initiatives in the United Arab Emirates. Since conventional physical trust mechanisms are insufficient for eGovernment services, there is a clear need to develop an electronic identity system. The UAE Government decided to make the identity management system Government-owned, and thereby took on the responsibility itself to provide digital identities for its citizens. By owning the identity management system itself, the Government hopes to ensure high security and improved levels of trust and confidence, and thereby obtain high levels of participation. Other developmental advantages are foreseen. It is hoped that the federated nature of the identity management system will enable the implementation of other applications and systems, and therefore avoid the need to replicate databases of users' credentials. The system will also lay the foundation for a common framework to share information, which different government agencies could access directly, so removing the need to pass information from one agency to another.

From back office to front office concerns, across government domains, from internal to external efficiency, digital strategies have now become a prominent management concern. Where it is ignored, problems will arise for governments, employees and citizens trying to access digital public services. Moreover, the benefits of digital transformation involve changing organisations and relationships, and not just technologies. Technology is embedded in people, institutions and networks. To enable successful digital change, competent advice needs to complement stakeholder involvement. There need to be clear goals and awareness of the potential for unintended consequences. Ambitions need to be scaled to the task and resources at hand and cannot stay purely at the visionary level. Digital strategy is now, more than anything, about people. On the other hand, management is not just a soft subject any more. There is ample evidence about what works and what does not. These are exciting times for software programmers, businesses, public employees and citizens alike, but also challenging. Change does not come without dedicated actions and follow through. Digital or not, strategy is a tricky art.

eStrategy Creation in a Local Swedish Government

eGovernment continues to be an interesting area of study, especially since it is not simply about the implementation of Information and Communication Technologies (ICTs), but rather, as this paper will show, about a larger change management process. When trying to understand the factors behind successful examples of eGovernment in the context of change management, most research to date focuses on the implementation phase in a literal sense and not on the planning phase preceding the implementation phase, or the evaluation phase following it. This paper aims at remedying this by focusing on the planning phase: the development of an eGovernment strategy and vision, which is the starting point for a future implementation process.

Through an in-depth case study of the work done at a local Swedish governmental authority in the city of Vasteras, this paper aims to answer the following question: Which are the key change management aspects of an eGovernment planning process?

By focusing on the planning phase of eGovernment in local Swedish government, this paper develops the knowledge and understanding of this kind of endeavour. Even if ICTs can be seen as a means to modernise government, technology alone cannot break down organisational and cultural barriers - something that is necessary in order for the full benefits of eGovernment to be realised. The paper is hence primarily empirical in contribution. However, it also provides useful insights on the planning process for eGovernment and necessary aspects when creating an eGovernment strategy.



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Keywords

eGovernment strategy, eGovernment planning, change management, stakeholder management, organisational set-up, eGovernment and business strategy alignment

Geovernment is about a large change management process.

1. Introduction

For more than a decade now, it has been proposed that ICTs have the possibility of transforming public services in various ways. It has for example been argued that they support public sector reforms by assisting and enabling the automation of existing human-executed processes, as well as that they help create new IT-executed processes (Heeks, 1999). Furthermore, since ICTs can be designed around citizens' needs rather than just structures or the convenience of civil servants, they can transform the way public services are delivered (Tapscott, 1996). ICTs may also be used for purposes of marketing and place development (Gascó-Hernández, 2009) for creating mGovernment (Kushchu, 2007) and as a means for contributing to the goal of sustainable development in various ways (Hallin & Karrbom-Gustavsson, 2009; Hallin & Karrbom-Gustavsson, 2009).

eGovernment, a field that "deals with the major initiatives of management and delivery of information and public services taken by all levels of governments" (Hu, Lu, Pan & Wang, 2009) has also been seen by some as "the use of ICT in (...) the inside, outside, and between of government agencies" (Persson & Goldkuhl, 2010). Furthermore, the implementation of eGovernment can be understood as a change management process. As will be elaborated later in this paper, several factors have been shown to be important in eGovernment implementation from a change management perspective. However, what is striking in this research is its focus on the implementation phase, meaning that the planning phase, as well as the evaluation phase, are still understudied. This study aims at filling the knowledge gap regarding the planning phase.

In Sweden, the so called 24/7-agency - Sweden's first government institution focusing on the development of eGovernment - issued, as far back as 2000, a set of criteria on how public authorities in the country were to enhance their accessibility and service-provision to all citizens round the clock (Östberg, 2000). The following year, the first eGovernment strategy was established in a local Swedish governmental authority. Sweden has also been prominent in delivering eGovernment from a user-perspective (Hallin & Lundevall, 2007). Since the turn of the millennium, much has taken place technologically, as well as in terms of the ways and the extent in which users have access to and use ICTs. EU has issued its Digital Agenda for Europe, and National Agendas are currently being produced. Thus, today several municipalities are updating or formulating new eGovernment strategies.

This paper departs from an in-depth case study of one local Swedish governmental authority (City of Vasteras), which presents great interest since it is at the forefront of eGovernment in Sweden. Firstly, a brief introduction in the area of eGovernment is presented, which concludes that eGovernment by and large should be seen as a change management process. It continues with a description of the method used in the study and in the Vasteras case. Lastly, an analysis of the case highlights three important aspects of change management in the planning process of eGovernment that emerged through the empirical case-study.

2. eGovernment and Change Management

There are several recent definitions of eGovernment. The World Bank's definition is as follows: "eGovernment refers to the use by government agencies of information technologies [...] that have the ability to transform relations with citizens, businesses, and other arms of government." (Becker, Crandall & Fisher, 2010). A more relevant and wider definition of eGovernment is suggested by Persson & Goldkuhl (2010): "the use of ICT in [...] the inside, outside, and between of government

agencies" because of the need to be able to understand and discuss eGovernment as a management regime and therefore the need to discuss the client side as well as the internal organisational changes (Persson & Goldkuhl, 2010).

Another study argues that eGovernment is: "The field [that] deals with the major initiatives of management and delivery of information and public services taken by all levels of governments (including agencies, sectors) on behalf of citizens, business, involving using multi-way use of the internet, web site, system integration, and interoperability to enhance the services (information, communication, policy making), quality and security, and as new key (main, important) strategy or approach." (Hu, Lu, Pan, & Wang, 2009). This definition will be the basis for the development of this paper.

It has been suggested (Aichholzer, 2004) that eGovernment can be looked upon as a comprehensive change programme, henceforth similar to Hu, Lu, Pan and Wang's (2009) definition of eGovernment where the eGovernment field deals with major initiatives. This is supported by Persson & Goldkuhl (2010) who state that "eGovernment in practice has somewhat changed from ICT in public administration to ICT mediated change in public administration." Using Guha et al.'s theoretical framework of eGovernment change management, Burn & Robins (2003) have also identified a need to integrate the change management aspect in eGovernment. Another indicator pointing to the importance of change management in eGovernment is that the Chief Information Officer (CIO) function (or role) in municipalities has gradually been transformed into a more strategic function in nature, as opposed to the traditional operational role (Almazan & Gil-Garcia, 2011). It can thus be concluded that in order for an eGovernment process to be successfully implemented, the process must be seen as a change management process.

There is a significant amount of studies on eGovernment as a change management process. However, many of these focus on the implementation of ICTs in eGovernment projects. Studies from Australia (Brown, Hossan & McNeil, 2011), Denmark (Agger Nielsen, 2006), Malaysia (Mohamed, Hussin & Hussein, 2006), Saudi Arabia (AL-Shehry, Rogerson, Fairweather & Prior, 2006), Slovenia (Štemberger & Jaklič, 2007) and the U.K. (Carr & Gannon-Leary, 2007) all put major focus on ICT implementation or technology. Some studies acknowledge the need for change management and that technology should not be in focus. One example is Carr & Gannon-Leary (2007) that identify technology-driven visions as misleading. Not much has been done in this respect however.

The fact that very few studies had been carried out on eGovernment as a change management process with focus on the preparatory work and planning phase constitutes, in our view, a gap in the knowledge about eGovernment implementation. It could be argued that the planning phase in all projects - also change management initiatives - is considered crucial for success, regardless of how abstract and vague the project goal might be (Engwall, 2002).

The researchers that have discussed change management from a wider eGovernment perspective than simply from an ICT-implementation perspective (Brown, 1993; Weerakkody, El-haddadeh, Sabol, Ghoneim & Dzupka, 2011; Chen, Chen, Huang & Ching, 2006;Vuksic, Pozgaj & Milanovic, 2010) have not focused on the planning of eGovernment. However, other studies have stressed the importance of the existence of an eGovernment plan, strategy, vision or policy (Moon, 2002; Alshawi, Altameem & Zairi, 2006; Lim, Pan & Tan, 2007; Ibragimova, Koh & Prybutok, 2006), but none of these take on a path for a more in-depth study regarding the creation process and the change management aspects of the eGovernment strategy.

In summary, studies on eGovernment and change management tend to primarily focus on the implementation of eGovernment and the related ICTs. However, a limited amount of studies have

actually studied the planning phase of the eGovernment change management processes, although a number of studies have stressed the importance of performing such planning.

3. Methodology

In order to understand the successful positioning of eGovernment strategies today, an in-depth case study has been carried out using the case of Vasteras, Sweden's sixth largest municipality.

The City of Vasteras has long been prominent as one of the Swedish municipalities that have invested a lot in information technology (IT) - historically perhaps more for economic and organisational reasons. Today, Vasteras is a stimulating eGovernment organisation since the information systems (IS) and IT issues are constantly on the top management's agenda. Vasteras is also one of the few municipalities in Sweden where the CIO is part of the city's management team.

Another distinctive feature of Vasteras is the great interest in IS/IT issues from those politically responsible for the city. The engagement comes from both major political parties. From a strategic point of view, this is seen as important in order to prevent a shift in political majority from changing the potential and strategy of eGovernment work. This interest and participation in the area of ICT originates both from a strictly organisational perspective, but also from the idea that eGovernment initiatives can strengthen the image of the city.

Hence, the study of Vasteras should be seen as an intrinsic study of a case that may help us understand a larger population of similar cities (Gerring, 2004; Berg, 2007). In addition, an in-depth case study like the one presented below can also help us develop new theories, since it is by studying a case in detail that the complexity of reality is seen (Eisenhardt, 1999).

The empirical material has been collected over time by three of the authors of the paper who in different capacities have been and still are involved in the development and implementation of the eGovernment strategy in Vasteras. One is a CIO in the city, with the main responsibility for the development and implementation of eGovernment while two are consultants, hired to help in the aforementioned process. This means that we have unlimited access to empirical material. The fourth author has taken on the role of asking the critical questions and surveying the empirical data. For this reason, the present paper can be characterised as having an action-research approach, where the continuous and joint reflection regarding the progressive problem solving, led by three of the authors in the work of developing and implementing an eGovernment strategy, forms the basis for the theories presented (Reason & Bradbury, 2001).

Action-research is a well-known and respected method of conducting research, where research is carried out alongside taking an active part of a change-process. This means that the knowledge developed is created together with the participants in the process (Svensson, 2007). A common critique against action-research is the loss of objectivity on behalf of the researcher, and it is certainly true that the kind of objectivity as the one envisaged in positivistic research cannot be achieved through action-research methodology. This is however not the aim in this case, since action-research builds on a different ontological and epistemological foundation. The objective in action-research is rather to build solid and trustworthy knowledge through a reflexive approach, where constructive criticism forms the basis for knowledge development. This is why four authors are involved in the present study, aiming at representing different perspectives and views on the empirical material we have worked on in a constructive manner in order to both collect and analyse the empirical material (Svensson, 2007).

The case of Vasteras is a good example of eGovernment as it drives a major initiative, including

both management and delivery of information and public services. Regarding the perspective of citizens and business from the definition of eGovernment stated earlier, the eGovernment strategy case in Vasteras does in fact deal with both throughout its content. As the eGovernment strategy in Vasteras involves multiple ways of internet use, interoperability and the enhancement of services, quality as well as security, it does fully comply with the definition of eGovernment used in this paper. The document is also a new key strategy, as revealed by the name of the eGovernment strategy in Vasteras - eStrategy.

The empirical material consists of formal documents, notes taken by the three participants in the change management process through meetings, workshops and interviews with people in the daily operations. Furthermore, 7 semi-structured interviews have been carried out with different persons involved in the process.

EMPIRICAL MATERIAL	EXAMPLE
Formal documents	Business visions, strategies and guidelines
Notes from meetings	Workshops, interviews and project meetings
Interviews	Chief of Staff
	City Archivist
	Enterprise Architect
	HR Director
	ICT Strategist Proaros
	IT Director
	Strategic Economic Planning

Table 1	:	Empirical	material
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A chronological account of the process was developed, building on the empirical material and taking into account the various 'voices' among the informants. Then, an analysis was made through the lens of change management. This helped us identify three aspects of change management in the planning process of eGovernment.

A brief introduction to the City of Vasteras will be given below followed by the results, analysis and our conclusions.

4. Organisation of Vasteras

The municipality of Vasteras employs about 10 000 people and has a turnover of approximately €750 million. The City of Vasteras is organised as presented in Figure 1. The City Council is the city's highest decision-making body and makes decisions that concern municipal finances, overall planning and organisational structure, such as electing members for the Executive Committee. The Executive Committee is responsible for the overall management and coordination of the municipality and is also responsible for city finances. It is assisted by a number of politically appointed committees and boards responsible for various areas.

Something that makes Vasteras stand out, compared to other Swedish municipalities, is that Vasteras

uses the client-contractor model. This means that each committee has an administrative unit, with employees who prepare items of business and supervise the implementation of political decisions and that business is carried out within the committee's area of responsibility (City of Vasteras, 2012).



Figure 1: Organisation of the City of Vasteras

4.1 The IT- Organisation

The IT- organisation of Vasteras is structured in accordance with the city's client-contractor model. A small strategic unit of the City Executive Office consists of the eStrategist (CIO), one IT-Architect and one IT-controller. The CIO is the process owner of IT and eGovernment (i.e. client) and part of the Executive Office Management team along with such roles as CEO, CFO, CIO and Welfare Director.

The city's IT-department (i.e. contractor) resides within the city's shared service centre (Consulting and Service). The department is headed by an IT-manager. The services that they provide are marketed in a consultant-like manner and ordered by the CIO. The annual IT cost is approximately €20 million, approximately 2.7 % of the total city budget.

4.2 The need for a new eGovernment strategy

In 2011, the CIO identified a need to bring forward a new set of governing documents in the eGovernment area. The old documents were out of date and the content was not adapted to the business strategy; instead, it rather focused on technology platforms and integration technologies. One additional problem was that there was a mismatch in the life span between the city's business strategy and the previous IT-strategy.

Large trials in eGovernment have occurred over the years in the context of the former IT-strategy. For instance, the City initiated an 'eService factory' on which the municipality invested \in 6.5 million. The investment was led by the IT-department and focused on different models for enterprise architecture, process modelling and technical theories. From an ICT-perspective, the work was well done, but due to a lack of understanding of the core business, the project was terminated after two of the planned three years. The outcome was quite poor compared to the project scope and budget.

Against this background, the CIO concluded that the municipality needed an entirely new approach to create a common ground and a common goal. It was decided that the core business must be involved in the formulating process of the new eGovernment strategy, not only in the implementation projects.

4.3 The production of the new eGovernment documents

In order to bring forward the new eGovernment documents, the CIO together with qualified consultancy support, started to review how the strategy would relate to the other governing documents of the city, regional and national policy. Early on it was decided to align the city governing document with the new eGovernment strategy.

To define the business demands, more than 40 key actors were invited to contribute, as well as development managers and business managers. These demands were grouped according to four business clusters:

- City planning and property;
- Health and social care;
- culture, sport and recreation;
- education;

Target groups, challenges, etc., were identified in a number of workshops. At the same time, the organisation started the process of accepting the coming changes. As a first step, the business cluster representatives were invited and the results were presented to a group of IT-people and more IT-specific challenges were identified as part of a second step. A Green IT audit was moreover conducted in parallel, and the results were used in the strategy formulating process. When the results of the first part were final, the process started all over again with new workshops in order to ensure that the summary and preliminary findings were in line with the group's opinion.

The strategy was then sent out as a referral to all participants in the process and was rewritten according to the comments received. The final version will then be decided upon by the Executive Committee during spring 2012.

According to stakeholders in the organisation, this work process was considered essential. The Chief of Staff once said "it is so important that the business representatives were included in the strategy formulating process - that they had the possibility to define in which areas they need to be supported by ICTs". As for the Enterprise Architect, he stated "now there's traceability - we can actually see were the goals come from, and also, there is an engagement among stakeholders from which we will benefit in the future".

According to the CIO, a great challenge during the planning phase has been to get everyone to understand what eGovernment is. First of all, this was a problem when attracting the right people to the workshop. Sometimes business people would delegate their attendance to IT-people just because of a lack of understanding that eGovernment in fact concerns the core business. Secondly, on several occasions, the issues brought up were perceived as not belonging to the scope of the strategy, as they were core business issues.

During the work, the CIO also noticed, somewhat to his surprise, that another work undertaken in parallel to the development of the eStrategy attracted a lot of attention and interest from various

people in the municipality. This was "Green IT". In order to make Green IT a natural and integral part of the daily work in the City, the CIO decided to incorporate environmental issues in the eGovernment strategy instead of producing a separate strategy document in this area.

Another important issue is that the new strategy is aligned in time and content with the City's Strategic Plan 2012-2015. The eStrategy is now a 'digital dimension' of the Strategic Plan, meaning that these two policies do not 'compete'.

5. Analysis

As previously shown, the research on change management is a well-known topic in the field of eGovernment, but the focus is mostly on the implementation of ICTs. Furthermore, the research that does stress the importance of strategic documents does not consider the planning process.

This analysis will primarily be empirical in contribution. The case study of Vasteras will contribute to this analysis, since three aspects of change management in the planning process of eGovernment can be identified:

- Stakeholder management through the inclusion of people from the daily operations, and a unifying concept.
- How the organisational set-up supports strategic-decision making as something different and separate from daily operations.
- The importance of strategic alignment between the eGovernment strategy and the overall organisational vision and business strategy.

Stakeholder Management

When it comes to change management, the involvement of stakeholders is essential. As we have seen, the City of Vasteras already applies this principle in the planning process. The work process of the production of the new eGovernment documents was all about finding out about business challenges. However, the workshops actually became a road trip for the participants to engage in and understand the concept of eGovernment. A lot of people were actually surprised that the focus was on business and not technology, and in the end, people with too much knowledge of technology in contrast to business had very little to share. If everybody had the same working knowledge about what eGovernment really is, perhaps some persons that chose not to participate would have reacted differently.

The case also shows how a concept that unified the common stakeholders was found in the area of Sustainability and Green IT. The reason for this is found in the Vision and Strategic Plan and in all of the ongoing initiatives in the City. High level stakeholders as well as management and operations have become involved in this work. It has been suggested that the motivation of introducing Green IT differs from the introduction and adoption of technology in general (Molla, 2009). This might be the reason why business stakeholders find it easier to accept eGovernment in this setting. Or as the ICT-Strategist Proaros said "If you do not include Green IT, it is not a modern eStrategy".

5.1 Organisational set-up

Another aspect that seems crucial in the development of the Vasteras eStrategy is the organisational set-up. As previously mentioned, Vasteras has a client-contractor model which in the planning process means that for eGovernment planning, the contractor (CIO) turns to the client to listen in on needs and plans for the future, in this case involving the client in workshops to help build the eGovernment strategy for the upcoming years. This set-up should provide good grounds for future work, since it enables sharing and listening both horizontally and vertically throughout the organisation (Hackney, 2003). Without the client-contractor model, the risk is that the IT process owner would take a more introverted perspective and turn to the IT department for planning the future. In this case, having a client-contractor model has helped clarify the client and stress the importance of IT listening in on client needs and plans for the future.

Having the roles of CIO, IT Architect and IT Controller as part of the City Executive Office does not only reveal that a number of central IT staff are part of upper management. The fact that these roles are located in the City Executive Office may also provide access to important discussions on strategic topics, thus providing IT with insight needed for making it a source of strategic support to the business. This might also show the organisation that IT is not 'merely a contractor' but that the CIO can also work as a strategic advisor. For the IT department, having a number of IT-related roles in the City Executive Office might also demonstrate that the City acknowledges the importance of IT as a vital part of the business.

Therefore, the organisational set-up supports strategic decision-making as something different within the daily operations. This is not only important in the planning process but essential for the coming implementation: "Organisational, institutional, political, and other factors greatly affect the CIO's capacity to implement eGovernment initiatives" (Almazan & Gil-Garcia, 2011).

5.2 Strategic alignment

Strategic alignment has proved to be of importance in the planning process for Vasteras. One simple example is that the involved clients are helping to plan the future of IT in Vasteras through the eGovernment strategy because they can relate to and understand the goals since they stem from the city vision and strategic plan. But ensuring that there is a strategic alignment between the IT-related documents (the ePolicy and the eGovernment Strategy) also directly creates a link between what is important for the business and IT goals. This means that it becomes more visible how IT helps the business approach the goals set in the vision and the strategic plan (Persson & Goldkuhl, 2010).

In addition, having a strategic alignment between the governing business documents and the eGovernment documents also helps clarify priorities for IT. Although IT might assume that a certain project is a priority for the business, the alignment between the business documents and the eGovernment documents makes obvious which goals and in turn which projects are priorities for the business-guiding, hence, the priorities for IT.

6. Conclusions

The purpose of this paper is to study the key change management aspects of the eGovernment planning process. The paper identified a gap in the previous research; a number of studies have covered eGovernment and change management, but no studies have been found on the change management aspects of the eGovernment planning process.

A study of Vasteras, an interesting eGovernment case due to its position at the forefront of the Swedish eGovernment implementation, shows that there are a number of key change management aspects in the planning process for eGovernment. The three aspects found were: stakeholder management, organisational set-up and strategic alignment.

We believe that much can be learnt from the Vasteras case in that it can function as a source of inspiration for other municipalities. In the future, it will also be possible to evaluate the implementation of the eGovernment plan which can further deepen the knowledge on eGovernment implementation on a wider perspective.

The paper is hence primarily empirical in contribution. There is a lack of studies concerning the planning phase of eGovernment as a change management process, and it is not until the full implementation has been evaluated that a comprehensive theory can be formulated. However, this paper has provided useful insight on the planning process for eGovernment and how the creation of an eGovernment strategy can work.

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The Spanish Plan for better governance and improvement of public services

This article presents the various strategic initiatives in eGovernment undertaken by the Government of Spain during the last decade. The greatest achievement until now is the entry into force of a Law in eGovernment (Law 11/2007) which recognises the citizen's right to interact with the Public Administration by electronic means. Large investments were made to make this right effective, so a complete eGovernment infrastructure is already available in Spain.

Figures and facts show the success of all these initiatives. Spain is in the 8th position in eGovernment development out of 32 European countries and in the 2nd place of the 2012 United Nations Public Service Award for the Total Citizen Access to Public Services initiative. These results have been obtained despite the complex scenario of the Spanish Government which involves the interaction of the central government, 17 regional governments and 2 Autonomous Cities, plus over 8,000 Municipalities.

The current economic and financial situation is very different from the last decade, where large public budgets were managed. The crisis Spain is suffering obliges its Government to reduce costs in the entire public sector, including eGovernment development. However, public services should have the same quality as before, but more efficiently.

This article shows the new eGovernment of the Spanish Government, which is focused on developing mechanisms that will provide better and more efficient services to the citizens and businesses. in a more efficient way. ICT and public information reuse, transparency and a stronger collaboration within the Government are the pillars of this new plan.



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⁶⁶ The transformation of the Spanish Government to an efficient citizen-centric organisation with the use of ICT.

1. Introduction

The Spanish Government faces challenges in achieving its policy goals within the framework of public sector cost-cutting. Furthermore, in the context of the economic crisis, citizens demand more and better public services. To achieve these commitments, several changes are necessary; obliging the Government to build a new way of operating, in order to be able to adapt rapidly and efficiently to the changing needs of citizens and the emerging political and market priorities.

Information and Communication Technologies (ICT) have proved to be an essential tool in doing more with fewer resources, and constitute an up-to-date mechanism to get the Government closer to citizens and businesses. In Spain, ICT have had high impact on main public policy objectives. Large investments to build an eGovernment system have been made, resulting in 90 % of the services to be provided by the central Government; additionally, 78 % of regional Governments' services are available online (Orange Foundation, 2011). New low-cost electronic services can be easily created, thanks to common ICT infrastructures deployed.

It is the time to focus on citizens, introducing ICT to redesign the administrative procedures, reducing high-cost burdens and reinforcing the creation of citizen-centric services. Furthermore, the time has come for rationalisation and intensive cooperation within the Government to avoid duplicated expenditures and resources due to the multiple levels of the Spanish Government, i.e. national, regional and local.

In order to reach these objectives, an operational and organisational Government transformation is needed making a good strategy more necessary than ever. ICTs become a key for success in its development.

2. The Spanish Government in the ICT Strategic Context

After many years of ICT implementation, the application of the Governmental policies depends entirely on ICT. The information-based technology system created provides the tools to generate a new governance method that suits the underlying organisational, economic, and social realities. Instead of trying to achieve its goals through command and control regulations, the Spanish Government considers that information technologies are necessary to build self-governing systems, facilitate functioning markets, empower people with information, and promote democracy by new means of participation. It cannot and should not discard all government bureaucracy. It can, however, provide new tools for transforming a significant share of what government does and how it does it (Atkinson, 2003).

Technology-enabled and networked governance will allow all levels of the Spanish Government accomplish their traditional goals, in a more efficient way. Beyond cutting costs, there is a high need to transform Government, fundamentally enabling new and more effective ways of addressing public policy concerns.

The modernisation of the Spanish Government has always been linked to ICT penetration in the administrative operation levels and in the relationship with citizens and businesses. All the developments made during the last decade would not have been possible without a contemporary strategic vision. During the last years, a good track record of eGovernment strategic plans has been launched with a great success. All of them aim at providing the best possible services and increasing the efficiency of the public administration using new technologies.

Spain's past eGovernment related strategies as presented by ePractice.eu include the following:

- The Info XXI Action Plan for the development of the Information Society during the period 2001-2003. The plan focused on laying the foundation of eGovernment, apart from the promotion of the Telecommunication and Information Technology sectors and the provision of access to Information Society for everyone.
- The Shock Plan for the development of eGovernment, which was part of the wider 'España.es' plan for the development of Information Society (2004-2005).
- The 'Conecta' Plan (2004-2007), whose aim was to help modernise the Public Administration on the basis of eGovernment, process redesign, inter-administrative coordination and cooperation, multichannel service delivery to citizens and training of civil servants. Meta-projects were launched in key areas such as: electronic interactions between Public Administrations and the citizens (eCertificates); eID card; and a citizen portal to provide access to interactive and transactional services.
- The 'Moderniza' Plan (2006-2008), which was a plan of measures aimed at improving, modernising and simplifying the Administration services with a view to better accommodating the needs of citizens. Its objective was to render the Administration more flexible and effective, while enhancing the quality of public services a definite step towards the implementation of eServices and means of eGovernment.
- Plan for the reduction of the Administrative Burden and Improvement of Regulation (2008-2012), which aims to enhance the competitiveness of Spanish businesses. Among other objectives, the plan fixes a burden reduction target of 30 %, focusing on business procedures and in particular those addressed to small and medium enterprises (SMEs), by 2012. The Government has approved measures that cover the procedures for businesses and measures to be implemented by various Spanish Ministries. eGovernment applications are at the forefront of this drive to cut businesses' and in particular SMEs red tape. It is to be noted that many of these measures are also intended to speed up citizens' transactions with the Public Administration.
- The 'Avanza' Plan, is a two-phase plan for the development of Information Society, which forms part of the broader 'Ingenio 2010' programme, aimed at giving new impetus to R&D investment in Spain within the framework of the National Reforms Programme designed by the Government. The Plan opts for a user-centric eGovernment, which furthermore overcomes the most serious challenges facing public eServices, namely, their uneven development and quality and their lack of integration, when these services are offered by distinct administrations or departments. These are some of the features that are common to the first phase of the plan (initially established for the period 2006-2010) and to its second phase, 'Avanza2', launched in January 2009, initially set to run until 2012. As the 'Avanza' Plan remains an initiative in constant evolution, a second strategy (2011-2015) was approved on 16 July 2010.
- The OECD has remarked the Avanza Plan as a case where "a strong policy and governance framework have been the key for the success of Information Society policies" (OECD, 2010: 45).

All of these plans are highly inspired by the European plans and strategies. Figure 1 shows the roadmap of the relationship between European and Spanish eGovernment plans up to date. As a Member State of the European Union, the ICT strategy of Spain is heavily influenced by the guidelines marked by the European Commission.



Figure 1: Alignment of European and Spanish ICT strategic plans roadmap

The great distinctive achievement of Spain in eGovernment matters is the Law on electronic access to public services for members of the public, published on 24 June 2007 (Spanish Government, 2007, Law in eGovernment). It officially recognises the citizens' right to communicate electronically with Public Administrations, i.e. to conduct their administrative business by electronic means on a 24-hour basis, any day of the year.

The aim of the law is to enhance efficiency by eliminating the need to present paper documents to authorities, to promote closeness to the citizen and administrative transparency and to contribute to the development of eGovernment. It also establishes the basic principles for the use of IT in relationships between citizens and the Government, but also among (central, regional and local) Governments.

An action plan to enable the implementation of the provisions of the Law 11/2007 was approved in December 2007 by all Central Government bodies. It defined the set of specific actions that are necessary in order to ensure the effective and efficient application of the Law that would enable the development of new services and enhance interoperability among the existing ones.

The implementation of these plans has provided a greater integration, cooperation, and transparency of the Spanish Government. In detail, these plans have placed Spain in the 8th position for full online availability of public services, out of 34 European countries, with 95 % of full online available public services (out of 20 measured services), 98 % of online sophistication of public services, 91 % of usability and 90 % of user satisfaction monitoring (Capgemini et al., 2010). Furthermore, in the international context, Spain has been rewarded with the 2nd position of the United Nations Public Service Award for its innovation in improving public administration (United Nations, 2012). These results have been possible due to the strategic consideration the Spanish Government provides to ICT.

However, rapid changes in the technology landscape continue, including the increasing use of technology developed for personal use, social media, mobile services, broadband and cloud

computing by business. These changes can profoundly influence government and industry choices for ICT investment as well as the way services can be delivered. The Spanish Government needs to balance the potential gains from innovation in ICT with the need to provide stable and reliable operations and services as well as a budget restriction scenario. Therefore, a national strategic plan that addresses all these issues and meets the commitments of Spain to EU strategies is more necessary than ever.

3. Present Socio-Economic Context

Spain is struggling to grow out of a deep crisis that has destroyed a great part of its productive industry and jobs, pointing out some of the weaknesses and shortages of the country.

The main problems the country faces nowadays are high unemployment rates, a banking crisis, high level of school dropouts, low investment in innovation, ageing population, accelerated climate change, brain drain, and high risk of poverty and exclusion of the society.

Figure 2 shows a remarkable drop of the GDP in 2012, driving the country to recession levels as those of 2009. The main reason of the decrease is the financial crisis, which drives to low credit squeezes that hinders the creation of SMEs. SMEs represent more than 90 % of the Spanish production industry (Orange Foundation, 2011). Since 2007, 20 % of SMEs have been destroyed (Ballabriga, 2010), with a high negative impact on the labour market, reaching a 22 % of unemployment rate, as shown in Figure 3.



Figure 2: Spanish GDP evolution



Figure 3: Spanish unemployment evolution

The Spanish Government has set up an austerity programme with a vision for an economic growth, leading to the taking of financial measures to launch and reinforce the SME sector, while internal Government budget has been severely reduced. However, the offer of quality public services has to be maintained, a fact that makes the discovery of the way to optimise the Government investments necessary.

The way out of the crisis has to be a common effort from all the actors involved. Spain is one of the more decentralised countries in Europe, signifying that regional and local governments have higher levels of autonomy in designing and delivering critical public services, for instance, health and education. In 2010, sub-central (regional and local) governments accounted for 42 % of the public expenditure, and represented 41 % of public revenues, which shows the high level of importance the sub-central government has in the decision-making process (Spanish Ministry of Economy and Finances, 2011).

Many approaches are taking place in order to make this crisis end. In particular, the Spanish Government has included eGovernment as part of the national crisis response, on the need to improve performance and reduce waste in the public sector, making strategic investments in new eGovernment areas, as public information reuse or transparency, improving the quality of public services and make them more efficient and transforming the public sector by using eGovernment as a key lever (OECD, 2009). As it has been mentioned above, the Spanish Law of eGovernment required the introduction of ICT in the administrative structures, thus the largest ICT investment has been made. Now it is the time to reap the benefits of the eGovernment services and enhance the effort made so far.

4. The ICT Government Strategy for 2012-2015

The Spanish Government is developing a new Strategic Plan for eGovernment 2012-2015, which sets strategic objectives in order for the Spanish Public Service to continue the journey down this critical context, using all the transformational possibilities that ICT can provide. The plan was inspired by the Malmö Declaration (European Council, 2009, Malmö Declaration) and outlines the way forward to implement the European eGovernment Action Plan 2011-2015 (COM 743, 2010) nation-wide.

This plan builds on and extends the gains of eGovernment Law that focussed on bringing the public

services closer to the citizens through electronic means. The Spanish Government has made a great effort to increase the offer of electronic public services, so 90 % of the public services can be managed online. Despite the offer rise though, there has only been a slight increase in the demand.

The Strategic Plan for eGovernment will be involved in a more ambitious ICT strategic initiative, the Spanish Digital Agenda, which will set the strategic ICT Spanish Framework according to the European 2020 strategy (COM 2020, 2010) and European Digital Agenda (COM 245, 2010). The relationship between the Strategic Plan for eGovernment and the Spanish Digital Agenda will follow the model set by the relation between the European eGovernment Action Plan 2011-2015 and the European Digital Agenda.

The main goal of the Spanish Digital Agenda is to promote the digital economy in Spain. The particular objectives are to:

- foster the deployment of networks and services to ensure digital connectivity;
- develop the digital economy for growth, competitiveness and internationalisation of Spanish businesses;
- improve eGovernment and adopt digital solutions for efficient delivery of public services;
- spread trustworthy ICT among citizens and enterprises;
- promote the research and development in Information Technologies and Communications;
- empower citizen and businesses for digital inclusion and train new ICT professionals;

The Spanish Digital Agenda has a wider scope, as it sets up a strategic framework to boost Spain as a reference country in ICT application, not only for the ICT support for the government politics but for the development of the society.

In this article, the Strategic Plan for eGovernment that will be applied in Spain for the next four years will only be considered. The mission of the plan is to align the Government ICT priority of improving productivity by delivering better services with a budget restriction scenario, while decreasing red-tape to people, communities, and businesses, engaging openly and improving its internal operations. Furthermore, the plan proposes a streamlined interaction within central Government and regional and local Governments.

The main objectives of the plan are to:

- advance to a paperless government;
- optimise ICT spending;
- promote the entrepreneurship by using electronic means;
- reduce administrative burdens;
- foster the open Government and the implementation of the new transparency law;
- increase the use of eGovernment services and promote the adoption of the electronic identity card, both in public and private eServices;
- maximise the public value of the public sector information through its massive reuse.

Some of these objectives are focused on improving user's satisfaction and participation, while others

seek to achieve more operational efficiency for the Government under a cost-reduction policy and others aim to build an open government. These goals materialise the main principles of the Spanish Government: transparency, democracy and efficiency. All of them show long term intent, and guide the ICT investment for the next years, remaining coherent with the Spanish economic context and the European Action Plan for eGovernment 2011-2015, as seen in Figure 4.



Figure 4: Alignment of Europe priorities and Spanish Government principles

To accomplish the objectives, the plan is structured in three strategic areas, according to whom they are addressed:

- Central Government area (Racionaliz@¹ Plan) •
- Citizenship area (Simplific@² Plan) •
- Interactions with other Government levels area (Comp@rte³ Plan) •

[&]quot;Razionaliza" could be translated as "To optimise" 1

[&]quot;Simplifica" could be translated as "To simplify" "Comparte" could be translated as "To share" 2

³



Figure 5: Strategic Areas of the Plan

For each area, there are multiple actions, designed in accordance to the European Action Programme for reducing administrative burdens, (the Digital Agenda and the EU Action Plan on eGovernment) in order to comply with the obligations assumed by Spain for these initiatives.

The implementation of these actions may require creating and strengthening the necessary alliances with the public or private sector to meet the challenges proposed. The plan is not focused on a specific vertical sector, but in a transversal eGovernment infrastructure. The plan can greatly benefit from bottom-up inputs to ensure that policy objectives and priorities match the needs of direct beneficiaries and take into account the perspectives of different stakeholders. Indeed, an inclusive and participatory process is particularly important for this strategy given the wide variety of actors and interests involved. Additionally, greater consensus over objectives may help facilitate co-operation and increase the amount of resources available to the implementation of the plan.

5. Racionaliz@ Plan

Focused on Central Government, this area aims to reform the Administration in organisational and technological levels through rationalisation of infrastructures and services and the consolidation of eGovernment. The particular goals marked for this area are lower spending, caused by undue multiplicity of structures and resources, the design of citizen and business centric electronic services and advance to a paperless administration.

In a budget-reduced scenario duplicities are not longer possible as they cannot be supported. Under the basic and essential principle that competencies and expenses cannot be duplicated at different levels of the Government, this strategic area displays actions aimed at streamlining administrative structures, reforming the administrative procedure, consolidating infrastructures and creating shared-services centres by building the private cloud computing network for the Spanish Government over the SARA network (Fabeiro, 2009). The time has come to identify how to get the most value from the investments already made. This will include guiding and helping shape policy choices for a better use of the existing capabilities, avoiding unnecessary duplication and complexity, and making the best use of new and emerging technologies.

The central Administration reform intends to deliver more personalised interaction with citizens through more efficient means. This model mainly relies heavily on integrated back-office operation, joined-up or bundled services and shared resources, all of which are enabled by ICT. ICT and technological advances are further fuelling this trend: growing digital convergence, for example, creates new opportunities for linking public services.

One of the main focus of the strategic plan is to promote and facilitate the entrepreneurship that is highly needed in Spain. A second generation point of single contact will be developed to create a business in a completely electronic manner. To achieve this goal, coordination between different governments departments will need taking on a different, more ambitions form.

Finally, the Spanish Government will improve its internal procedures by actively encouraging innovation and better use of existing and new ICT capability investments. It is through this cross-fertilisation of information, resources and technological solutions that new opportunities for greater efficiency and innovation arise. New ways of real energy efficiencies will moreover be searched and a virtual office will be developed.

The action programme for this area lies in the following objectives:

- rationalise Central Government Structures;
- reform administrative procedures;
- rationalise ICT infrastructures and technological solutions by using innovative means as cloud computing;
- establish a homogeneous boarding system to supervise public services quality, efficiency and effectiveness;
- design citizen-driven electronic services;
- promote the internal market using the ICT;
- implement a paperless Government;
- contribute to energy-efficiency;
- reform IT procurement;
- innovate eGovernment.

6. Simplific@ Plan

Focused on the citizen, its primary objective is the design of public services, reducing the burdens and social impact of administrative bureaucracy and cutting red tape. It also aims at enhancing open government and administrative transparency and increasing the use of electronic public services.

Reducing red tape is a critical challenge for the Spanish Government, as it allows improving the competitiveness of the economy and alleviates the costs on business and citizens by complying with Government regulations. The excess of bureaucracy has to be eliminated in some fields in order to attract foreign investment. In particular, efforts will be made to easily start a business in Spain.

Concerning access to public information, the Government of Spain will launch a law for Transparency. In the near future it will use Web 2.0 tools as part of its consultation process to deliver better services by engaging more effectively with internal and external stakeholders and making better use of the information resulting from interactions. A participative government is a real democratic government.

Finally, according to the Standard Cost Model, which is used by Member States to measure the costs businesses face in their effort to comply with legal information requirements, the use of digital public services is cost-effective and generates real profits for a greater number of citizens and businesses. In this area, the plan focuses on improving users' awareness of the availability of online public services, so they know the benefits of choosing this way of interaction with the government. It furthermore focuses on improving users' trust in government explaining that measures have been taken to maintain their privacy and sensitive personal information, as well as increase the motivation of users to use digital services.

The action programme for this area lies in the following objectives:

- reduce administrative burden and simplify administrative procedures;
- reduce red tape, so documents will only be requested once by the Government;
- improve the quality and effectiveness of rules;
- promote the transparency of administrative procedures;
- increase the use of public services by citizens and businesses;
- grant the citizen rights to access the public services by electronic means.

7. Comp@rte Plan

Focused on creating partnerships across all levels of government, this area aims at strengthening the links among them in order to advance within a framework of collaboration and shared responsibility to build a whole-of-government vision. It also establishes initiatives to collaborate actively in the international stage.

A challenge, in this case is to reduce additional costs produced by the dispersion and lack of coordination of responsibilities among various administrative bodies. The plan establishes mechanisms to move from dialogue and coordination to close cooperation between the different governments, under the auspices of 'a government - a competency', with specific actions to foster the reuse of public information and ICT resources, to create a better and efficient regulation of governmental cooperation bodies and to provide a more active participation of Spain in international and European forums.

The transversal nature of technology enables growth and competitiveness, and further necessitates strong coordination within the eGovernment policy. During the past years, regions have developed their different sub-national regulations on eGovernment based on their own criteria, leading to duplicated investments. In the framework of budget cuts, governments must coordinate and join efforts in order to create synergies and maximise ICT potential for social and economic gain.

Furthermore, the need for horizontal and vertical coordination is likely to increase when everybody conceives the Government as structure based on ICT and no paper or queues in attendance office will exist.

The action programme for this lies in the following objectives:

- promote and boost the necessary agreements for the reuse of resources and services;
- define a new structural and dynamic intergovernmental cooperation framework;
- reactivate the presence of Spain in the European and International forums.

8. Conclusions

Spain has showed a great commitment in aligning ICT solutions with Government policies and EU strategies. Concerning eGovernment, the Spanish Citizens Electronic Access to Public Services Law approved in 2007 has been a major driver for its implementation in our country. It recognised the right to choose the eChannel used for relations between government and citizens a right that was fulfilled by 31 December 2009.

The Spanish Government has learned the lessons of the results of the strategic ICT plans over the last decade; therefore, now it is necessary to move towards a more citizen-centric service delivery in the frame of budget reduction. That is why a new ICT strategic plan that goes far beyond ICT is needed, introducing cultural and organisational changes in order to have a more open and efficient Government, which tries to meet people's expectations for better services.

The strategy presented has a clear vision of what has to be achieved. It identifies objectives and actions that are to be made in order to transform the Government and its services, to improve its relationship with citizens, and boost cooperation with Spanish regional and local governments, in order to install a new model of work.

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Measuring Interoperability Maturity in Government Networks

The purpose of this paper is to create a model that describes the development of interorganisational collaboration in government networks that apply eGovernment. Contrary to several models that describe eGovernment from a government-to-citizen perspective, and primarily emphasise on the front office of eGovernment services, this paper focuses on the collaboration that takes place in the back office to enable successful eGovernment services. A maturity model was developed to describe and assess the level of interorganisational collaboration in government networks that apply eGovernment. Through a structured literature review, 19 existing maturity models related to interorganisational collaboration and eGovernment were identified. These models were subsequently analysed on their dimensions and on the stages that were used to define maturity.

Furthermore, the authors of this paper studied the characteristics of each stage and the preconditions for increasing maturity. Based on this literature review and their analysis, the authors propose a new maturity model in which existing concepts are integrated and extended from a network perspective. This model describes the levels of interorganisational collaboration in government networks on three dimensions: system, information and process. Five levels of increasing interconnectedness describe how the interorganisational collaboration in government networks unfolds across these three dimensions. The model is empirically applied through case studies of three government networks. Medium- to large-sized networks of municipalities and their cooperating partners that apply eGovernment services in their permit application procedure have been studied. The model appears to be suitable for assessing the development of interorganisational collaboration among government networks that implement eGovernment in their service provisioning. Further research could focus on the use of this model in order to analyse additional growth strategies, aiming to create successful roadmaps.



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Keywords

eGovernment, interorganisational collaboration, government networks, maturity models, interoperability.

⁶⁶ The different stages of interoperability in government networks as well as the processes that initiate shifts between these stages are described, combining concepts of interoperability and interorganisational collaboration.

1. Introduction

Governments aim to provide information services that are more citizen-centric and that integrate their operations (Layne & Lee, 2001). eGovernment contributes to achieve these goals and thus, its development is frequently studied through maturity models (Yildiz, 2007). In the past, studies on maturity models in eGovernment primarily drew on the global eGovernment picture, focusing mainly on the development of eGovernment at the front office. However, many eGovernment developments also take place in the back office, where several government organisations form a network and collaborate to jointly provide an eService. Particularly, in order to achieve interoperability in the back office of eGovernment networks, much progress can still be made. Since improved interoperability among government organisations is of great importance to overall eGovernment success, it is worth studying this development (Gottschalk & Solli-Sæther, 2008).

Furthermore, there is a lack of process-oriented eGovernment studies as opposed to output and outcome-oriented studies (Yildiz, 2007). Different stages are often described, but not the conditions under which government organisations can reach them. The dimensions used in current models are also underspecified (Coursey & Norris, 2008). Finally, interorganisational collaboration takes place in networks of government organisations, but current literature does not sufficiently describe the characteristics of these government networks in combination with maturity models.

This paper will focus on the research question about how interorganisational collaboration in government networks that apply eGovernment can be modelled and measured in terms of maturity. In order to answer this question, the paper is structured as follows: First, a literature review is present providing an overview of the existing literature relevant to the research question. Current eGovernment maturity models are analysed, based on their dimensions and on the stages that are used to describe maturity. In this regard, a new maturity model for interoperability is presented, focusing on government networks that apply eGovernment. This model is then applied to three government networks in the Dutch public sector. Finally, the conclusions are summarised and future research suggestions are proposed.

2. Literature overview

The primary goal of this literature review is to identify the existing related work on the subject, which will in turn serve as input for the maturity model. The secondary goal is to provide a theoretical background for the model and to explore the available literature in the research domain. A systematic literature review is conducted based on the guidelines provided by Okoli & Schabram (2010). The literature review focuses on three research domains: 'maturity models', 'interorganisational collaboration' and 'interoperability'. These research areas are predominantly described from an eGovernment perspective, creating an additional overarching 'eGovernment' domain. The information gathered from the literature review is extracted, analysed and combined.

2.1 eGovernment maturity models

A total of 19 eGovernment related maturity models are found. These models take on different perspectives and describe eGovernment development from different dimensions using different concepts (Lee, 2010). The characteristics of these models can be viewed in Table 1 and will be further discussed below.

Author(s)	Year	Main focus	oriented	Nr. stages
Grijpink	1999	G2G	Yes	5
Baum and Di Maio, Gartner	2000	G2C/G2B	No	4
Layne and Lee	2001	G2C/G2B	Yes*	4
Hiller and Bélanger	2001	G2C/G2B	No	5
Silcock, Deloitte	2001	G2C/G2B	No	6
Ronaghan, UN	2001	G2C/G2B	No	5
Wescott	2001	G2C/G2B	No	6
Netchaeva	2002	G2C/G2B	No	5
Chandler and Emanuels	2002	G2C/G2B	No	4
Peristeras, Tsekos and Tarabanis	2002	G2G	No	4
West	2004	G2C/G2B	No	4
Siau and Long	2005	2005 G2C/G2B		5
Wauters, EU Commission	2006	G2C/G2B	No	4
Andersen and Henriksen	2006	G2C/G2B	No	4
Papantoniou et al.	2001	G2C/G2B	Yes^	4
Gottschalk and Solli- Sæther	2008/2011	G2G	Yes#	4
Sarantis, Charalabidis and Psarras	2008	G2G	Yes#	5
Klievink and Janssen	2009	G2G	Yes#	5
Janssen	2010	G2G	Yes#	4

Table 1: Maturity models in eGovernment

* = Challenges for each stage

^ = Change management

= Capabilities

Many of the early stage models describe eGovernment from a customer perspective, such as the model by West (2004), describing the growth of the government as a provider of services to its citizens and businesses (G2C/G2B). Other models take on a perspective that focuses on government organisations that provide services to each other (G2G). Interoperability between different government organisations plays an important role in these models. Although multiple models combine G2C/G2B and G2G perspectives, there are still few models that take on a pure G2G perspective. Examples of these types are the models by Gottschalk & Solli-Sæther (2008) and Klievink & Janssen (2009). Lee (2010) identified and analysed 12 eGovernment maturity models, making a distinction between a citizen/service theme and an operation/technology theme that is apparent in the models. The G2C/

G2B models mostly use a citizen/service theme, which is sometimes combined with a technology theme to describe the technologies that are used to provide a certain service. The G2G models predominantly have an operation/technology theme and discuss the different technologies that create interoperable organisations. Furthermore, Lee (2010) noticed that different perspectives such as technology, organisation, management and politics are divided over the different models and that there is no model complete enough to contain all of them.

In addition to the G2C/G2B versus G2G perspective, there is also a difference between outcome- or process-oriented stage models. Many of the current stage models describe the characteristics of a stage without mentioning, which processes lead to a shift between stages. Some models go further by not only describing the characteristics of the stages, but also by describing the processes that lead to transitions between stages as well. One of the few examples of a process-oriented model is that of Klievink & Janssen (2009), who use the concept of dynamic capabilities to describe transitions between stages. The earlier models of eGovernment describe the general outline, for example by describing the different phases of eGovernment on a national level. An advantage of these models is that they give a clear overview of the possibilities of eGovernment, but they are less practical in the implementation of eGovernment, especially when focussing on regional and local government networks, due to lack of detail. Figure 1 shows a positioning model for the current maturity models in eGovernment research. The model is divided into two dimensions: one dimension is based on the orientation in the provision of services, making a distinction between G2C/G2B and G2G and the other provides a description of the model, which may either focus on the characteristics of the stages or on the processes and preconditions that lead to subsequent stages. The figure clearly shows the relatively large amount of outcome-oriented G2C/G2B models.



Figure 1: Positioning model eGovernment maturity models

2.2 Interorganisational collaboration

An important aspect in realising eGovernment at the front office is to develop an effective back office. Within the eGovernment domain, several organisations in the public sector collaborate with each other to provide a joint service. Networks form an important concept, since the delivery and management of public services increasingly rely on complex networks of interdependent organisations (Pardo &

Jiang, 2007). In organisational studies, networks are viewed as non-hierarchical, non-market forms of organisation in the public sector. Networks are based on relationships, mutual dependency and norm reciprocity. These capabilities make them suitable in situations, where efficient information exchange with reliable information is necessary. Networks can furthermore adapt to unexpected environmental changes, making them more flexible than bureaucracies and better able to control resource dependencies (Pardo & Jiang, 2007).

Bekkers (2005) describes that viewing a group of collaborating government organisations as a network is increasingly valued as a means of steering complex societies in terms of co-operative production and management. Janssen (2010) indicates certain developments that have contributed to the rise of networks in governments. Increased collaboration to improve efficiency and profit from each other's knowledge, resources and capabilities is such a development. Another contributing factor to the rise of networks is the integrated service delivery, which requires public organisations to collaborate in networks.

Although government organisations collaborate with each other and are dependent on resources controlled by other organisations, each of them maintains a certain degree of autonomy, by having a set of specific resources in the form of information, knowledge or competences. There is no single organisation that can enforce its will on all other organisations in the network, as both Grijpink (2009) and Bekkers (2005) acknowledge. There is a unique sphere of influence, ownership and control over information, which makes negotiating over exchanging information more difficult (Bekkers, 2005). Organisations fear that they might lose their independence and rather want to increase dependencies that other organisations have on them. When deciding on shared resources, such as a shared information system, a struggle arises over the type and amount of information that is shared with other organisations. Bekkers (2005) calls this process 'information politicking'. Janssen (2010) states that the development of a public service network is a difficult task and therefore, time is required to create the necessary authority structures, procedures and mechanisms. A shared infrastructure should be created that is usable for all organisations involved, to prevent organisations to remain as independent units. Janssen (2010) mentions that formal arrangements that ensure quality and performance seem to be necessary to stimulate the maturity of the network. These characteristics should be taken into account when describing the development of interorganisational collaboration in eGovernment.

2.3 Interoperability

Operating in a network implies that various individual organisations have to share information and link their processes. This inevitably requires the existence of interoperability solutions between different information systems and organisations in public administration (Soares & Amaral, 2011). Interoperability is therefore considered to be a critical success factor to make progress in the online provision of public services (Pardo, Nam & Burke, 2011). The interoperability concept was initially predominantly described from a technical perspective and was concerned with the coupling of diverse and disparate IT systems (IEEE, 1990). However, interoperability in the eGovernment context goes beyond this technical dimension, by also including the reorganisation of different processes, aligning organisational structures and agreeing on the meaning of what is exchanged. A definition of interoperability with a broader scope comes from the European Interoperability Framework (EIF) for pan-European eGovernment Services (European Commision, 2010, p. 5) and defines interoperability as follows:

"[...] the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations via the business processes they support, by means of the exchange of data between their respective information and communication technology (ICT) systems."

This definition takes a much broader perspective on interoperability than the traditional technically oriented definitions and reflects the different aspects that have to be taken into account in an eGovernment setting. Scholl & Klischewski (2007) mention that the extent and complexity of the challenges surrounding interoperability initiatives in public administration are not yet fully understood either in theory or in practice. Many interoperability initiatives fail due to this complexity, which prevents creating more sustained levels of interoperability (Soares & Amaral, 2011).

The EIF (European Commission, 2010), is a framework that is often mentioned in eGovernment literature on interoperability. It describes three main dimensions of interoperability: a technical, a semantic and an organisational. The technical dimension describes traditional interoperability, which deals with connecting computer systems and services. The semantic interoperability level addresses issues to enable organisations to process information from external/secondary sources in a meaningful manner. Finally, the organisational interoperability level describes the linkage of different business processes.

3. Towards an integrated maturity model

In order to create a new maturity model to measure interorganisational collaboration in government networks, the original dimensions of the EIF, the technical, semantic and organisational dimensions are adopted and used as a basis. Other models focus only on one dimension or they do not clearly specify which one they focus on (Coursey & Norris, 2008). The original three dimensions in the EIF are however quite generic and are adapted to better suit local government networks. The three dimensions used in the model are therefore labelled the 'system', 'information' and 'process' dimension. Where the system dimension is used to describe technical aspects, the information dimension focuses on the semantic aspects and the process dimension focuses on the organisational dimension as described in the EIF (European Commision, 2010).

In order for the government networks to be able to reach a higher level of interoperability, agreements have to be made on the standards for the system, information and process dimension. Archmann (2007) mentions several phases in defining such standards. In the preliminary phase, there are no mutually agreed standards between organisations. A phase of drafting/agreeing on standardisation follows, leading to initial standards in each of the dimensions. The next stage consists of applying these initial standards in practice. An evolving phase follows, in which adaptations will be made to certain standards, while other will be maintained. The final stage will be reached when all standards are fully developed and evolved into stabilised, flexible standards and agreements. This concept of evolving standards and agreements plays an important role in the growth of interorganisational collaboration and is therefore used as a foundation for the transition between stages.

Applied to the domain of interorganisational collaboration in government networks, five stages will be defined, based on the dimensions that were identified earlier.
Stage 1: Independent stage

In the first stage, all organisations in the network mostly operate independently, instead of as a network, as described by Janssen (2010). Information systems are rarely connected to each other, which prevents information exchange among different organisations. The systems in this stage can be described as "islands of automation" or "silo's", according to the EIF (European Commision, 2010). Since the technical abilities to exchange information are absent in this stage, there is also no focus on semantics across the organisation borders. Each organisation only manages its own processes and there is no alignment with the processes of other organisations; thus, the focus is purely on the internal workflow.

Shift towards the ad hoc stage: initial contact. In this stage, there has been little or no progress made towards an interorganisational network of organisations. The different stakeholders are often unaware of the information that is available in other organisations and that could be of use to improve the quality and efficiency of their service. This situation can be compared to the development of organisational chains as described by Grijpink (2009). The shift towards the following stage is made by making some initial agreements on each of the dimensions with organisations in their immediate surroundings. Organisations should not immediately try to create agreements that affect the primary process in the network, but should rather discuss collaboration in supporting processes. This creates the initial discussion and awareness that is necessary to improve interorganisational collaboration.

Stage 2: Ad hoc stage

At the stage of ad hoc collaboration there are only very limited organisational frameworks in place in the network to support collaboration. Organisations begin to align their processes with several other organisations in the network, but not with every potential partner and only on specific occasions when collaboration is inevitable. In the normal work process, there is still no focus on interorganisational collaboration and information systems also do not sufficiently support this. This level of collaboration can also be characterised as peer-to-peer collaboration. The type and amount of data that can be exchanged is limited to the possibilities that the current systems offer. The information dimension depends on the system dimension, in a sense that you need an initial infrastructure in order to further develop the interoperability within the information dimension in an effective manner. Since there is still little progress in the system dimension, the information dimension does not make any important progress either, aside from some inevitable adaption for ad hoc collaboration.

Shift towards the coordinated stage: agreeing on initial standards. In order to shift towards the next level of interorganisational collaboration, agreements on initial standards should be reached among the current organisations in the network. At the beginning of the ad hoc phase, there will only be interaction among several organisations and not all parties in the network. The first part of reaching the coordinated phase is identifying all parties and creating a platform (such as informal consultations as described by Grijpink, 2009) for parties to exchange information and to ventilate their ideas. The second part of the process includes agreeing on initial standards for each of the dimensions. Once initial standards for each of the dimensions are agreed upon and these standards apply to the entire network, the coordinated stage will be reached.

Stage 3: Coordinated stage

In the coordinated stage, shared goals are recognised and roles and responsibilities between the different organisations are clearly defined. Organisations are still distinct, but they now use some basic standards to cooperate with each other throughout the network. Information systems of the different organisations are adapted to accommodate information exchange between different

partners. Initial standards for data exchange are agreed upon between several organisations in the network. Since information exchange with other organisations takes place regularly in this stage, several agreements on the structure and meaning of what is exchanged have to be made. Organisations are starting to map interorganisational work processes based on an agreed standard for describing these, such as described by Archmann (2007).

Shift towards the domain stage: evolving initial standards. In this third transition phase, formalisation of the collaboration takes place, the initial standards will be used in the daily work routine and its advantages and disadvantages will be encountered in practice. The informal consultation between the organisations in the network will evolve into formal consultations, as described by Grijpink (2009). At the same time, the initial standards will evolve and thereby create a better fit with the network. Where the initial standards are still quite generic in nature, they will evolve by incorporating domain specific attributes and thereby enabling the shift to the next stage.

Stage 4: Domain stage

In the fourth stage, domain specific attributes are added to the initial standards in the network. The core technical interoperability in the network is expanded with supportive technical interoperability, cf. Archmann (2007). In the information dimension, initial low level ontologies were agreed on, a domain ontology that covers all relevant domain specific concepts can now be further developed. In the coordinated stage, initial standards to describe business processes in the network were agreed on. In the domain stage, these standards will not only be used to further document the processes, but are used to align processes throughout the network as well.

Shift towards the unified stage: maintaining standards and flexibility. A network of organisations will likely spend a considerable amount of time on continuous development and adjustment of standards due to stakeholders each having their own interests and demands. The network environment is furthermore changing continuously, so development and adjustment will never be completely finished. However, when these standards reach a point where all parties in the network agree on the current functionality and the standards have the flexibility to adapt to changes, the network will reach a stage in which all dimensions are fully developed. The level of collaboration is efficient enough to develop a shared information system, if necessary.

Stage 5: Unified stage

In the unified stage, the organisations collaborate in such a manner that the network can be perceived as a single organisation. This is the stage in which full interoperability between organisations has been reached. Shared information systems that support the network as a whole could be developed to work on top of the existing ones. Protocols and syntax for data exchange are fully standardised and flexible. Organisations know which information is available and where it can be found. All concepts and attributes are documented in a high level ontology and used in practice throughout the network. The processes between the organisations in the network are fully documented and processes between organisations are aligned and can adapt to changes in the environment when needed. The model depicting all five stages and their interconnections is visualised in Figure 2.



Figure 2: New maturity model for interoperability in government networks

4. Empirical application: government networks in the Netherlands

In this section, a case study is described to validate the model by applying it to three different (existing) government networks in the Dutch public sector. The current level of interoperability in these networks will be assessed. The outcome of the analysis will be mapped to the five stages of our model, in order to apply and validate it. For each of the three dimensions, three capabilities are defined based on the earlier stage descriptions, creating nine evolving capabilities across the stages. These are used to map the cases to the model. These capabilities are depicted in Table 2.

Table 2:	Capabilities	per	dimension
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I. System dimension	II. Information dimension	III. Process dimension
A. Data structure standards	A. Protocol and standards for information exchange	A. Documentation of (shared) business processes
B. File type and document formats	B. Managing concepts (ontology)	B. (Re)design of business processes
C. File and message transfer protocols & services	C. Managing information sources	C. Repository of business processes and best practices

To initiate the case study, a new permit application procedure at municipalities is selected as a case scenario. The Ministry of Public Housing, Spatial Planning and Environmental Management in the Netherlands decided that as part of modernisation, several permits should be combined into one permit, the All-in-one Permit for Physical Aspects ('omgevingsvergunning' in Dutch). These permits cover matters such as construction, demolition and spatial planning. By combining these requests, a single request procedure can be started for up to 25 permits, thereby ensuring that the applicant only has to address his request to the respective authority. This enables the government to present itself as a unified organisation. During the procedure, the competent authority, mostly a municipality, checks if the applicant is entitled to the requested permit. During the decision-making process several organisations in the back office collaborate and deliver advice to the competent authority, which in turn takes it into consideration in order to decide whether or not to assign the permit to the applicant. These can be other governmental bodies, but also external advisors such as welfare and environmental committees and fire departments. With this new procedure, citizens and businesses can use a web application to quickly check if a permit request is required. This web application is called the 'All-in-one-permit Online' ('Omgevingsloket online'). The applicant can also use this web service to fill in the application for the permit and check on its status.

The main unit of analysis in this case study is the network of government organisations involved in the permit request. In order to analyse the chain of government organisations as a whole, individual organisations in the network are analysed first. Due to their central role in the network, municipalities are selected as the central points for data collection. Three medium- to large-sized municipalities in the Netherlands are selected. Multiple data collection methods are employed in this case study. The main data collection method consists of conducting semi-structured interviews with the head officers of the permit authorisation department within the municipalities. These interviews are conducted according to a protocol, containing standardised questions and are processed based on recordings. Additional information is obtained by analysing documentation of process descriptions and technical architectures.

4.1 Results

In the first two cases, several organisations in the network use their own information systems. The exchange of data between individual organisations in the network however, is limited to peer-topeer agreements. In certain cases, information exchange is enabled by linking individual information systems together. In other cases, this is not possible due to conflicts on standards to be used, and automated information exchange is limited. Furthermore, the collaboration is not at a sufficient level to reach initial technical standards that apply to the network as a whole and that are defined in the coordinated stage of the maturity model. There is a clear awareness of each other's output in terms of services that are delivered by the different organisations in the network, but there is no overview and no alignment between processes that lead to these outputs. When analysing the information gathered from the interviews and mapping this to the maturity model, these two cases are found to reside on the ad hoc level of interorganisational collaboration.

In the network of the third municipality, each organisation uses its own information system, but these are all linked to the back office system of the municipality. Within the network, the municipality forms the central point of data exchange and all organisations comply with the standards that are agreed upon. A common format for information exchange is used to prevent ambiguities in the permit applications. Agreements are made to align the processes between these organisations and are documented. Since the collaboration in the third municipality covers the entire network of collaborating organisations, it is assessed to reside on the coordinated stage of collaboration. As they use an existing technical platform, based on the 'All-in-one-permit Online' web service, and do not further develop domain specific applications or standards for information exchange, they do not qualify for the domain stage at this point.

5. Conclusions

The different stages of interoperability in government networks as well as the processes that initiate shifts between these stages are described, combining concepts of interoperability and interorganisational collaboration. Furthermore, the literature overview described a starting point for an integrated model, by identifying dimensions and the need for a process-oriented approach. This approach is of great importance when applying the model in practice, by providing government networks that wish to improve their collaboration with capabilities to develop. The literature overview furthermore described the importance of applying a network view, in addition to planning a roadmap to develop future collaboration. These findings led to the development of an integrated maturity model. This model can be applied to measure the current maturity level in a network and plan a roadmap to develop future collaboration as well.

The different levels of interoperability seem to be applicable to government networks in the Dutch public sector. The three dimensions in the model form a good starting point for discussing and measuring interoperability in government networks. The most effective level of collaboration attainable seems to depend on the context. Networks can effectively operate on a certain level without the need to strive for a higher stage. The first step should therefore determine what level of collaboration is sufficient in a specific context. The model can then be applied in order to close the gap between the current level and the desired one.

Furthermore, the three dimensions may not always develop evenly. Different strategies seem to exist, in which the focus is predominantly on one of the dimensions. This focus might change after (several) stages. It has been found that in some cases the focus was more on developing the processes and supporting them by the system, while in other cases the processes were primarily influenced by system development. Further research could therefore focus on using the model to analyse new cases that could uncover additional growth strategies. Different types of government networks may apply different growth strategies in their collaboration and it would therefore be interesting to study the situational factors influencing this strategy. Why do they apply a specific growth strategies can also contribute towards creating several successful roadmaps through the model. Hopefully this can help government networks to improve their interoperability maturity and will therefore be able to provide improved services to the public.

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Digital Transformation in Public Security and Policing

Are fears about security and changes to ways of working standing in the way of digital enablement across public security and law enforcement agencies? Technology has changed the way in which government and citizens are able to interact. Digital communication, such as social media, cloud computing and mobility, is now the norm for young and old alike, yet government appears to be lagging behind in some areas. The issue is that while using modern technology to put the citizen at the heart of everything (citizen-centric government) looks good on paper, government is struggling to turn its ideas for digital enablement into practical solutions.

In public security as well, the impact of what has been described as today's Digital Transformation (Bonnet & Nandan, 2011) has the potential to be huge. Despite this potential however, there is still a long way to go:

- The initial response to cloud computing in public security and policing has been hesitant. While primarily due to security concerns, it is also fair to say that many aspects of cloud computing go directly against current police culture and operational practice.
- The availability of location-based and real-time information to the police officer in the field has a profound impact on the role, the situational awareness and the power to execute and prioritise duties of an individual police officer.
- Social media provides a new and different platform for formulating community policies and interaction with the general public. In addition, the 'crowd' has become selforganised so that government can supervise rather than manage communications - for instance handling a crisis situation.

It is time for public security and law enforcement agencies to seize the opportunities presented by digital technologies. Increased collaboration, improved crime fighting, informationled policing and a faster response to change are surely the ambition of all such agencies - and Digital Transformation will deliver this.



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Keywords

Citizen Centricity, Government, Public Security, Digital Transformation

66 As governments have picked up the pace and learned from the private sector how to benefit from the opportunities provided in the digital age, so public security and law enforcement agencies will also benefit from what has been learnt and tested across both the private and the public sectors.

1. Introduction

'Government' as citizens have traditionally known it will soon cease to exist. The days when many of us lived by the notion of a government keeping a watchful eye on us is over. In the past, in the event of a crisis, our parents and grandparents closed their windows, sat next to the radio and waited for instructions. For routine activities, the government also used to caution us on what to do, how and when to do it. Then we would do as advised. However, all that is changing swiftly.

Technology has driven society in new directions. In turn, society has seized technology developments, such as social media, cloud computing and mobility to bring about a silent revolution in the way it receives and expects to receive services. This revolution is a true *Digital Transformation* (Bonnet & Nandan, 2011).

Most governments have had plans in place for years to manage the Digital Transformation. Yet, while good at understanding and conceptualising a digital world, government lacks the ability to bring these plans to fruition. These plans highlight how the citizen should be at the heart of government thinking. To achieve this *citizen centricity*, today's government would not manage, but enable. It typically would not decide on the what, how and when, but provide the right conditions for a society with all actors playing their respective roles. Citizens and companies work together with the government in an interdependent manner. Government primarily develops real-time situational awareness and collects information in order to supervise whether the data available is valid and relevant - and if there is any need for the government to step in. It only acts specifically subject to the need of the hour, when things go wrong, or when changes are absolutely required. Government 'directs' society rather than 'produces.'

2. Digital Transformation

Digital Transformation (Bonnet & Nandan, 2011) entails changes at a number of different levels:

- We have new and better tools to carry out tasks far more efficiently than before. For instance, information technology has made administrative processes much more streamlined.
- A non-linear level of scalability is possible in cyberspace that was not possible in our linear physical world. For example, financial fraud can be repeated to a level that was physically impossible for a fraudster to achieve before.
- New functions and value chains are being enabled in the digital world that were not possible previously. This is transformational change. For example, organised crime networks can be uncovered by combining terabytes of data from not yet connected sources of information, so that connections could emerge from the data in a way that police officers in the 20th century could not have thought of.

What does this mean for public security and law enforcement? A lot of what government does is concerned with how we administer society. The many functions of the government include tax collection, road construction and its maintenance, providing guidance and support to the unemployed for getting new jobs, setting up sound financial structures for the elderly, and providing planned health care systems for the wider citizenry. For all such functions, citizen centricity seems fairly straightforward as soon as government starts to design its role from the citizen's perspective; the change is halfway there. It is about ensuring that a citizen has the ability to deal with government using a single channel driven by life events such as unemployment, death and marriage. The interaction with government for all these events should be a one-stop shop.

That all seems straightforward enough, but when it comes to public security and law enforcement, we are clearly talking about two separate entities that differ from the rest of government in many ways. In principle, the use of violence is a government prerogative. The justice system is the final line of defense for society. According to 'Maslow' (Maslow, 1943), safety and security come before citizen centricity. In public security and law enforcement, Digital Transformation is also viewed in a different light than in the rest of government. Compared with other domains, in the public security sphere government seems to have been taken by surprise by the digital changes underway.

3. Cloud computing

Cloud computing is here to stay, both in government and beyond (Mulholland, 2012). The question for public administrations is no longer if cloud is a tool for improvement, but *how* to maximise its advantage to address contemporary challenges. Data centres are being merged, more and more government data is made available in the public domain, and government infrastructure applications and data increasingly need to be accessed via the Web. Demand for efficiency and cost savings plays a role in increasing the urgency and speed of change. 'Private' and 'public' cloud technology proliferates.

In public security and policing, the initial response has been hesitant. This is primarily due to security concerns, but also because many aspects of cloud computing go directly against how police train their staff. There is little in policing that is open, transparent and designed for sharing and collective use of sources. Worse still, police officers in many countries do not have full internet access at work. Many carry their police phones to access relevant data, as well as a personal device.

Nevertheless, the cloud wave will not be lost on public security and police. It started passively, with law enforcement using the Internet to enrich their criminal case files. Later on, private clouds and virtualisations were introduced in the closed environments to benefit from a level of efficiency gains. But now, community policing is increasingly thriving on the Internet and with cloud technology. Suspects are found in collaboration with the general public; police forces at national and international levels work together and have learned to share resources. Police forces are gradually realising the importance of speed more than security. Undoubtedly in law enforcement, due to regulation and other reasons, data protection and security remain important - and legally much data cannot be there in the public domain. But attention is now also being paid to the flip side of the coin - we will most likely see a further development of internet-supported collaboration within police forces, across government agencies and with companies and citizens.

Transparency plays a role as well: citizens demand to know about crime statistics and performance, and increasingly such data is being made available. See for instance http://www.police.uk/data. In many countries police is publishing crime data, insurance companies provide risk maps and victims of robberies post videos and images on public websites. This latter development calls for a government strategy. Citizens do not want a victim-organised manhunt without judiciary system involvement. On the other hand, they want criminals and thieves to be caught, especially if the data is available to make it happen. In the digital future, it will remain a government role to provide guidelines and a legal context to embed the rapid increase of open data and transparency in our democratic society.

4. Social media

On 9 June 2012, the Netherlands lost a football match against Denmark in the 2012 European Championship. Some disappointed fans got together via social media and 'planned' to meet and riot - without previously knowing each other - around a public square in the city of The Hague. It was conducted on a small scale, with relatively little harm done; however, this is a typical example of how Digital Transformation affects law enforcement. Following social media channels, The Hague has now become a routine and integral part of policing (Denef et al., 2011), as in many other forces in the UK, the Netherlands, Australia, the US and increasingly elsewhere. Flash robs - where people who have never met before plan via social media to rob a shop together - have become a known phenomenon. Furthermore, evidence of what happens on a larger scale was clearly visible with the August 2011 UK riots.

Where awareness has been raised on how social media as a tool can contribute to policing, practice is not yet mature. Often, for instance, social media are used as a data source to find early warnings for riots around sporting events or in crisis situations. However, to date most police forces and crisis management organisations have failed to systematically interpret and feed this data into their core processes, systems and people.

On a different level, government has so far failed to recognise the full potential of social media as a driver of transformational change, or in the very least has failed to act accordingly. Now that the 2011 EHEC health crisis has settled down, it provides a good example of how governments should *not* communicate. Between May and July 2011, 50 people died in northern Germany after 3500 cases of EHEC infection were identified. The source of the infections allegedly was fenugreek seeds imported from Egypt and sprouts produced from these seeds. European and German authorities considered these case handlings a major success (German Federal Ministry of Food, Agriculture and Consumer Protection, 2012). But was it really a success? Before the fenugreek seed conclusion was reached, cucumbers and tomatoes were cited as the cause. Specifically, it was claimed that a cucumber producer in Spain was the particular source. Then tomatoes were discussed as a potential source. The estimates of damages in different European countries as a result of these premature government-issued warnings reached a billion Euros. Taking a closer look, we will find that different German regional government organisations concurrently advised differently on what the potential contamination source would be, or rather, on what food to avoid.

In hindsight, not enough information was available to draw any conclusion at the time. Moreover, even if the German Federal Ministry in question spoke of 'close cooperation between federal and land authorities', we now realise this collaboration was limited. There was no common communication strategy. There were no clear warnings on the limitations of current knowledge and advice. And there was no data. In terms of a post Digital Transformation, government could have stepped down from its old role of providing citizens with instructions, especially where there was no specific information to support the instructions. It would have made sense to simply help people become informed, by validating - joined-up as government organisations - information that people had available through many sources and help them judge which ones to rely on. Furthermore, it would have made sense to focus on obtaining better data - now and in the future.

Social media communications have taken over a part of what has been a unique government function in the past. Governments have an opportunity to refocus their roles and with that bring more value with less effort. From the example of the EHEC crisis, we know this opportunity was missed. Unfortunately, this is not a problem specific to Germany. The EHEC crisis happened to touch Germany, but it could have happened in any country and governments elsewhere could have chosen similar communication strategies.

5. Mobility

Mobile devices were adopted early in law enforcement. Even before mobile phones were made available to the general public, police were using communication devices to support officers in the field via live communications with the police headquarters. At that time, such communications were mainly used to instruct and manage police officers out in the community. In 2012, 'mobility' has grown to mean something different (Borgonjen et al., 2012). Current mobile devices have or could potentially have all the functionality that computers at police headquarters possess. Based on the officer's exact location in the field, specific information can be made available to the officer that makes sense in this context. In many ways, mobile devices have the potential to make the officer out in the community information dominant over his chief. Functionally, this is borrowed from the defense doctrine - where it was called 'network centric warfare' (Alberts et al., 1999). 'Power to the edge' is important in network-centric warfare: decide locally in the field as much as possible, escalate only if needed. Real-time communications and non-linear, network-enabled information exchange have made this possible.

This is more than just an evolutionary development. Police are managed differently in different countries. Typically where top-down control and hierarchy are important, the police officer is not supposed to make too many strategic and tactical decisions out in the field. However, by using a mobile device the same officer has the opportunity to work with the best information available. Here, functional requirements and cultural preferences go in opposite directions. Police leadership and politicians need to make choices. Is it better to respect current culture and police identity or allow for network-enabled capabilities, empower the officer in the field and adapt organisation and top-down control to transform police culture?

A caveat around mobile technology is that there is a tendency for a lack of focus on the back-end infrastructure. A lot of the talk and attention is at the front-end, using appealing and theoretically practical devices that support police officers and first responders and offer a much improved way of working than is currently being experienced. However, for all of this to be effective, a proper communication infrastructure and back-end IT infrastructure is required. In that sense, mobile technology and integrating police IT systems are intrinsically linked (Capgemini, 2012, Denef et al., 2011).

6. Keep up with organised crime

There is an ill-advised but pragmatic way to resolve the conflict between central steering and local information dominance. If information is selectively withheld from officers in the field, central power may stay intact. High-ranking officers would have information that is not available in the field, similar to how it was prior to Digital Transformation. Even if just for the short term, such centralised information dominance would be more in sync with the cultural status quo. However, in the long run this will not work and would cause police to lag behind in the continuous battle for technological supremacy.

Since both law enforcement and crime have undergone a Digital Transformation, government and police can no longer afford to develop digital strategies that fail to take into account both law enforcement and the criminal. Cyberspace has become important for public security in different ways:

• New resources and methods for law enforcement - police are using new technology to improve effectiveness and efficiency.

- New tools and methods are used to tap known criminal activities for instance, the onion router project TOR, (an underground internet, TOR project, 2012) has enabled pedophile networks to exchange prohibited material in a relatively protected and anonymous manner.
- New types of crime have developed of late for example, internet payment has specific vulnerabilities that have been exploited by organised crime.
- Cyber activism cyberspace has attracted individuals with the ability to cause severe and largescale damage to society even if they had good intent to start with.
- Cyber warfare increasingly, countries have publicly announced plans to invest in offensive cyber capabilities. Interestingly, cyber defense is organised more around law enforcement and terrorism than around preparing for a potential nation state cyber attack.

As a consequence, there is no doubt that governments and law enforcement authorities will further invest in Digital Transformation. If not the government-centric change drivers, then at least the pressure to keep up with organised crime will drive innovation and transformational change.

7. Conclusions

In light of the rapid changes in society, some driven by technology, government is also in transformation. This paper has provided an overview of how it is changing and has shown how the area of public security and policing has struggled to benefit from the potential that this Digital Transformation has promised and already delivered in other areas.

On the other hand, lagging behind may be a blessing in disguise. Apart from the technological change drivers, such as cloud computing, social media and mobility, other societal developments call for change. Citizens are taking more control, governments are retreating and private companies are increasingly part of the equation. Thus, public security and police leadership have the opportunity to take these change drivers fully into account when they design and implement their future.

This future must encompass a vision of how, in each country's specific cultural context, public security and police will function after the Digital Transformation, and what the roles of government, citizens and private sector should be. Visioning is generally something governments do well. The challenge is in the implementation and execution - a roadmap that details the path ahead is needed.

Typically, the first steps will be down to earth and unglamorous: putting in place technological infrastructure, recruitment, training and renewing back-end processes, among others. The good news is that thanks to today's possibilities, some of these steps will be faster and simpler than in the past. The other good news is that some of these changes will rapidly reduce the operational cost. Now is the time and opportunity to act - making our world a safer place for less cost through a lean and technologically-enabled government.

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Social Twins Enterprise 2.0 and Government 2.0

Many research papers have been published on the utilisation of web-based tools (Web 2.0) in enterprises (Enterprise 2.0), whereas governments (Government 2.0) are still in the early adoption phase in relation to Web 2.0. This paper explores the similarities and differences between enterprise and government use of Web 2.0 technologies and employ the analogy of 'social twins' to investigate the internal and external factors influencing both environments. An examination of contemporary research in these areas reveals that there are lessons to be learned in both directions. The similarities inherent in the two environments reaffirm that government deployments can benefit by capitalising on the knowledge gained through private enterprise experiences with Web 2.0 technologies. Government implementation of Web 2.0 has a strong policy focus and private enterprises could consider integrating the knowledge learned from these deployments to maximize the benefits obtained through Web 2.0 technologies.



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Keywords

Enterprise 2.0; Government 2.0; Web 2.0; emergent social platform; social twins.

66 Understanding the similarities between the tools, technologies and trends in both environments provides reassurance to government departments, endeavouring to increase the pace of transformation via Government 2.0 that they can indeed look into private enterprise for guidance.

1. Introduction

The term Web 2.0 was first coined by Darcy DiNucci in 1999 (DiNucci, 1999) and was subsequently used by Dale Dougherty, the Vice President of O'Reilly Media in 2004 (O'Reilly, 2005). The term was used to highlight that the Web was more significant than ever, with exciting new applications and sites emerging with surprising regularity despite the dot-com collapse (O'Reilly, 2005). Murugesan (2007) identified several principles that distinguish Web 2.0 from the traditional Internet or Web 1.0. For example, Web 2.0 facilitates flexible web designs and creative reuse and/or updates. It also provides an effective user interface, facilitates collaborative content (create and modify) and enables the creation of new technologies by reusing or combining different applications. Finally, Web 2.0 allows the creation of social networks with common interests and assists in gathering collective intelligence.

Web 2.0 can be considered as a gravitational core, linking all sites that implement some, or all, of its principles (O'Reilly, 2005). These principles enable users to interact with the Web via smarter online applications, personal story-driven marketing and networked applications which form an extensive computing platform not previously believed possible (Musser & O'Reilly, 2006). Web 2.0 tools augment the Web by simplifying collaboration between and among users. The use of these tools can easily be distinguished by three main capabilities, namely Community (allow contributors to collaborate and share information easily), Mashups (data from different sites can be pulled together in order to provide new values with different combinations of data) and Asynchronous Java-script and XML (AJAX) (technological pillar of Web 2.0 that enables the creation of responsive user interfaces which supports the previous two capabilities) (Ankolekar, Krötzsch, Tran, & Vrandecic, 2008).

Building on these three capabilities, a multitude of Web 2.0 tools have been created including social networking, wikis and blogs (Ankolekar et al., 2008). Some of the Web 2.0 applications examined by O'Reilly and his colleagues include (McAfee, 2009: 45):

- · Wikipedia collaborative encyclopaedia
- Facebook and MySpace social networking sites
- Delicious social bookmarking
- Typepad and Blogger blogging platforms
- Google web search engine

According to the Web site rankings of the most-visited sites by Google's DoubleClick Ad Planner (Google, 2010) in May 2010 and Amazon's Alexa Traffic Rank (Alexa, 2010); Facebook, Wikipedia, Youtube, QQ and Wordpress are among the ten most popular sites in the world, with Facebook leading the rankings. These rankings demonstrate that Metcalfe's law ¹ of the network effect (Hendler & Golbeck, 2008) seems to play a role to ensure an effective integration of Web 2.0 technologies into the daily lives of users (McAfee, 2009: 46). For many, the term Web 2.0 suggests a different version of the Web, but in fact it represents a change in the way developers and end users utilize the Web.

When McAfee introduced his idea of utilising web-based tools within an enterprise in 2006 - which led to a concept aptly called Enterprise 2.0 - he described it as "the use of emergent social software platforms inside organisations or across organisations that are close partners" (Bain, 2007; McAfee, 2006). He suggested that Enterprise 2.0 would be successful due to three principal reasons. The

¹ Metcalfe's Law represents a hypothesis that while the cost of networks grows with the number of connections, the value of a network is proportional to the number of users. It essentially means that a network has higher value as more users are interconnected via the network.

first reason is the simple, free, readily available platforms for self-expression allowing users to easily express themselves online and potentially reach a wide audience who share the same views, opinions or interests. Secondly, Enterprise 2.0 has the appeal of emergent structures, rather than imposed ones. This relates mainly to how software developers allow users to define a structure with which they are comfortable instead of imposing a fixed structure on the users. An early example of this is tagging content with specific tags that are useful to users (Farrell, Lau, Nusser, Wilcox, & Muller, 2007). The final reason is the capability for users to more effectively filter large amounts of information using a variety of tools, referred to as 'Order following chaos'.

These principles were also reconfirmed by Joe McKendrick (2009); an independent researcher studying the impact of Information Technology and management changes on organisations as well as markets. McKendrick (2009) has identified five compelling forces within the modern workplace, namely:

- 1. From pyramids to participation: The hierarchical structure within organisations is evolving towards a more balanced decision making structure. Employees, business partners and customers are enabled to make decisions that have an impact on the organisation.
- 2. From employment to empowerment: Employees are becoming more empowered as they are equipped with transferrable skills such as specific management knowledge or tool knowledge and resource networks that can be utilised in any environment. Through the use of social media tools, the workspace has been transformed into a giant virtual workspace.
- 3. From "high tech" to "high touch": Technologies are more likely to succeed when the human element is emphasised. The success of social media tools is a great example of this trend.
- 4. From "busy to "burst" economy: This is related to how 'burst' employees are valued for their ability to deliver information regardless of their location and time zone. Traditional or 'busy' employees have been judged merely on their ability to keep busy during standard working hours.
- 5. From vertical to virtual organisations: Organisations can no longer afford to run every business activity on their own resources. This leads to a network with a multitude of partners or communities of businesses assisting an organisation with specific business activities.

These five forces are acting as catalysts in transforming organisations across the globe. Most of today's organisations and their participants are part of an emerging global network that can rapidly deliver information and capabilities, regardless of borders or industry boundaries. Buytendijk et al. (2008) agree that these changes are occurring within organisations, having an impact on business activities, both internal and external.

Similar changes are also occurring within government agencies as more employees are embracing Web 2.0 tools in their business activities, either officially or unofficially. This has led to the introduction of a concept similar to Enterprise 2.0, to indicate the usage of Web 2.0 tools within a government department. Government 2.0, also known as eGovernment or digital government represents the use of web-based tools in order to promote an effective and efficient communication channel between employees and the public or between the government and the private sectors (Hau-Dong, Chong-Yen, & Ching-Bang, 2010). This view of improving communication could be linked to the premise that employees are less productive within a large organisation due to the siloed environment that exists (Gilchrist, 2007). This environment, where there is a lack of communication and information sharing between departments necessitates an effective communication channel that not only dissolves the siloed environment, but also promotes a higher collaborative and effective work culture among employees.

Both Gilchrist (2007) and Matuszak (2007) argue that the challenge of effective internal and external communication increases as an organisation increases in size. Although these authors are referring to private corporations, it seems reasonable to infer that large government organisations would also experience similar challenges. Large government agencies can take advantage of web-based tools to meet this challenge. Governments are also realizing the importance of becoming more agile and better connected (Tapscott, Williams, & Herman, 2007). Due to the rise of terrorism - new forms of military conflict and the declining relevance of managing physical borders - improved cooperation is required between internal government agencies as well as between governments. The use of Web 2.0 technology allows governments to achieve this while lowering financial costs and streamlining their operations (Tapscott et al., 2007).

The terms Enterprise 2.0 and Government 2.0 have been extensively employed in their respective environments. The purpose of this paper is to consider these two concepts in parallel in order to improve understanding of the similarities and differences between them and to explore the implications of these for improving the deployment of Web 2.0 technologies in both environments. The analogy that will be used to explore these concepts is that of 'social twins', taking into consideration both internal and external factors that characterise the similarities and differences. Similarities between the two concepts will be explored first, followed by an examination of the differences. Current research in both areas will be reviewed, with a focus on how the tools have been used in both environments. This will lead to a discussion of the lessons to be learned from the exploration of similarities and differences, including recommendations related to the adoption and integration of tools in each type of environment.

2. Similarities between Enterprise 2.0 and Government 2.0

Interest in the use of web-based technologies in both the public and private sector is evidenced by the growing number of publications in the areas of Enterprise 2.0 (Bhatti, Baile, & Yasin, 2011; Wang, Greaseley, & Thanassoulis, 2011) and Government 2.0 (de Kool & van Wamelen, 2008; Eggers, 2007; Mergel & Schweik, 2012; Tapscott et al., 2007). It is noticeable that these two sectors use technology in similar ways, namely to enable effective collaborations either internally or externally, to improve the business activities / communications between different parties such as customers, employees or business partners and to promote higher levels of transparency within an organisation (McAfee, 2009; Mergel, Schweik, & Fountain, 2009).

When McAfee (2006) first introduced the concept of Enterprise 2.0, he created a framework called SLATES, which identifies the technology elements or features used to realize the benefits identified above. The elements below were identified when he first introduced the concept of Enterprise 2.0:

1. Search: This helps users to find information, not only through page layout and navigation, but by using keywords. Differences in success search rates have been identified in studies by Forrester Research and Pew Internet & American Life Project (Cook, 2008; McAfee, 2006) where they examined keyword searches done through the Internet versus an intranet. This largely depends on the second component of SLATES, namely the links.

- 2. Links: Google's understanding that any tool is more useful in conjunction with information (and vice versa) has allowed it to attract users to its tools (O'Reilly, 2005). Coupled with Google's ability to take advantage of the information included within web page links, this has ensured its status as an online search engine giant (McAfee, 2006). Links provide access to useful information and create structure for online content. The difference in search rate success mentioned above is due to the high volume of information available on the Internet when compared to what is available via a corporate intranet. If employees are given the opportunity to create more links, there is potential for more successful search rates.
- 3. Authoring: People instinctively have the desire to author, express their opinions and share their experiences. When employees are given the tools to create information, an intranet can become a living body of collective information. There are two types of Web 2.0 authoring, namely individual authoring (blogs) and group authoring (wikis).
- 4. Tags: According to a Forrester Research survey (Cook, 2008; McAfee, 2006) many employees desire better content categorisation, which can be obtained by allowing them to attach tags (one-word descriptions) to their intranet content. Taxonomies (typologies) created by experts are becoming less popular with users (McAfee, 2006) and are being replaced with folksonomies² (Vander Wal, 2007).
- 5. Extensions: By combining authoring with linking, tag frequency patterns can be used as extensions to information and relationships. Tags which are repeatedly used by many employees also offer a way of valuing the tagged information and can provide meaning or create relationships across various parts of the organisation.
- 6. **Signals:** These are alerts sent to users when new information is created and usually involve any information of interest. Technologies used for alerts include RSS (Really Simple Syndication) and email. This concept is effectively identical with 'permission marketing'³ (Marinova, Murphy, & Massey, 2002).

McAfee's (2006) list of technology elements or features was extended by Hinchcliffe (2007) who added four new elements and called the framework 'FLATNESSES'. The four additional elements are Freeform, Network-oriented, Social and Emergence. Rather than technology elements, the additional elements represent possible outcomes from using the original technology elements and were included because Hinchcliffe felt that SLATES 'needed to convey the intended outcomes clearly' from the technology elements for the users (Hinchcliffe, 2007). These additional elements are described below:

- 1. **Freeform:** This outcome refers to the flexibility of utilising different technology elements for specific purposes. Some would argue that it is similar to Extensions where it refers to the new information that could be gained from the flexibility but this outcome is more towards the concept that it is possible to utilise different technology elements as a group.
- 2. Network-oriented: Hinchcliffe (2007) uses this outcome to define that all of the technology elements as well as the outcome elements must apply not only to applications that are delivered over a network but also to the content as well. The content must be fully web-oriented, addressable and reusable depending on the need.

² A system of classification derived from collaboratively creating and managing tags for content.

³ This refers to a relationship with customers who have given a marketer permission to send them information about a product, service, special offer or sale.

- 3. **Social**: This outcome specifically observes the non-hierarchical processes from using the technology elements as well as the level of transparency that using Enterprise 2.0 tools brings. Traditional processes like decision making are made more effective because the elements provide a new way of working collaboratively where everyone shares information.
- 4. **Emergence:** As a result of the technology elements (SLATES) and the three outcome elements above, new methods of conducting business activities as well as improving communication, both internally and externally, are surfacing. This outcome represents the endless possibility of benefits for an organisation by using the technology elements.

In order to understand how these technology elements could benefit or be used within organisations, the elements can be expressed as a four-category model (shown below), known as the 4Cs approach (Cook, 2008):

- 1. **Communication** Platforms that allow people to converse with others via text, image, voice or video. This functionality could be related to the Authorship component.
- 2. **Cooperation** Enabling users to share content with others either in structured or unstructured ways. Both Search and Authorship could be linked to this functionality.
- 3. **Collaboration:** Encourages users to collaborate with others on specific issues either directly or indirectly. The Authorship and Links component could be related to this functionality.
- 4. **Connection:** Networking technologies allow users to connect with other users directly or via similar content. The Signals, Extension and Tags components all relate to this functionality.

The 4Cs approach represents the primary functions of social media or social software as depicted by Cook (2008). The model diagrammed below (Figure 1) was created by combining the 4Cs formality/ interaction matrix, the social software footprints and the 4Cs social software technology framework (Cook, 2008).



Figure 1: Adapted 4C model (Cook, 2008)

Cook's (2008) adapted 4C model (Figure 1) shows how organisations can benefit from the particular elements that fit their specific needs. The formality/interaction matrix visualises the relationship between collaboration and connection, which requires a higher level of formality as it depends on relatively structured activities to gain results; while collaboration and cooperation requires a higher level of interaction due to the focus on group activities. Organisations can consider the appropriate working culture when introducing different forms of social media and make use of the matrix when developing and implementing effective organisational change.

To show how different organisations could have different software footprints, Cook took three general types of organisations as examples, shown in the shaded areas in Figure 1 (Cook, 2008). The first type (1) has a very informal, collaborative culture. The second type (2) has a very formal, highly collaborative culture while the third type (3) is both informal and formal, with more focus on individual effort but some group problem solving. The different footprints depict how the use of web-based tools in organisations depends on their needs as well as their environment. For example, a government agency might require a high level of formality but a lower interaction level, which will place their software footprint into the first category.

Any available technologies from Web 2.0 which are based on the 4Cs social software technology framework could then be applied to the appropriate category/ies to suit an organisation's culture. Based on Cook's diagram (2008), the software footprints for a private enterprise or government agency could be different or similar to each other depending on their needs; however it is important to understand that the underlying web-based technologies used by both environments are the same. It is also important to understand that Cook's adapted diagram provides a standard guide for organisations to adapt the tools to their needs, which allows organisations to have different software footprints than depicted here.

3. Differences between Enterprise 2.0 and Government 2.0

The differences between the two concepts are mainly based on the environment in which the tools are used and the goals that an organisation wants to achieve. The list below highlights the cultural and environmental differences between the two concepts regarding the implementation of new technology (McAfee, 2009). The differences also relate to the five major forces that are affecting the workplace and acting as a differentiator between the two concepts. As the five forces are collectively moving towards a more human and collaborative business approach, the differences between the two concepts (Enterprise 2.0 and Government 2.0), such as the technology used (high tech - high touch) and the importance of employee feedback (pyramid - participation), are becoming more evident within the two different environments as the use of these web-based technologies sometimes requires different implementation approaches between an enterprise environment and a government environment. Radick (2008) outlines the key environmental differences and their implications for the two environments as follows:

1. Risks

Mark Drapeau, an associate research fellow at the National Defence University mentioned in his blog that the risks associated with web-based tools are higher for government when compared to the impact for other organisations such as Google's search algorithm leaking publicly (Drapeau, 2008). This is due to the fact that government agencies hold sensitive information such as military movements and even tax payers' information which is highly confidential (Schellong, 2008; United Nations, 2010: 26).

2. Administration Change

Within government agencies, there is always a chance that employees (both senior and junior) might be transferred to a different department or position especially when new leaders are elected. This may impact on any technology implementation that would have occurred within the agencies, especially if a senior manager has different ideas about implementing the technology. Private enterprises are usually quite resistant to major administration change because of the potential impact of the change on their business activities (Tapscott & Williams, 2006).

3. Intra-agency collaboration

Most government agencies do not only collaborate internally, but also collaborate with different partner agencies for specific projects such as inter-agency training programmes (United Nations, 2010: 27). Government agencies usually have a complex organisational structure with a higher number of internal agencies when compared with internal departments in private enterprise. Private enterprises are usually streamlined to allow more effective management of business processes.

4. Bureaucracy

Government has multiple levels of bureaucracy which lead to long work processes. It usually takes a few months before any deliverables from reviews, approval or even presentations are visible (Eggers, 2007: 101). This process can result in longer planning or execution time when various regulations and policies have to be consulted. For non-governmental organisations, the bureaucracy levels are lower due to the associated costs related to any delays within the organisation.

5. Demographics

Based on the Australian Bureau of Statistics (2010) report, government employees tend to exhibit a very different demographic than employees in the private sector. They tend to be slightly older which means they are not as familiar with web-based tools. Government employees who have been working for a long period of time will have established ways of working leading to a resistance to change. Furthermore, they are motivated by different needs in their work, such as deliverables and ease of use instead of innovation. This complicates any cultural change that social media requires.

6. Available Resources

There is a constant battle for funding within government agencies, mostly because every agency has a fixed budget that affects anything from the number of staff to innovative technology such as social media. In order to accomplish their everyday activities, government agencies tend to focus on much more pressing and concrete agency needs rather than innovative activities (Landsbergen & Wolken, 2001; Considine, Lewis & Alexander, 2009: 45). There is also often a lack of project champions and leadership in order to support necessary tasks to make social media a success. Private enterprises are usually more flexible in terms of allocating resources as the numbers of internal departments are smaller and the organisational structure less complicated.

Table 1 below shows more clearly the differences in the issues that exist between the two environments.

Table 1: Differences based on similar cultural or environmental issues

Enterprise 2.0	Government 2.0	Impact on Government 2.0			
Risks					
Organisations usually have to protect specific information such as intellectual property, customer databases and financial information. Minimum or moderate risk, since it will only impact the organisation.	A government usually has more sensitive information such as tax payers' information, future development projects, military information and more. High risk as it will have an impact on a larger scale.	Government agencies are more focused on developing control policy in order to lower the risks associated with social media technology.			
Administration Change					
Few changes on the senior management level. This is due to the impact on business activities if that occurs.	Regular changes to administration due to e.g. end of term, re-election of a new government or a reshuffling of an existing government structure.	The change to government administration leads to slower technology uptake compared to Enterprise 2.0.			
Intra-agency collaboration					
More streamlined structure, which minimises non-essential departments. Associated with running costs within an organisation.	Many agencies and complex structure that has been built into the government. This may lead to inter- collaboration between associated agencies with a common interest or goal.	Government usually develops formal communication procedures which are not streamlined among the different departments. This also impacts the speed of technology uptake among employees.			
	Bureaucracy				
Less prevalent as delaying any business activities are financially damaging.	Complex structure leads to more bureaucracy. Decisions require time to be processed and approved by the different levels of management.	Government often develops complex usage and communication policies which impair the benefits that social media technology provides such as speedier communication and mass collaboration activities.			
Demographics					
Quicker to obtain new employees due to their competitive need in their respective business areas.	Not as quick in replacing their employees. Higher number of older employees. However, not all of the older employees are resistant to new technology.	Government agencies are usually slower in adapting to new technologies due to the higher older workforce.			
Available Resources					
More resources due to the lower competition for budget.	Strict budget impacting their running costs. Have to be very economical in investing new technology.	The strict resources limit the choices of social media technology to those that fit with requirements such as improved security capabilities, available business tools and licensing numbers for employees within agencies.			

Table 1 summarises the differences between Enterprise 2.0 and Government 2.0. Some of the identified issues could be mitigated through the exchange of knowledge between the two environments where the web-based tools are used. For example, a government agency could adopt a similar organisational structure as an enterprise in order to lower the bureaucracy that exists. On the other hand, an enterprise could adopt lessons learned from a government's organisational policy, which allows them to protect their needs and guide their employees more effectively, while utilising web-based tools. Some research has been conducted in the area of organisational structure (Capuano, Gaeta, Orciuoli, & Ritrovato, 2010; Paton & McCalman, 2008) and policy development (Husin & Hanisch, 2011; Woolcock, Szreter, & Rao, 2011). In the next section, the contemporary research conducted in both areas is examined in order to identify any differences or similarities of usage within the two concepts.

4. Contemporary research in the areas of Government 2.0 and Enterprise 2.0

There has been some research conducted within the areas of Enterprise 2.0 and Government 2.0 but there are definite differences between the research concentrations. Most of the present research for Enterprise 2.0 has concentrated on the enhancement of the technology itself while little research has been undertaken with regard to the social impacts on users. The research around Government 2.0 is mainly focused on both the theoretical and the practical uses of improving specific government activities as well as on providing a higher level of transparency both internally and externally.

4.1 Enterprise 2.0

Some of the contemporary research includes enterprises based on social networking sites such as IBM's Beehive (DiMicco, Millen, Geyer et al., 2008), social bookmarking tools such as IBM's Dogear (Millen, Feinberg, & Kerr, 2006) and MITRE Corporation's Onomi (Damianos, Cuomo, Griffith, Hirst, & Smallwood, 2007). Basic social research has been done in the Beehive research as well as that undertaken into the Onomi initiative, where the researchers evaluated a small number of users' interactions with the systems. The research conducted by IBM (Ehrlich & Shami, 2010) on the usage of micro-blogging during business activities included qualitative interviews to gain insight into the implications of using the tool. Other research investigated the impact of tools such as enterprise wikis (Bhatti et al., 2011; Stocker & Tochtermann, 2011), combining an Enterprise Resource Planning (ERP) system with the Enterprise 2.0 concept (Wang et al., 2011), utilising Enterprise 2.0 to improve organisational knowledge management (Back & Koch, 2011) as well as using ontology as a means of improving Enterprise 2.0 usage (Mangione, Miranda, Paolozzi et al., 2009). Furthermore, research has been conducted on the usage of Enterprise 2.0 to improve specific business processes such as in the areas of team collaboration (Zeiller & Schauer, 2011) and enterprise architecture (Buckl, Matthes, Neubert, & Schweda, 2011).

As can be seen from the contemporary research highlighted above, there is a high degree of interest in improving the tools available for Enterprise 2.0 through the combination of existing systems such as ERP or even using adopted concepts such as ontologism from different fields of research. Examples of the tools included in the research are:

1. Wikis:

Utilised as a knowledge management centre for service oriented organisations within the field of engineering (Bhatti et al., 2011; Stocker & Tochtermann, 2011)

2. Social networking platform:

Utilised as a way of connecting employees who are globally located within different locations and providing a social platform for interactions about common interests and projects. (DiMicco et al., 2008; Millen et al., 2006)

3. Combination of tools (Wikis, social networking platform and micro-blogging et cetera):

Utilised to improve the existing business activities workflow within an organisation by combining those tools to provide a seamless and effective workflow process. E.g. improving ERP workflow processes and other related business activities as well as improving the learning process within organisations with the use of ontology based concepts. (Mangione et al., 2009; Wang et al., 2011)

4.2 Government 2.0

Most of the research that has been conducted within this area is geared towards effectively implementing the web-based tools within a government environment. This is due to the high level of control that is usually associated with government. For example, Osimo (2008) produced a European Commission report on why and how Web 2.0 tools are useful. This provided background on web-based trends and their impact on government related activities. There was also a case study on NASA's successful open collaboration website, DASHlink against the boundaries of government policies and regulations (Barrientos, Foughty, McIntosh, & Matthews, 2009) where one of the main lessons was ensuring that policy makers and policy compliance officers were involved early in the project; as well as the development of a diplomacy wiki called Diplopedia by the United States State Department's Office of eDiplomacy (Bronk & Smith, 2010) based on the success of Intellipedia (McAfee, 2009 p. 108).

Within Australia, there are a few prominent Government 2.0 initiatives such as the Government 2.0 Taskforce (Australian Government Information, 2010) which was founded in view of the increased interest in public sector information and online based engagements. The taskforce has two main objectives: to increase the openness of government through publishing government information publicly to promote transparency, innovation and value add for possible users of the available information; and to encourage online engagement with the aim of collecting information, perspectives and resources wherever possible through active collaboration.

The taskforce was then renamed to the Australian Government Information Management Office (AGIMO) under the Department of Finance and Deregulation as part of the first initiative for the Australian government into the area of Web 2.0 (Tanner, 2010). The role of AGIMO is "to make Australia a leader in the productive application of information and communication technologies (ICT)" (The Australian Government Information Management Office, 2011) for government related services as well as for administration topics.

AGIMO has released a number of programmes and publications, which provides guidance to other departments within the Australian government about using Web 2.0 tools. The office also runs the Intra Government Communications Network (ICON) which provides communication links for government agencies across the Australian Capital Territory as well as providing service delivery to the primary online presence for the Australian government (The Australian Government Information Management Office, 2011).

Other initiatives using Web 2.0 within the government include the following:

1. SAGEMS which is an acronym for a short messaging service that acts as an instant messaging system among different South Australian government departments (Gauci & Jones, 2010) and

2. the Department of Innovation, Industry, Science and Research (DIISR) blog platform aptly entitled "Innovation Blog" (Department of Innovation, 2010).

This blog acts as a semiformal channel for government employees to gain updates on new innovation developments within the government sector, as well as procuring ideas for new innovations and highlighting examples of their use within the public sector. Research has also been done to review the policy development procedures that government agencies could utilize to develop effective organisational policies (Husin & Hanisch, 2011). This is due to the necessary control required by most government agencies before implementing a highly flexible web-based tool. Some of the examples of tools highlighted by the research include:

1. Wikis:

Utilised as a common knowledge base for different government agencies across the government level. Information that is available on the wiki includes procedures, policies and other agency related information (Barrientos et al., 2009; Bronk & Smith, 2010).

2. Blogs:

The tool is used as a way to communicate information to employees in an informal situation. This allows the government agency to build a higher level of trust as well as transparency among employees. (Mcclure, 2010; The Australian Government Information Management Office, 2011).

The examination of the contemporary research from both areas has shown that tools such as wikis are used to cater for different audiences and size as well. Within the enterprise area, the wiki is used to provide specific information such as engineering reports for a department, while within government wikis are used to store different information that is accessible to many departments such as general policies and guidelines for different government agencies. This examination also shows that enterprises are much more confident using multiple web-based tools within the same platform while governments are more confident utilizing specific web-based tools for specific business activities.

As it can be seen from the contemporary research in both the Enterprise 2.0 and Government 2.0 areas, the usage of similar tools is marginally different depending on the environment and needs of the enterprise or government sectors. Enterprise 2.0 research mainly focuses on improving the tools that are used along with pre-existing tools or processes. It also focuses on understanding the impacts on the utilization of specific web-based tools within a business environment. Research on Government 2.0 focuses on implementing the tools within a government environment. This could be linked to the highly controlled environment, which may require a different implementation approach for these web-based tools.

5. Implications for Practice

This paper has explored both the technical and organisational aspects of deploying Web 2.0 technologies in two different environments branded as Enterprise 2.0 and Government 2.0. The underlying technologies and principles of Web 2.0 are consistent in both environments, similar to the way that real-life twins have identical DNA. The external influences on both environments are also similar to some extent. For instance, McKendrick's (2009) forces, enabled by the use of Web 2.0 tools, are transforming both enterprise and government organisations. This is analogous to the way in which twins from the same family are influenced by family values, traditions and norms.

However, even twins are not completely identical. As they move through life, twins will encounter different experiences which will help to shape their personalities. Private enterprises and government organisations also have different 'personalities' or cultures. These are, to some extent, affected by the different contexts within which they operate and partly by the culture or traditions that have evolved over time. Table 1 highlighted some of these key differences in the two environments.

Understanding the key similarities can, in itself, provide guidance for the deployment of Web 2.0 technologies in either environment. Since the tools and principles are identical, knowledge about these can be shared across the two domains. The research indicates that, for various reasons, private enterprises are more advanced in their use of Web 2.0 tools and technologies, and so governments can look to private enterprise for guidance and inspiration in deploying new tools and technologies. This paper identified a range of Web 2.0 technologies and highlights the potential business benefits that can be realised through their use in both government and enterprise environments. In particular, the 4C model (Cook, 2008) can be used to identify appropriate Web 2.0 technologies that align with cultural characteristics and organisational goals.

Awareness of the differences between Enterprise 2.0 and Government 2.0 can also be enlightening. On one hand, Enterprise 2.0 usually has a less complicated and constrictive environment where the benefits of web-based tools can be reaped more effectively. On the other hand, Government 2.0 requires a more controlled approach without sacrificing the benefits of using the tools. As a result, research into Government 2.0 has focused on implementation issues such as the development of appropriate policies.

The key message derived from this comparison is that there are potential lessons to be learned and benefits to be transferred in both directions. It is not surprising that government departments tend to lag behind private enterprise in terms of technology implementation and adoption. Understanding the similarities between the tools, technologies and trends in both environments provides reassurance to government departments endeavouring to increase the pace of transformation via Government 2.0 that they can indeed look to private enterprise for guidance. It is the lessons in the other direction which are more surprising. Due to the differences in the two environments, the research into Government 2.0 has focused on implementation issues such as policy development and the research results can be applied by private enterprise to maximize the benefits delivered through new Web 2.0 technology implementations.

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Advancing Open 3D Modelling Standards in National Spatial Information Policy

Individuals and organisations around the world - facing extraordinary challenges and new opportunities - are together engaged in numerous projects, involving natural and built environments. Spatial information policy is at the heart of these projects. The information technologies available enable individuals to observe, measure, describe, map and portray these environments with increasing ease, flexibility and precision. In our time, individuals create digital geographic objects that reflect the ones of the real world, so that we can better understand it, sharing our understandings and managing our diverse activities.

National Spatial Data Infrastructures (NSDIs) provide public information about survey points, elevation, roads, political boundaries and water bodies. Basic aerial images are widely useful, as are data about land use and land cover. The purpose of this paper is to help policy makers understand the role of policy in advancing standards that support the goals of INSPIRE, the overarching European SDI effort, and SDIs in general.

To illustrate the role of policy in SDI formation, the National Spatial Data Infrastructure (NSDI) executive committee in the Netherlands called Geonovum, will be examined. It has been working on behalf of the Dutch Kadaster, the Netherlands Geodetic Commission and the Dutch Ministry of Infrastructure and Environment towards the establishment of a national 3D standard that aligns both the existing national 2D standards and the International OGC standard for 3D geo-information, CityGML (OGC, 2012). The Netherlands' CityGML-based national 3D standard is an important step towards the inclusion of comprehensive 3D information about the built and natural environment within the Dutch SDI.



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Geonovum and partners have made 3D information a key part of the Dutch National Spatial Data Infrastructure.

1. Introduction

The European Commission (EC) has extensively promoted the reuse of public sector information, with basic geospatial data being of a particular focus. The European Commission's INSPIRE Directive, established in 2007, is a policy infrastructure for sharing geospatial information in Europe to support Community policies and activities that have an impact on the environment (EC, 2007). Although environment is the focus, the information gathered, maintained and shared will also bring benefits to many non-environmental activities.

Economic growth is a key driver for NSDI development. In December 2011, in its most recent call for freely available public sector data, the EC announced an 'Open Data Strategy for Europe' (European Commission, 2011), which is expected to deliver a \notin 40 billion boost to the EU's economy each year. "Europe's public administrations are sitting on a goldmine of unrealised economic potential: the large volumes of information collected by numerous public authorities and services" (EC, 2011). A significant percentage of this information is geospatial, referring to or deriving from location data about people, places and things.



Figure 1: A spatial data value chain - "Information Marketplaces - The New Economics of Cities, (Accenture, 2011).

Open data depends on open standards for ICT interfaces and encodings. Referring to the Open Data Strategy, Neelie Kroes, Vice President European Commission responsible for the Digital Agenda, explained that "In all sectors, standards and standardisation drive competitiveness, promote innovation, and benefit consumers through competition ... in the ICT sector, having the right standard-setting procedures and interoperability rules creates the level playing field needed for all parts of the machine to fit together: devices, applications, data repositories, services and networks" (Kroes, 2011).

Standard ICT interfaces and encodings for geospatial data and geospatial information systems should address a wide range of requirements. These requirements tend to be complex compared to those of most other kind of information and information systems. The complexity derives from the diversity of geodesy systems (measurement of the Earth and Earth coordinate systems), 2D vector geographic information systems, 2D raster-based geographic information systems, 3D representations of natural and built objects, Earth imaging systems, navigation systems, mapping systems and systems for naming and describing geospatial features and phenomena.

In 1994, members of the international community of geospatial technology providers and users came together in the Open Geospatial Consortium (OGC) to develop the special interfaces, encodings and best practices (OGC, 2011); this technology sector requires realising the vision described above by Neelie Kroes, as it applies to all geospatial data.

The OGC has developed relationships with a wide variety of other standards development organisations (SDOs) and industry associations (OGC, 2011) to maximize the possibility organisations with different standards to actually "work together". Such relationships are critical as 'geospatial' is a crosscutting issue that is relevant but not central to the agendas of other standards efforts. Most other ICT standards organisations must - at some point - take decisions about how to encode geospatial information and how to enable client-server communication related to geoprocessing requests and responses. These organisations discover 1) that this is seldom simple (Reed, 2004) and 2) that arbitrary decisions inevitably introduce non-interoperability problems for developers and users. Thus, the OGC's policy of active collaboration with other SDOs is critical for the free flow of geospatial data and geospatial processing instructions within the global information system.

In the modern and highly connected world, all countries need to rely on many of the same open standards if they are to take full advantage of the global information infrastructure and the global economy supported by this infrastructure. For this reason, INSPIRE and other SDI programmes in Europe depend on OGC standards, many of which in turn rely on or accommodate standards from ISO/TC 211 Geographic Information/Geomatics and other standards organisations.

The purpose of this paper is to help policy makers understand the role of policy in advancing standards that support the goals of INSPIRE or SDIs in general. Therefore, this paper presents a case study. Geonovum, the National Spatial Data Infrastructure (NSDI) executive committee in the Netherlands is being examined and the way it has been working on behalf of the Dutch Kadaster, the Netherlands Geodetic Commission and the Dutch Ministry of Infrastructure and Environment in order to establish a national 3D standard that aligns to both the existing national 2D standards and the OGC standard for 3D geo-information, CityGML (OGC, 2012). This national 3D standard is an important step towards the inclusion of comprehensive 3D information about the built and natural environment within the Dutch SDI.

One of the reasons why this particular case study is useful is the fact that it portrays a highly evolved model of NSDI building that adds to lessons learned in earlier NSDI efforts in the Netherlands and elsewhere. Much can be learned from Geonovum's approach in using policy and other measures to accelerate the implementation and uptake of open standards for data, interfaces and encodings.

As the world's population is concentrating in cities around the world, governments have an increasing mandate to manage urban resources, waste streams, risks, traffic flows, zoning, energy usage and more. Many of these management issues, such as storm water and wastewater management, energy usage, and pedestrian traffic involve 3D and 4D (temporal) information, and thus 3D geoinformation becomes increasingly important.

CityGML is already in use in Spatial Data Infrastructure programs in Germany, France, Malaysia, Abu Dhabi and other countries, where it provides an important platform for the transition from 2D to 3D data. The Netherlands, however, is the first country to have made CityGML a national standard. Other countries will quite likely do the same for similar reasons, and therefore it will be useful for their policy makers to look at why and how this has been applied in the Netherlands.

CityGML is an information model and eXtensible Markup Language (XML) based encoding for the representation, storage as well as the exchange of virtual 3D city and landscape models. It provides a standard model and mechanism for describing 3D objects with respect to their geometry, topology, semantics and appearance, and defines five different levels in detail. CityGML is highly scalable and datasets can include a very wide variety of different urban entities. Thus, it supports the general trend towards modeling individual buildings and urban landscape features, but also whole sites, districts, cities, regions, and countries.

CityGML allows users to share virtual 3D city and landscape models for sophisticated analysis and display tasks in application domains, such as environmental simulations, energy demand estimations, city lifecycle management, urban facility management, real estate appraisal, disaster management, pedestrian navigation, robotics, urban data mining, and location based marketing. Because CityGML is based on the OGC Geography Markup Language Encoding Standard (GML), it can be used with the whole family of OGC web services for data accessing, processing, and cataloging. These are all open, consensus-derived international standards. CityGML also plays an important role in bridging Urban Information Models with Building Information Models (BIM) to improve interoperability among information systems used in the design, construction, ownership and operation of buildings and capital projects.

The OGC 3D Information Management (3DIM) Domain Working Group, a group whose mission is to facilitate the definition and development of standards for sharing and accessing 3D geo-information, gave the 3D Pilot NL organisers a special award in 2011. According to the Working Group, "The developments in the Netherlands serve as an inspirational example of a national implementation of a 3D standard" (OGC, 2011).

2. The vision behind the 3D Pilot NL

NSDI efforts in general are based on the realisation that standards provide value. Standards support interoperability and help reduce integration costs. They provide flexibility to insert new technologies rapidly and they provide the ability to extend legacy systems to interoperate with new sources of data and new technology services. Standards ultimately make data more discoverable, accessible and usable, which increases the social and economic value of the data. They also promote transparency, accountability and manageability.

The value of open standards has been demonstrated many times over with respect to geospatial data. Geonovum and other groups recognised the value of creating a national standard for 3D data in the Netherlands based on open standards that provide interoperability with open standards for 2D geospatial information. 3D data includes both geospatial and 'building spatial' data; that is, data about the size, shape, appearance, function and content of buildings and physical infrastructure elements such as streets, bridges, pipes and wires.

All countries can benefit from urban 3D models and all cities need elevation data, but, particularly when considering the increased risks of flooding that come with climate change, the Netherlands has a unusually acute need. Accurate and comprehensive 3D data is especially important, in cases where the terrain is flat, heavily built on and close to the sea level. However, in addition to planning and managing flood control, many other benefits were seen to derive from richer 3D data. Promoting tourism, civil security, high tech innovation, business development and efficiencies throughout the building lifecycle were among the reasons for organising the 3D Pilot NL.

3. 3D Pilot NL players and methods

The 3D Pilot NL brought together over 65 private, public and scientific organisations that cooperated in order to advance 3D developments in the Netherlands. The four national organisations that helped establish this collaboration network are the Kadaster, Geonovum, the Netherlands Geodetic Commission and the Dutch Ministry of Infrastructure and Environment. These national organisations recognised the importance of aligning Dutch national standards for 3D content data sharing with relevant international standards. In addition, they value the importance to align to the existing standards and efforts of the 2D domain. The Netherlands has well-established national standards on geo-domain models, but as in most countries, they are all 2D. The new 3D standard preserves valuable 2D concepts from the existing national standard for large-scale topography (Information Model Geography: IMGeo), and extends them with 3D concepts from CityGML. The 3D standard is therefore not just another standard on geo-information; instead the realised CityGML implementation profile bridges the 2D and 3D standardisation developments.

The leading organisations of the Dutch 3D standard effort recognised the importance of enlisting the support and cooperation of a broad base of technology providers and users in the public, private, academic and research sectors. And indeed the involvement of many stakeholders in the development of the standard proved to be essential in obtaining the necessary support for the national 3D standard. The involvement was realised through a 3D Pilot.

The pilot had quite ambitious goals: The creation of a test bed based on use cases related to a predefined test area in order to find consensus on a 3D standard NL, which should lead to a breakthrough in 3D. This required a set of use cases based on well-defined 3D requirements. One difficulty in creating such use cases is that users may not be aware of all the potentials of 3D techniques. Therefore, it was important for users to think about and express their requirements when confronted with the technical possibilities during the research process.

Thus, an inclusive research process was a guiding principle of the methodology of the 3D pilot. In January 2010, more than 45 organisations responded to the call for participation. Since the pilot received a lot of attention during its course, the number of participating organisations grew to about 65. Those organisations consisted of (large) municipalities, provinces, universities, main GIS and DBMS vendors, 3D data suppliers, engineering companies etc. All played a major role in the pilot. The 3D pilot participants are not limited to the Netherlands, e.g. there are participants from Germany and Belgium. In addition, several organisations work beyond the Dutch borders and involve
their international counterparts. In addition, the (interim) results of the pilot have been discussed at various international workshops.

In order to realise the pilot objectives with so many contributing organisations, four work packages (WPs) were defined, each one equipped with its own WP leader:

- WP 1. Generation of 3D information
- WP 2. 3D Standard NL
- WP 3. 3D test bed
- WP 4. Use cases

In this way, all participants could contribute their expertise, while pursuing their individual interests and, at the same time, jointly realising the aims of the pilot. An optimal alignment of the participants' interests was also driven by the fact that no budget was available for individual contributions. Intermediate results were exchanged and aligned during plenary sessions, organised every six to seven weeks. Additionally, social media were used to further enhance the collaboration. Currently, the 3D Pilot NL LinkedIn group counts about 500 members.

Policy is also important. It is important to educate stakeholders and participants about the shared benefits of standardisation, but simply creating awareness may not be sufficient. To accomplish socio-technical change, personal and institutional inertia must be overcome. Habits, workflows and business models are hard to change from without, but some methods are generally effective.

One method used to encourage implementation is for government data and system procurements to set up specific requirements for standards in their requests for quotes. There are many examples around the world, from Canada to India to Germany, where OGC standards are mandated for procurements.

Another method, employed in 3D Pilot NL, is a legal requirement for government-funded data producers to 'comply [with standards] or explain why'. Though not yet fully implemented in the pilot, as it is a pilot, this is a powerful strategy employed by the Dutch government. A general governmental policy exists to list open standards on an officially endorsed list. These standards are mandatory for public parties under 'comply or explain' conditions and are officially requested in public procurement processes. A comprehensive set of open geo-standards for SDI components is part of this list, and since November 2011, IFCs for 3D-BIM are included.

Standards help to provide users with assurance that the work they do will not be wasted. It was announced that the new standards set forth by Geonovum are included in a maintenance programme and therefore, the results and efforts of the 3D Pilot NL are anchored. In general, a period of two years is considered to be a proper revision period. But this can be adapted for specific standards depending on the different dynamics. Revision in all cases is considered as a collaborative process to review changes suggested by users and to ensure harmonisation and consistency with the international developments.

4. 3D Pilot NL results

The first phase of the 3D Pilot NL has successfully laid the organisational and policy grounds for one of the world's most comprehensive national 3D geo-information programmes.

A major result of the pilot was the proof of concept for a 3D Spatial Data Infrastructure (SDI), covering issues on acquisition, standardisation, storage and use of 3D data. The findings of the pilot were formally established in a national 3D standard, realised as a CityGML Application Domain Extension (ADE). The ADE completely integrates the OGC CityGML Encoding Standard with a new version of the existing national Information Model for Geo-information (IMGeo) (Van den Brink et al, 2012). IMGeo contains object definitions for large-scale representations of roads, water, land use/ land cover, bridges, tunnels etc. and prescribes 2D point, curve or surface geometry for all objects. As the new version of IMGeo is completely integrated with CityGML, IMGeo version 2.0 also facilitates extensions to 2.5D representations (i.e. as height surfaces; equivalent to the coarsest CityGML Level of Detail (LOD0) and 3D volumetric (CityGML LOD1, LOD2 and LOD3) representations of the objects according to geometric and semantic principles of CityGML.

The close integration between an existing information model for 2D geo-information and CityGML is an important step towards the practical use and re-use of 2D and 3D information.

The pilot fits in with an ongoing national programme for harmonising the semantics of various data sets, looking at feature catalogues, information models, and the naming and mathematical representation of classes, attributes, code lists, etc. UML models were developed and these were used to generate OGC Geography Markup Language (GML) application schemas. Time was spent reaching an agreement on profiles and versions of interface standards such as the OGC Web Map Service (WMS) and Web Feature Service (WFS) interface standards and on coordinating reference systems, image formats, etc. in order to improve interoperability.

There was also considerable investment in online validation and certification. Online validation of datasets against XML schema, schematron business rules and 2- and 3D geometry - including topology - were found to play a key role in improving proper standards implementation. Certification of services was introduced along with European Spatial Data Infrastructure (ESDIN) principles to test but also guide standard-conformant services implementation.

The pilot has demonstrated the added value of 3D geo-information compared to 2D geo-information in various use cases, including:

- Interactive airstream simulation, in which mathematical models showing surface movement of air obviously must be based on 3D data;
- 3D cadastre, as for example in describing the properties owned in high rise condominium developments;
- Integrated planning and management of underground and aboveground municipal assets.

Also, it was demonstrated that 3D information automatically generated from laser point data could serve many application domains. Such information about tree heights and sizes, new buildings, roofs, etc. can easily become part of an OGC CityGML model.

The use case studies helped answer questions such as: What applications need 3D information? Which 3D information is needed? What is the state-of-the-art of 3D techniques in relation to 3D needs? In order to answer these questions, six use cases were defined and executed. A selection of these is shown in Figure 2.

These use cases are:

- 1. 3D cadastre: recording of properties located above and below each other;
- 2. Generation, maintenance and distribution of 3D topography;
- 3. Applying voxel data for GIS analyses:
 - a. Integration of voxels (3D grids) with 3D objects;
 - b. Integration of surface and subsurface data;
- 4. 3D data integration in construction processes: How to use design data (IFC/CAD/Collada) in GIS applications and how to use 3D geo-information in building information models (BIM)?
- 5. 3D for spatial planning: generating 3D virtual environments based on architectural models for communication with citizens;
- 6. 3D change detection.





Figure 2: Selection of the executed use cases (Stoter, 2011)1

¹ All the images shown in Figure 2 were generated within case studies that were carried out in the 3D Pilot. The main company responsible for each image is mentioned in the image caption.

5. 3D Pilot NL continues

In the development process of CityGML ADE IMGeo 2.0 a number of topics were identified that require further attention before the standard can be widely implemented. These open issues are currently being studied in a follow-up project of the 3D Pilot, described below. A pilot setting is again used because the first pilot has shown that fundamental 3D innovations can best be realised by an intensive collaboration of research institutes and private and public organisations. These organisations all possess unique knowledge and experiences about the complex topic of 3D that need to be brought together to accomplish 3D innovations. Also further agreements between many stakeholders are necessary for advances in 3D.

The goal of the follow-up pilot is more focused than the first pilot and aims at writing best practice documents by joint effort of the 3D Pilot community. The best practice documents are based on tools and techniques that are being developed for supporting the implementation of the 3D standard. Specific attention is being paid to align CityGML to the standard in the BIM (Building information Model) domain, that is, Industry Foundation Classes (IFC).

In summer 2011 a new call was launched and more than 100 organisations (180 persons) responded. These organisations are currently executing the six activities of the second 3D Pilot NL, which are:

- 1. Generating example 3D IMGeo data for several levels of detail and several classes;
- 2. Writing example tendering documents for creating 3D information;
- 3. Designing and implementing a 3D validation tool;
- 4. Describing a generic approach for maintenance, update and dissemination of 3D IMGeo data;
- 5. Collecting examples of 3D killer applications;
- 6. Aligning CityGML and IFC/BIM Building Information Model standards.

6. Challenges remain in the Netherlands

In the Netherlands, as in other places, knowledge of open standards is generally not widespread. The community of implementation experts is not large, and the number of those who have experience implementing the specific national standards and the new OGC CityGML standard is even smaller. A contributing cause of this, as well as a result, is the lack of educational materials and coursework in standards. Geonovum has some free, online training information on a wiki, but this is only the first level of knowledge required.

It was undoubtedly easier in the Netherlands to find and begin working with these experts than it would be in larger countries. However, there is a tremendous need for knowledge and expertise on standards at all levels, and the outreach done by the national partners of the 3D Pilot, which also included a free introduction course to CityGML to the Netherlands 3D Pilot participants, helped to raise awareness of this deficit. Professor Thomas Kolbe, who is one of the creators of CityGML, contributed to this 100 % CityGML course (TU Delft CollegeRama, 2011).

One important new challenge for the Netherlands and other countries that reach a similar point in NSDI development is dealing with issues involved in lifecycle management of standards, training, and further integration of open standards into business applications. This is an ongoing topic of discussion in the OGC. Users of the standards are invited to participate in this discussion, so that they can plan accordingly and influence the roadmaps for standards.

7. Conclusions

The 3D Pilot NL example has been successful as it aims to advance the use of 3D information wherever European governments - national, subnational or local - choose to promote such use. It provides a good model for institutional team building and policies that work in order to bring together a diverse group of stakeholders - nations, professions, industries, and communities of interest - for Spatial Data Infrastructure development.

The need for such a model increases as information technology advances. Many areas of information technology innovation involve spatial information, including Augmented Reality (AR), sensor webs, Building Information Models (BIM), Smart Grid, ubiquitous computing, location-based marketing, crowd sourcing and others. These are all part of visions such as Smart Cities, Smarter World, and the Internet of Things. Each of these areas of innovation offers potential benefits for citizens, consumers, and sustainable and resilient economies and societies. Each of them, where they involve spatial data, shares a dependency on open access to a rich infrastructure of 3D data and services. The 3D Pilot NL shows that governmental promotion of open standards in Dutch national policy accelerates uptake of the standards that make such open access possible. For these reasons, we believe that forward-looking policy makers can learn important lessons from the 3D Pilot NL.

European members of OGC play an increasingly important role in advancing new standards, as well as in providing valuable feedback to improve the current international standards and to ensure that they meet Europe's needs. Ongoing European dialogue with the OGC's international membership is important, as more often than not, standards requirements submitted by one region are also requirements in other regions.

Many members of the OGC are calling for more training and education about open standards, as well as for research on a growing list of interoperability topics. These are areas where European organisations have already contributed significantly, whereas education and research are still areas of great opportunity.

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Managing Public Administration Reform in Russia the Role of Citizens' eCard Project

Electronic Government in Russia became a strategic component in the governance process. To establish trust and security in the electronic interaction process between authorities and citizens, the Russian Government aims to deliver high quality public services through a secured and comfortable environment. The complexity of Strategic eGovernment decisions is illustrated through the example of a key eGovernment solution, the Citizens Electronic Card. The Citizens eCard project case study outlines strategic management issues caused by the interrelation between eGovernment and administrative reforms in Russia. The necessary technological, legal and organisational changes performed in Russia to effectively organise the national eGovernment system are also analysed.



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⁶⁶ Public Private Partnership is a key tool to Citizens' eCard project implementation in Russia

1. Introduction

Strategic eGovernment development in Russia started in 2002 when the Federal Program Electronic Russia (2002-2010) was launched (Russian Government Resolution №65, 2002). The Russian Federal Government considered the Programme as a tool to build Information Society in Russia based on key components consisting of technological and organisational measures in different areas: culture, governance, healthcare, IT-industry, regional development. The measures proposed were quite typical and comprised hardware and software access supply across the country, public services transfer to online mode, high priority for IT-industry development, public records digitalisation, eSociety promotion campaign, and IT-skills improvement programmes.

In fact, the first edition of 'eRussia' targeted too many diverse and ambitious goals with quite a limited number of accumulated resources during a period of eight years. The Programme had to be coordinated by five federal agencies and implemented with the resources of regional governments. This meant that programme coordination and decentralisation of responsibility became a real threat to the Programme's implementation.

In 2008, the Government produced the third consecutive version of eRussia, which was limited to only one key goal - "to make interaction between government and other stakeholders efficient and effective" (Russian Government Resolution №632, 2008).¹The main target of the Programme mostly became the Russian Federal Government with the assumption to achieve tangible results first on federal level of governance and then to share best practices with regional and municipal level authorities. This corresponds to the principle announced by Andersen Consulting in 2000 "Think big, Start small, Scale fast" (Heath, 2000). Until 2008, the eGovernment development programme in Russia was chaotic and comprised projects, which could be characterised as the first and admissibly quite difficult new ICTs usage experience for Russian regional and federal authorities.

Among a series of typical projects sponsored by the Programme were web-portals for federal and regional authorities, eDocument management systems, regional analytical systems, geographical information systems, data registers and public services reengineering and design. These projects were financed both by the federal authorities (eRussia budget) as well as regional authorities, but unfortunately they were not able to deliver tangible results, visible to end users - citizens and businesses. Civil servants considered eGovernment as means of making their own work and performance more effective and efficient but businesses and citizens were not much involved in the process of public information systems' design. Civil servants assumed that 'they knew better than people from the street' why and what exactly they need from ICT and how that would help other stakeholders use their constitutional rights and use public services (Styrin, 2006).

Authorities tended to buy ready made IT solutions from IT companies, considering it as the simplest way to deal with eGovernment challenges. Both IT-spending effectiveness and information system appropriateness were not of a high priority for agencies because they didn't own experience and recommendations on how to make decisions about ICT-solutions. At the same time, Russia's world rankings on eGovernment remained around the 60th place (UN eGovernment Survey, 2010). In 2012 Russia's standings improved sufficiently by moving to 27th place (UN eGovernment Survey, 2012). Further eGovernment system improvement will be possible when secure electronic transactions between citizens and governmental information systems will be implemented. eCard project will serve these goals by providing secure infrastructure for transactions with Government. The article defines specific Russian context in which the project is being implemented. The context is viewed from

¹ The second edition of the 'eRussia' Programme was released in 2006 but didn't become a true guidance to a successful eGovernment system either.

historical, administrative and strategic perspectives. Key factors influencing project development Public Private Partnership mechanisms are being analysed. The research question of the article is to find what the risks of eCard project that arise through public private partnership mechanisms quality analysis in Russia are. The applied methodology includes eCard project stakeholder analysis and SWOT analysis. Finally, recommendations on possible strategic, legal and technological changes aiming to improve project's results tangibility are formulated.

2. Strategic Goals for Russian Governance System Transformation

eGovernment development was supported by the Federal Programme 'Administrative Reform (2004-2010)' owned by the Russian Ministry of Economic Development (MED). The MED was implementing eGovernment in Russia as a tool to effectively satisfy citizens' and businesses' demand for high quality services.

The key goals outlined in the Programme became the absolute new tasks for authorities, which had never been formulated before.² Until 2008, key players responsible for administrative reforms and ICT-development didn't have a common vision on the role of ICT in goal achievement. Below these goals are summarised and ICT influence on each one of them are briefly described:

- **Create citizen oriented government.** Citizen oriented government becomes possible thanks to the combination of openness, accessibility and availability of public services. Official web-resources organised around citizens' needs provide complete information on Government activity.
- Create a result oriented governance system. The better an agency performs, the more financing it can get in the future. Governmental eDocuments and eRecords management systems can simultaneously increase civil servants' productivity and transparency of decision making processes.
- Increase quality and access to public and municipal services for citizens and businesses. In the context of the fast growing Internet penetration in Russian households, there is a necessity to design citizen oriented governmental portals providing information and interaction mechanisms aiming at the best possible comfort of the citizen. Starting in 2002, the number of Russian Internet users has been stably growing and in the past two years Russia has been the fastest growing Internet users' country in Europe with more than 50 million Internet users in 2011, Russia has overtaken Germany (Comscore, 2011).
- **Decrease corruption level in public authorities.** This goal can be achieved indirectly by providing control mechanisms to the society through public services and discussions based on online interaction.
- Improve the feedback between authorities and society. The growing importance of social networks, blogs and other virtual environments together with the official Governmental Internet presence, provides perfect conditions to for the facilitation of the dialog between Government and society. 55 % of Russian citizens are using Internet and 82 % of them are registered in social networks (Russian Public Opinion Research Center, 2012).

² Includes federal regional and municipal level authorities in Russia

3. Public Services Reengineering and Transfer to Electronic Form: Russian Outlook

The Administrative Reform (2004-2010) Programme aimed at supplying the public services with a reengineering process reallocating them from paper to electronic environment.

eServices creation and development is a formalised process produced by both Russian federal and regional agencies systematically and guided by the MED. The latter supports federal and regional agencies in providing methodological recommendations developed by leading Russian experts in public administration. A very important feature of electronic public services development process in Russia is their formalisation (includes in particular public service quality standard, process provision description) in the form of normative acts approved by the agency, which owns the service. These normative acts are called 'administrative regulations' and they institutionalise electronic service provision on the agency governance level.

An administrative regulation is a normative act, which establishes formal procedures and quality standards for the public service. It contains a description of service usage process (divided in steps), delivery channels (personal visits to the agency, Internet, personal visits to authorised one stop shop service operation centers), time frames for results obtainment, results of the service as well as claim mechanisms if service results are seen by citizens as unsatisfactory (Russian Government Resolution №30, 2005). All administrative regulations are approved by the agency which owns the service. In other words administrative regulation in the form of a normative act fixes the results of public services transformation from the 'AS IS' state to the state of 'AS IT IS TO BE'. The agencies skills and capabilities to produce high quality administrative regulations are strongly challengeable, even though they are the basis for service provision in its electronic form. More than 50 % of the administrative regulations in the years 2009-2010 didn't pass the validity expertise (performed by the MED) allowing them to be considered as roadmaps for eServices implementation.

At the end of 2009, the highly important decision to establish and run the national eServices portal <u>www.gosuslugi.ru</u> as a single point of access to all public services in Russia was implemented. Up to this day, this portal is a collection of all administrative regulations and public services produced by federal, regional and municipal authorities. The portal is run by the Russian Federal Ministry of Infocommunications and Media. The back office system for this portal is called Public and Municipal Services Register (PMSR), owned by MED which coordinated efforts to collect all public services and administrative regulations in one information system (Styrin and Zhulin, 2011).

The portal supplies citizens with interactive eServices. It means that citizens can download eForms and fill out eApplications for a number of services online. 73 public services owned by 15 federal agencies were defined as of the highest priority for transformation in electronic form (Russian Government's Order, 2009). Citizens can check online the documents they need to successfully apply for the service. They can also get consultation online and be assigned to an appointment to obtain service in person. The portal was noticed by the United Nations Development Programme (UNDP) experts and Russian eGovernment rating improved in 2012 (27th place instead of 59th).³

Russia, as many other countries developing eGovernment services, goes through legal framework changes, which are being developed and approved with a much lower speed then ICT solutions' enactment. For example, key legal initiatives were firstly approved by the Russian Parliament (Duma)

³ In previous UN eGovernment development ratings including report in 2010 Russian Federal One Stop Shop Portal: <u>www.gosuslugi.ru</u> were not included. That influenced the overall rank of Russian eGovernment system as soon as methodology of the rating is very sensitive to availability of single points of access to government services in Internet.

only since 2008 even though eRussia was initiated in 2002. The most important federal laws for eServices development were approved in 2010 and they were the Federal Law About Public Services Provision in the Russian Federation, the Law About eSignatures and the Law About the National Payment System. These Federal Laws define the terms 'eDocument' and 'eService', clarify the term 'eSignature' and establish the eGovernment system architectural components.

4. Context and history of the citizens' ECARD project

The eGovernment System Project is a practically oriented document adopted by the Russian Federal Government in 2010 as a guide to implement eGovernment on a federal level. It defines the key eGovernment components in Russia: eServices, security and trust infrastructure and national payment system. Without these three components the Russian eGovernment system cannot move to the transactional stage where citizens can get public service in a completely electronic form on a legal basis. The key goal in the Citizens eCard project is to establish secure identification of the citizen as a public eServices user. At the same time the Russian Government aims to ensure that the eService applicant is really the person who applies for service. It also aims to effectively manage personalised financial relations with citizens obtaining services. By means of the eCard, Government can directly allocate, control and monitor money assigned to each eligible for benefits by law citizen. Thus, money distribution function from Moscow Government to citizens implemented previously by intermediary banks disappears. The demand for eCard usage is provided by developing the appropriate banking system in Russia, which makes citizens use plastic cards and electronic transactions (170 million plastic cards issued by banks in Russia and only half of them actively used (Central Bank of Russia, 2011)).

Banks are not the only source of experience regarding the use of plastic cards by citizens. Regional authorities were also using plastic cards in social support projects in order to pay social benefits to different social groups: single mothers, students, pensioners, and people with disabilities and as a pass in public transport. Regional authorities are card proprietors and issuers by Law. The Moscow authorities, for example, named such a project Social card and implemented it in partnership with Bank of Moscow. The key problems encountered were as following:

- Different social groups eligible for benefits were getting different types of cards (they had different colors and different scales of usability);
- The social card, as applied in the transport sector could not be unique because it couldn't be used in all types of transportation (for example suburban trains);
- It was not clear what type of card to issue if a certain citizen was eligible for benefits belonging to different benefit groups at a time (for example, single mother with disabilities). The solution was to give different cards to the same person making social card usage uncomfortable for both issuer and acceptor.
- The Moscow Government couldn't make personalised social payments by transferring big sums of money to the banks (most Banks in Moscow) which were distributing funding to the citizens. The authorities couldn't trace how much money was spent and by whom. For example, each year Moscow Government paid to the eligible citizens a certain amount of subsidy money on the basis of 30 trips per month. According to internal statistics and surveys conducted the Moscow Government social beneficiaries in average used not more than 60 % of their trips. At the same time in the end of the month almost every transport card did not contain any transport money. It means that social beneficiaries gave their cards to third party people who were able to use the transport money in their own interests. Budget losses could be measured in millions of dollars.

Social card projects were implemented in most developed and financially strong regions of Russia. The eCard project can provide much more convenient and effective support to citizens using electronic public services.

5. Electronic card as a tool for effective access to public and municipal eServices

5.1 eCard definition, appearance and applications

eCard is "a material carrier of personal data used to identify a citizen and successfully implement eServices for him/her, legally bringing to completion the electronic transaction between the citizen and the service provider" (Russian Federal Law №210, 2010). In other words, the Russian Government aims to supply secure technology that can provide eServices in a way that would allow further claims in court, in case a citizen is not satisfied with the result and quality of the service. This is due to the fact that eTransactions lead to a change of the citizen's personal data in one or several governmental databases or registers, changes that can now be confirmed and verified. The eCard contains a chip, a magnet stripe and a barcode, as well as the citizen's name, date, place of birth, photo, and a series of data used for citizen's identification in different governmental agencies: unique number in the National Pension Fund and the National Medical Insurance Fund. The chip will be not less than 72KB and will be produced by Russian companies under governmental supervision and certification. The eCard will comply with the EMV standard (Europay, VISA, Mastercard) regulating eCard applications functionality. The eCard also contains a scalable number of applications such as: a pension savings calculator, medical benefits and medical history viewer, a taxes history calculator, a social benefits informer, a bank application and last but not least, a transport application. The citizen signs an application giving permission to authorities and other service providers to work with his personal data (Russian Federal Law №152, 2006). No decision has yet been made regarding the payment systems to be used in the eCard project, while the Government is still in negotiations process with Visa and MasterCard. Another opportunity is to use a payment system PRO100 developed by Russia's biggest bank, Sberbank - a key participant of the project. In this case, the card will have limited payment opportunities and will be used for transactions exclusively carried out in the Russian Federation. An example of how personal card could look like can be seen in Figure 1.



Figure 1: eCard appearance

5.2 eCard benefits

There are three key ideas making the Russian Government proceed with the eCard project:

- The eCard will be the single key to access eGovernment infrastructure on all governance levels. This infrastructure includes all government databases and registers which will become available online through eCards serving as references, information and facilitating transactions. Interaction between citizens and authorities will initiate the process of citizen's eRecords quality improvement in all agencies involved, for example the National Pension Fund, the National Medical Insurance Fund, the Federal Agencies Administrating Taxes, the Healthcare system etc. When citizen applies for the eCard, all his/her personal data mentioned in application in paper form will be inserted in agency's data base in electronic form. In case the data about the citizen already exists in electronic form all necessary changes in agency's eRecords about the citizen will be made especially if mistakes were detected (Federal Law №152, 2006).
- Personalised transactions including electronic payments executed by citizens in the process of governmental and commercial services usage. The government will be able to effectively control the amount of social benefits paid and used by citizens and thus redistribute social support to those who really need it. The Government also intends to decrease fraud in social benefits allocation.
- Citizens will be able to interact with the government based on the principle 'any service, anywhere' which means that the eCard will enable citizens to access to hundreds of governmental and commercial services, including ePayments on a 24/7.

The eCard will be the only tool used by citizens while interacting with the authorities but also public and private enterprises in the provision of services. The card will also be used by citizens as a unique identifier to initiate electronic transactions with information systems belonging to pension funds, medical insurance companies, governmental agencies, public transport companies and other partners of the project. Citizens will access public information systems with eCard through personal card readers, public kiosks, ATMs. Still it is not possible to say that eCard is equal to internal Russian passport (Russia does not use plastic IDs for internal identification) and in some cases authorities can re demand the passport instead of the card (for example, when a citizen personally visits the agency to obtain the service).

5.3 eCard distribution process

According to Federal Law №210, starting 1 January 2012 and until 1 January 2014, citizens can apply for an eCard filling out a paper application at all points of eCard distribution. As of 1 January 2014, eCards will automatically be issued for all unless citizens make a personal request against the issuance of the Card. The card distribution process involves all possible infrastructures belonging to public and private organisations participating in the eCard project. It means that citizens who do not yet have their card or do not know that they can use it, will definitely be proposed the issuance of an eCard if they submit an application, for any reason, to any office of the participating organisations: the National Pension Fund, The Social Security Offices, the Medical Insurance Offices, the automobile insurance offices, special points of eCard distribution established by the Federal Company JSC FUO eCard as well as banks. An eCard, for instance, must be immediately issued for all newborns or when a citizen starts to work and his/her unique number appears in National Pension Fund. Another example is the case of a citizen who wants to obtain medical insurance. The agent may propose the filling out of the application of the eCard which will also serve as the citizen's medical insurance card. The eCard distribution process is closely connected to the information of citizens on the

opportunities created by the use of eCards. Authorities have to organise this process so as to reach as many citizens as possible, persuading them as to the usefulness of eCard, Validating, thus, all investments in the project.

6. Federal and regional governance interaction in citizens' eCard project implementation

According to Federal Law 210, the key organisation appointed by the Federal Government's Order № 1344, to manage the eCard project on a federal level is JSC FUO ECard and is established through the partnership of three Russian banks: Sberbank, UralSib and AK Bars. Sberbank is the biggest bank in Russia with a developed branch infrastructure executing more than a half of all bank services in the citizens' market. Any other bank can join these three banks in the future and become a provider of the eCard banking application. The FUO eCard is responsible for establishing information and applications for federal level authorities and organisations: the National Pension Fund, the National Medical Insurance Fund, as well as the National Social Security Fund. Each of these organisations has their unique identifier for each citizen in their databases, registers or eRecords. The FUO eCard creates and manages a federal register of eCard users, keeping information on what eCard is assigned to which citizen, how many applications are made per card and which of them are active, also making possible the creation of a register of federal applications developed by public and private organisations. In fact the function of card issuance belongs to Regional Authoritative Organisation (Regional AO) which is selected and appointed by regional authorities in partnership with the Department of the Ministry of Economic Development (Regional MED). On a federal level, the project is supervised by the Ministry of Economic Development (the leader of the Russian Administrative Reform Program) in collaboration with the Federal Security Service (security expertise), the Ministry of Infocommunications and Media (which has established very important Federal Program entitled 'Information Society (2011-2020)' and acted as a leader as far as the technological components of the national eGovernment system are concerned), the Ministry of Industry and Trade (involved in partnership relations with commercial organisations - potential service providers).

The Regional Authoritative Organisation executes the same functions as the FUO eCard on federal level. It creates and manages the Regional eCard Register and the Regional eCard Applications Register, while being the issuer and owner of every single eCard. The overall price of the eCard project was initially estimated by MED to 150 billion rubles (almost 3,75 billion euros). Banks will invest in infrastructure for eCard acceptance and usage (ATMs, terminals, card readers) and federal and regional authorities will invest in the establishment of card processing centers, public eServices transactions management and card issuance. Regional AO must qualify to the requirements posed by FUO eCard to security, privacy, eRecords management, interoperability with federal level systems and data bases. Regional AO can be founded by private owners or it can be joined stock company belonging both to regional authorities and private owners. Regional AO established in one of the Russian regions has the right to provide the same functionality to authorities in other regions but only after the company wins this right on a competitive basis with other candidates in each region. Thus one company can serve as a Regional AO in more than one region at a time. Information from regional eCard registers is integrated in federal eCard users register.

eCard applications are of two types: federal and regional. Firstly, the eCard is initialised on federal level and then it is completed through applications provided by suppliers at a regional level. When citizens receive the eCard they submit permission on applications that they want to be activated on their eCard. For example, a citizen might want to use transport and social security applications but not the one from healthcare. Any moment citizens will be able to change activation status of all

available eCard applications by submitting a special application (this service will be implemented online). Commercial service providers can apply to Regional AOs and as soon as these applications comply with formal requirements and are approved by Regional AOs they can be available in cloud applications and also installed on the card.

The eCard register will be connected to federal and regional governments' eServices gateways called Interagency Electronic Exchange Systems (IEES). IEES electronically connect agencies on the same governance level and provide complex eServices to citizens, involving information resources from several agencies simultaneously. A single point of access to eServices will be the Federal One Stop Shop Portal - <u>www.gosuslugi.ru</u>. Th e totality of the eServices provision system architecture in Russian Federation is presented in Figure 2.

Figure 2 demonstrates the role of Citizens' eCard project in general eGovernment architecture in Russia. First component of the eGovernment system is front office Federal One Stop Shop eGovernment portal www.gosuslugi.ru, with which citizens start using eServices. At the back office, there is Interagency Electronic Exchange System (IEES) which is transportation information system connecting federal and regional agencies in both horizontal and vertical eDocuments exchange. Security, integrity and IT standards compliance is coordinated and controlled by three federal agencies: Federal Security Service, Federal Ministry of Infocommunications and Media and Ministry of Industry and Trade. Federal Ministry of Economic Development (MED) and its branches in the regions provide methodological, organisational and legislative support to FUO eCard and Regional AOs in managing eCard registers, interacting with stakeholders. Federal eCard Register integrates records from regional eCard Registers and also interacts with IEES authorising interagency eDocuments exchange from citizen applying for the service with eCard and agency accepting citizen's application. To solve namely problems arising with eCard (loss, exchange, applications activation) citizens can apply to eCard Users Portal. Later, along with banks FUO eCard will establish eCard payment gateway, which will serve both security and transaction control purposes. It is worth to mention that architecture presented on Figure 2 has to be replicated and reproduced in 83 Russian regions. This is a very expensive and difficult task, due to the scale of replication, regional digital divide issues and rigid time frames, posed by Federal Government (in 2014 citizens should be able to use their eCards on regular basis benefitting from all public services put online).

Citizens will be supplied with personal card readers which can work on their PCs. Other points of eCard access will be developed in partnership with several banks and authorities. The challenges of establishing partnerships in the eCard project will be discussed further on in the paper.



Figure 2: Multilevel eServices provision system architecture

7. Stakeholder analysis in citizens' eCard project

eCard implementation is not something new; countries like Singapore and Estonia have already successfully implemented eCards for citizens (Young, 2003; Voore, 2011). The main difference between these countries and the Russian Federation is their small territory and population size but the highly developed ICT infrastructure as well as the existence of one (Singapore) or two (Estonia) levels of governance. Still, it is possible to admit that the Russian Government used the same general principles for eCard infrastructure as the ones used in Estonia. The main burden of the Citizens' eCard project in Russia (including federal, regional and municipal authorities) is carried by regional authorities with the methodological support from the federal center (MED) and banks cofounders of the JSC FUO eCard. Sberbank constitutes a key player in the establishment of project leadership as has already happened in Asia (Sharma S., 2007). According to Figure 2, it is possible to assume that the general number of treaties to be signed between Regional AOs, the FUO eCard project banks and commercial services providers will grow fast during the lifespan of the project. The Russian Government assumes that the number of banks participating in the JSC FUO eCard could reach forty during the year 2012. All these banks will have to satisfy the requirements of an eCard issuer as stipulated by the JSC FUO eCard. The key challenge in this particular partnership is to satisfy the interests of all stakeholders, including citizens - as the end consumers of eCard product. Unfortunately the stakeholders' interests can be quite contradictory.

7.1 Government (including federal and regional authorities) establishing and regulating partnership relationships

The final estimation of the project has not yet been completed. A preliminary evaluation shows that authorities will spend approximately 2.9 billion euros whereas some experts estimate investments reaching the double of that amount. At the same time, the issues of general trust of the Russian society to the Government remain challengeable and in case citizens' security and privacy is not well protected within the eCard project, it will fail and investments will have absolutely no returns. Another problem lies within the management of partnerships and agreements with participating organisations aiming at preserving society's interests. For example, Government is liable to reasonable costs in order to offer its citizens eCard payments, simplicity of eCard interaction interface and reliability of transactions. It remains unclear who and how will undertake the familiarisation of the citizens and the creation of skills and knowledge in performing electronic interactions with Government. Massive rejection of eCards by the citizens will cause the failure of the project, but if established transactions interests remain high enough, citizens will prefer cheaper ways to communicate with Government. At this point, that sufficient resources are invested in the so called regional multifunctional centers where citizens can personally apply for wide range of services produced by regional governments based on the single window principle⁴. The reasons making eCard more effective of an interaction channel than the multifunctional center is currently not well understood by citizens.

7.2 Banks investing in eCard infrastructure

Banks invest serious capital to develop eCard infrastructure, processing and acquiring centers. They would like to establish profitable relations with authorities, thus keeping their commercial interests high. At the same time, banks are interested to enlarge the number of eCard users through their banking application. Agreements and negotiations between banks and authorities may not be easily achievable and may differ as to the time frames (eCards will be issued automatically in 2014).

⁴ In Russian terminology "single window" is equivalent to one-stop-shop principle according to which citizens can choose one point of access to different interconnected public services.

Meanwhile, Sberbank promotes its own payment system PRO100 which can be chosen by citizens in a row with VISA and Mastercard payment systems to be assigned to eCard. PRO100 payment system might lose to VISA and Mastercard if eCard assigned to it can be used as a payment means only in Russia and not in international scale. The final decisions on a number of payment systems potentially serving the card have not been made yet.

7.3 Commercial providers of eServices for citizens developing eCard applications

Russian authorities are very interested in the creation of federal and regional eServices clouds which can be accessed by citizens through eCards. Commercial companies may face certain types of problems in their attempt to join the eCard project. For example, the process of inclusion of the application made by a Regional AO organisation in the applications register may not be transparent or can take too much time. This process can also lack competitiveness in case the Regional AO is interested in a certain type of commercial partners. Moreover, the issue regarding the way in which foreign enterprises can participate in eServices clouds also remains open.

7.4. Citizens using eCard infrastructure

The key challenge for citizens is to understand the importance of eCard usage. It is very hard to predict the actual number of eServices relevant to citizens needs and available through eCards. A typical global strategy is to put online as many services as possible starting from social security and medicine and up to the process of starting a business or getting permission to build new warehouse. Current research shows that the most popular online services are: foreign passport exchange, making an appointment for vehicle inspection, paying fines for traffic violations, making a doctor's appointments. The level of demand for more complex services or just any services similar to the ones above remains question to be answered by researchers. To provide electronic public services which demand embedded electronic payments (getting a new passport, permission, paying fines) governmental agencies will have to establish partnership agreements with banks defining financial burden to maintain payment transaction among participating stakeholders: citizens, agencies and banks. There is the actual risk of including interest redistribution in the general cost of the service. In other words the citizen doesn't pay interest directly to the bank instead it is included in the final cost of the service (this can be a new passport, license, permission etc), thus making the eCard usage for electronic public services access more expensive than more traditional interactions with Government.

8. Citizens eCard project swot analysis

The project is quite unique among world best practices. Russia (the size of its population and territory) is a challenge on its own. The amount of the cards to be issued brings initial investments to billions of dollars.⁵ The future infrastructure includes not only cards but ATM machines' upgrade or installation. The services' provision must attract citizens by showing them very clear profits from the electronic use of public services. The transaction price has to be reasonable among all partners: banks, authorities and citizens. The security and privacy level has to be kept high throughout the project lifecycle since the first serious personal data leakage can immediately downsize the level of the public trust in this particular Government initiative.

⁵ Population of Russia is more then 143 million people.

The Russian Government has not yet accumulated sufficient experience in public/private partnerships establishment in the domain of eGovernment. The coordination burden for the Government remains high since the number of business participants will grow extremely fast in short amount of time. Existing digital and economic divide among Russian regions may represent an additional obstacle in the simultaneous implementation of the project.

The overall conclusions on project perspectives are presented in Table 1.

Strengths	Opportunities
 The Government guarantees financial support to the project. Public services provision quality is continuously growing since 2009. The number of Internet and mobile phone users is growing with a high speed. Russian IT-industry presents growth and maturity. 	 In midterm time frame corruption level may decrease. Citizens will stop spending time in lines at the agencies during working hours (indirect growth of National GDP). Faster economic development (the speed of opening new business, paying taxes, getting permissions and licenses can sufficiently grow). The government has the opportunity to better control expenditures (social benefits, transport, pensions).
Weaknesses	Threats
 Russian Government lacks experience in establishing public-private partnerships in the eGovernment area. 	 The burden of transaction prices is still not clearly divided among project stakeholders;
• Sufficient difference in legal frameworks, economic, technological and human resource support on regional governance level.	 High burden of coordination among key players due to the country scale. External economic factors may influence governmental
 Existing unsuccessful practices in previous eGovernment projects as to citizens' personal data and/or other public records protection. Lack of ICT-skills among civil servants and citizens 	 financial support to the project. Citizens' trust and awareness level of the project may not be sufficient to establish massive eCard usage.
 Public opinion marketing research about the project is not of a high priority. 	 Fair competition among payment systems supporting the project is still a challenge.

Table 1: Citizens' eCard Project Strategy Implementation - SWOT

9. Discussion

By implementing the eCard project the Russian Government plans to establish a secure infrastructure for the development of an eServices system for citizens. Due to the fact that investments in the project are unprecedented, the risks of low ROI (Return on Investments) from the governance perspective are equally high and unpredictable. Russia experiences sufficient economic, social and technological divide among 83 regions. Simultaneous eCard infrastructure establishment becomes a

challenge in regional development context. The issue of trust in partnerships between commercial enterprises (mostly banks) and public agencies can be foreseen through historical experience of collaboration. Political component here remains important as soon as in the first stage of the project informal agreements and guarantees between Government and banks will have to be preserved followed by formal agreements. The Government needs infrastructure, skills and experience from the private sector and at the same time has to pursue acceptable price levels encouraging citizens to use the eCard as an access point to the eServices system.

Further research is needed on knowledge management and learning practices exchange and dissemination among Regional AOs. Clear recommendations on technological and organizational aspects of integration among Regional AOs and Federal company FUO eCard must be developed and pushed from top to the bottom by federal company. Research and recommendations on world experience legal adaptation of partnership agreements in Russian realities among project's stakeholders are also necessary. Finally, one of the most important steps to be done in the eCard project is citizens' demand and readiness for eCard adaptation and usage study. The number of interviews and focus groups with citizens in pilot regions adopting citzens' eCard have to be conducted on system basis. Government has to have clear response on how to improve citizens' demand, attitude and trust towards eCard as an instrument to use public services.

The project also has potential vulnerability in security area. FUO eCard keeps the complete log of all eCard transactions performed by citizens in different Russian regions and maintained through Regional AOs. In this log it is possible to see that through certain eCard with unique number N a certain service with unique identifier M was used. eCard identification function is implemented by federal company FUO eCard even if the citizen uses regional services. In case of third party access to federal eCard log information it becomes possible to know private information about citizens. For example, to learn which services were used by certain citizen and when.

Russian Government does not own an electronic population register and information about citizens (including their different unique identifiers) is spread by different organisations including the National Pension and Medical Funds. The eCard project can contribute to the creation of such register which is almost equal to a federal eCard users' register.

The Russian Government is ready to spend a sufficient budget on this project foreseeing future savings on personalised benefits distribution to citizens. In this case the Government might need to shift the data storage paradigm to citizen's life events. It needs to not just keep data but also facts about citizens. For example, during a car accident a person lost his leg and became eligible for social support. The responsible public agency (the Police in this case) and the hospital have to describe the fact of the incident in electronic form and insert it in the register of citizens who become eligible for support and privileges. Thus the Government will keep the history of events and services provided to every citizen and will avoid fraud and possible legal claims' burden. This management of citizens' records may result to the shifting of decision making to civil servants (it will be possible to only say 'yes' or 'no' if a certain fact about the citizen existed or not). The Facts register will eliminate personal contacts between citizens and civil servants and decrease discretionary powers of the agencies. Thus the chance to mitigate corruption in the country increases a fact that is extremely important since Russia ranks 143 in the international corruption perception index (Transparency International, 2011). This approach is very challenging and can hardly be implemented in coming one or two years.

Finally, we provide some quantitative data demonstrating the problem of the country's size scale from a financial point of view. The population of Russia is of 143 million people and the territory is 1/7 of the land on Earth. eCard issuance costs regional government 350 rubles (approx. \in 8,75). A personal eCard reader for the citizen should cost approximately 90 rubles (\in 2,25). The Moscow Government is spending 1,5 billion rubles (\in 37 million) to establish data centers and hardware for eCard infrastructure and 1 billion rubles (\in 25 million) to develop necessary software.

10. Conclusions

The Russian Federation is the only one among countries comparable from a territory and population point of view that is actually implementing an eCard project on system basis, involving all levels of governance simultaneously. To keep the project running, the Government had to propose a package of completely new laws regulating electronic security and interaction between Government and citizens, to face the problem of establishing partnerships with commercial organisations (primarily banks), develop federal and regional Interagency Electronic Exchange Systems for complex eServices provision, and constantly improve quality of electronic data registers (cadastre, enterprises, property rights, addresses), crucial for national eGovernment system. The eCard project's success remains interdependent from that of other eTransformation projects (ICT infrastructure, eGovernment readiness among agencies, interagency information sharing). Only clearly augmented and guaranteed benefits formulated by the Government through the eCard project together with high emphasis on the strategic management approach can guarantee citizens' involvement and support.

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Objectives and Barriers of Implementation of eGovernment: From Lisbon Strategy to Digital Agenda 2020

According to the Digital Agenda, all services should become digital. However, European citizens do not use eGovernment; in 2010, only 32 % of individuals interacted with public authority in EU-27. EU must be skeptic and try to identify the barriers in the adoption of eGovernment. In this article an extensive literature review aims to track down the eGovernment European Strategy, investigating legal documents of the Lisbon Strategy, the Action Plan eEurope 2002, the Action Plan eEurope 2005, the Strategic Framework i2010 and the Digital Agenda 2020. The Eurostat database has been researched and compiled a data analysis in order to identify barriers of eGovernment implementation. Strategic objectives are pointed out, as well as the barriers of eGovernment implementation, such as low computer and internet use and skills, as well as low level of Internet access of households. European citizens that do not have internet access at home estimate that: access costs are too high (telephone, etc.), or there is lack of skills, or they do not need it because content is not useful, or content is not interesting, or the equipment costs are too high, or content is harmful, or there are privacy or security concerns. Concerning barriers there are great differences among countries in EU-27. Also, it is very important for the EU to create a Framework of Adoption of eGovernment services that will enable Government services to be adopted by citizens. In order for the EU to materialise its strategic plans, it is important for European governments not only to produce eGovernment services, but also to ensure that citizens are using those services in their everyday routine. If eGovernment services are not used by the citizens, then the European relevant strategies will not benefit for the society.



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The use of eGovernment in EU-27 is very low. In order for the European Union to materialise its strategic plans, it is important for European governments not only to produce eGovernment services, but to also ensure that citizens are using those services in their everyday routine.

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1. Introduction

The present document constitutes a study of the eGovernment European Strategy in terms of the Lisbon Strategy, the Action Plan eEurope 2002 and eEurope 2005, the Strategic Framework i2010 and the Digital Agenda 2020 in order to outline the main objectives and barriers of the Strategy.

Approximately a decade earlier, the EU was discussing European Governance, while now the focus is on Internet Governance. In the year 2000, the European Union Lisbon Strategy set out the goal for the EU to become (in 2010) the most competitive knowledge based economy, enjoying full employment. In order for the Lisbon Strategy to be correctly deploued, European policies were outlined in the Action Plan eEurope2002 and eEurope2005, in the Strategic Framework i2010 as well as in the Digital Agenda 2020.

Although governments invest continuously in producing eGovernment services, citizens face difficulties in adopting these services. A number of barriers prevent them from using eGovernment services. If these barriers are pinpointed, it will be possible to take them into consideration in designing eGovernment services, which the citizens are likely to use (Delopoulos, 2010). Even if eGovernment services can eliminate costs and save time for public administrations, the take-up of eGovernment services by citizens is low; in 2010, only 32 % of individuals interacted with public authorities (see table 1). Based on the Eurostat database, a data analysis(see section 4) was put together to identify the barriers of eGovernment implementation. Strategic objectives were pointed out as well as the barriers of eGovernment implementation, such as low computer and internet use and skills, as well as low level of Internet access of households. European citizens that do not have internet access at home estimate that:

- Access costs are too high (telephone, etc.),
- there is a lack of skills,
- they do not need Internet because content is not useful,
- content is not interesting,
- content is harmful,
- the equipment costs are too high,
- there are privacy or security concerns.

As far as barriers are concerned, it has been found out that there are great differences among countries in EU-27.

2. Barriers for the adoption of eGovernment services

Researchers have tried, among others, to present barriers in the adoption of eGovernment services to explain the difficulties in eGovernment implementation.

Barriers in the adoption of eGovernment services can be detected concerning some population group characteristics of citizens in general, such as education and sex, (Akman, Yazici, Mishra, & Arifoglu, 2005), the lack of knowledge (Verdegem & Verhoest, 2008, in EJeP), the low level of access to technology and problems of privacy safety.

In most countries there are many disadvantaged groups (ELOST), which are much less likely to use eGovernment services. These subgroups of population include elderly individuals, people with special needs, of low socio-economic level, unemployed, low income citizens, people with a low formal education level, national minorities and immigrants. These disadvantaged groups make very little use of personal computers. As long as public services become digitalised, a big part of the European and global population might not be able to use them (Delopoulos, 2010). However, these demographic groups should not be excluded from eGovernment.

The remaining fraction of non-adopters of ICT may be lacking financial resources to afford the Internet, under-skilled, hard to convince to use the internet because they fear the technology or because they resent using it (Verdegem & Verhoest, 2008: 37 in EJeP). "Income or socio-economic status remains the most important factor in explaining differences in ICT adoption and use, as well as gender, age, lower level of education, family structure, race, geography/rural location and culture/ social participation" (Verdegem & Verhoest, 2008: 38 in EJeP).

Internet should be affordable for all but "the Internet is still perceived as being expensive and it is commonplace for participants to overestimate hardware and software costs. Obviously, the issue of costs is particularly important for groups on lower incomes" (DG Information Society and Media, 2008: 17) and there is the perception that computers and internet at home are expensive (Verdegem & Verhoest, 2008 in EJeP).

It must not be neglect that "overall, the information we have to date suggests that the Internet is a complex phenomenon. Internet services certainly have value, but at present, there is no reason to conclude that more Internet sophistication is always better than less". (Streib & Navarro, 2006: 14)

The lack of trust (Wimmer, Schneider, & Shaddock, 2007) or confidence (Torres, Pina, & Acerete, 2005) is pointed out as one of the most serious barriers in the adoption of eGovernment services by citizens. The unwillingness of citizens to use eGovernment services concerns security and privacy of information systems (United Nations, 2003). Users must be safe and secure when they connect online and just like in the physical world, cybercrime cannot be tolerated. Besides, some of the most innovative and advanced online services - such as eBanking or eHealth - would simply not exist if new technologies were not reliable. (Comission of the European Communities, 2010).

Technology infrastructure, on its own, is insufficient to support the adoption of eGovernment services by citizens and it is only the first step to 'real access'. This can happen when "real access can be translated to opportunities and empowerment. Access must be blended with relevant and culturally appropriate content for transmuting itself into knowledge. The blended knowledge must be processed and utilised to create opportunity for economic and social empowerment" (United Nations, 2004). Governments realise that they have to refocus on wasteful spending of taxpayers' money and give focus to those eGovernment projects that will produce tangible benefits (Ubaldi, 2011 in EJeP).

There is no uniform legislation system in Europe, so eCommerce, elnvoicing and eSignatures and transactions in the digital environment are too complex (Commission of the European Communities, 2010). The barriers correlate to legal subjects concerning the following: how consistent are they with the national and European legislation, their safety, the identification and the authentication of the network services users, the intellectual Property Rights co-ownership of digital content, privacy, the protection of personal data, the freedom of information, the access of citizens to information increasing the transparency of public administration, the regulation of relations between public institutions, citizens and enterprises that deal with technologies, the re-use of public information and data of citizens concerning the use of estate, fortune, health etc., the lack of confidence, the poor designing of eGovernment services or, the digital divide. (European Commission, 2007)

Mentality is important, since civil servants, as well as decision makers, may either facilitate or prevent the growth of eGovernment services. "The transformation of the public services was meeting resistance from existing staff because they felt threatened. Public servants are the "major players" in government, [...]" (Chou Tzu-Chuan, Chen Jau-Rong, & Pu Ching-Kuo, 2007: 1). Decision makers and policy engravers do not use ICT technologies to make decisions (Ruman, 2004), a fact that should be taken into serious consideration when materialising eGovernment projects or use services by themselves.

"A lot of governmental services are e-supplied but their consumption is low" (Wauters & Lörincz, 2008: 62 in EJeP). If all e-supplied government services where used by European citizens, then we should expect a percentage of 100 % of eGovernment interaction with public authorities. On the contrary, the total average of eGovernment use is 29 % at the period 2006-2010, in EU-27 (see section 4). Therefore, we may conclude that there is a clear imbalance between supply and demand and demand is not equal to supply (Wauters & Lörincz, 2008 in EJeP).

Furthermore, "a critical factor determining the rate of return on most public sector ICT investments is the number of users or the volume of information processed electronically" (Foley, 2008: 44 in EJeP) or "...the number of users that utilise a new service delivery channel" (Foley, 2008: 45 in EJeP). It may be added not only the number of users of eGovernment in European Union is very low, 32 % in 2010 (see table 6) and faces difficulties in using internet as a delivery channel, but also a large percentage of European individuals have never used internet among different ages in EU-27. At the European continent, the most popular channels for dealing with government in UK are the traditional ones such as, telephone, post or in person visit (Foley, 2008, in EJeP).

In order to identify some of the main adoption barriers in this article, an extensive Literature review and a data analysis, aims to track down the eGovernment European Strategy, investigating the Legal documents of the Lisbon Strategy, the Action Plan eEurope 2002 and eEurope 2005, the Strategic Framework i2010 and the Digital Agenda 2020 (see section 3, 4).

3. Objectives of eGovernment European Strategy from Lisbon to Digital Agenda 2020

"Reforming governance addresses the question of how the EU uses the powers given by its citizens. It is about how things could and should be done. The goal is to open up policy-making to make it more inclusive and accountable. A better use of powers should connect the EU more closely to its citizens and lead to more effective policies" (Commission of the European Communities, 2001c: 8).

The EU was determined to launch, in early 2000 an initiative to amend European Governance as a strategic objective, well in advance of the Nice European Council. Europe decided to reform governance and on how the EU uses the powers given by its citizens. One of the main aims was to open up policy-making and make governance more inclusive and accountable. The promote of new forms of European Governance was a major scope of the European Union at 2000 (Commission of the European Communities, 2001d).

EU decided to use ICT in reforming Governance into Good Governance and designed its formulated Lisbon Strategy. It was believed that eGovernment should facilitate the implementation of the objectives of the Lisbon Strategy. EU lay out Action Plan eEurope2002, Action Plan eEurope 2005, Strategic Framework i2010 and Digital Agenda 2020 in legal documents. The above mentioned legal documents have been studied, based on which the main objectives of the eGovernment European Strategy were highlighted(see section 3).

3.1 Objectives of Lisbon Strategy

The Lisbon European Council set in 2000 "the bold and ambitious ten-year goal of making the Union the most dynamic, competitive, sustainable knowledge-based economy, enjoying full employment and strengthened economic and social cohesion", (Commission of the European Communities, 2002b: 2).

The year 2000 the scope of EU was to enhance democracy in the European Union and it was clear at that time "that the reform of European modes of governance is all about improving democracy in Europe" (Commission of the European Communities, 2000). In 2001, in order to pursue further European integration, the Commission outlined the following priority objectives, as well as the Lisbon Strategy, the new economic and social agenda, the ongoing enlargement process, the European Charter of Fundamental Rights and the White Paper on Governance (Commission of the European Communities, 2001a).

The priority objectives were to:

- a. Promote new forms of European governance,
- b. stabilise the European continent and boost Europe's voice in the world,
- c. move towards a new economic and social agenda,
- d. work in order to provide better quality of life for all.

In order for the above strategic objectives to be accomplished, Europe decided to encourage discussion among citizens regarding European values, issues and decisions (Commission of the European Communities, 2001c).

The White paper proposed how ICT could help in the following six work areas of European Governance as depicted in Figure 6(Commission of the European Communities, 2000).



Figure 1: In which six areas of European Governance could ICT help, according to the White Paper. Source: (Commission of the European Communities, 2001c)

3.2 Action Plan eEurope 2002 and Objectives of Implementation of eGovernment European Strategy

It was believed that ICT could bring and continue to bring significant alterations to the modus operandi of public authorities (Commission of the European Communities, 2001e). The overall effort of modernisation, within the function and attitude of the State is evident on three fundamental political principals:

- Provision of public services through the Internet,
- provision of public services concerning businesses through the Internet,
- giving the potential to citizens to access new media and receive training in their use.

Action Plan eEurope 2002 was among the following ten priorities that were outlined by the EU in order to consolidate and extend the Lisbon Strategy (see Figure 2).



Figure 2: Ten priorities extending the Lisbon Strategy. Source: Commission of the European Communities, 2001e

The goals of the Action Plan eEurope 2002 focused on the fields of education and professional occupation. All schools have to be connected to the Internet and professors must be trained on information society media. Employees are required to be flexible and specialised. Regardless of whether the occupation of the European citizen is directly related to the new technological means, all workers must be qualified to comprehend and use the contrivances of information society.

According to the European Committee in the Conference of Lisbon, the State set the following priorities (Commission of the European Communities, 2001b):

- Internet connection of all educational establishments by 2001 and teacher training on Internet by the end of 2002,
- ability of local markets to access the competition until the end of 2000,
- new framework for electronic communications services by 2000.

3.3 Action Plan eEurope2005 and Objectives of Implementation of eGovernment European Strategy

eGovernment was a central element in the eEurope 2005 Action Plan. The public sector played a very important role in Europe's social and economic model. Public administrations were expected to provide cross-border and even pan-European public services and public service provision was expected to become more user-friendly and personalised, adapted to the needs of individuals (Commission of the European Communities, 2003).

Furthermore, the Plan was based on four interconnected ideas:

- a. Political Measures for the revision and modification of legislation on national and regional level, boosting of competition, sensitisation, remarking of political will,
- b. development, analysis, dissemination of correct practices,
- c. comparative evaluation of achieved progress,
- d. overall coordination of substantial policies (Commission of the European Communities, 2002a).

The aims of the Action Plan eEurope 2005 comprised two main criteria:

- Accessibility, from every location, to the public services addressed to citizens' according to their needs
- "Broadband" connection to the World Wide Web. Improvement of transaction security. Every public agency would have to be web operative by 2005.

The eEurope 2005 Action Plan had formulated specific eGovernment targets (see Figure 3):



Figure 3: eGovernment objectives according to eEurope 2005. Source: (Commission of the European Communities, 2002a, 2003)

3.4 Strategic Framework i2010 and Objectives of Implementation of eGovernment European Strategy

According to the Strategic Framework i2010-European Information Society, knowledge and innovation are the engines for sustainable growth. The scope of the framework was to promote an open and competitive digital economy and render ICT a driver of inclusion and quality of life. The objectives of i2010 are integrated and consistent with the new "Lisbon Governance cycle" (Commission of the European Communities, 2005).

It was "essential to build a fully inclusive Information Society, based on the widespread use of ICT in public services, SMEs and households". ICT could be a powerful driver of growth and employment. A quarter of EU GDP growth and 40 % of productivity growth are due to ICT. The EU had set the following three priorities for information and media policies (Commission of the European Communities, 2005), (see Figure 4):



Completion of a <u>Single European</u> <u>Information Space</u> with the scope for an open and competitive internal market for information society and media.

Creation of growth and more quality jobs through the increase of <u>innovation and investment</u> in ICT.

Creation of an <u>Inclusive European</u> <u>Information Society</u>. This gives priority to the creation of better public services that increase the quality of life translating into means increasing of jobs as well as sustainable development.

Figure 4: Priorities for Information and Media Policies according to Strategic Framework i2010. Source: (Commission of the European Communities, 2005)

3.5 Digital Agenda for Europe 2020 and Objectives of implementation of European eGovernment strategy-Barriers to ICT exploitation

"The crisis has wiped out years of economic and social progress and exposed structural weaknesses in Europe's economy. Europe's primary goal today must be to get Europe back on track. To achieve a sustainable future, it must already look beyond the short term. Faced with demographic ageing and global competition we have three options: work harder, work longer or work smarter. We will probably have to do all three, but the third option is the only way to guarantee increasing standards of life for Europeans. To achieve this, the Digital Agenda makes proposals for actions that need to be taken urgently to get Europe on track for smart, sustainable and inclusive growth" (Commission of the European Communities, 2010: 3).

In March 2010, according to the Europe 2020 Strategy and in order to exit the crisis, the European vision was to increase productivity, employment, social cohesion and become a low carbon economy. The Digital Agenda 2020 is one of the seven flagship initiatives of Europe's 2020 strategy. The primary scope of the Agenda is to maximise the social and economic potential of ICT, giving priority to the Internet. However, there are several obstacles that undermine efforts to exploit ICT.



Figure 5: Virtuous cycle of the digital economy. Source: Comission of the European Communities, 2010

Europe is not equipping itself adequately to prosper in this growth sector of the knowledge economy. Seven obstacles exist as shown in the inner circle in Figure 5, such as (Commission of the European Communities, 2010):

- 1. Fragmented Digital Markets
- 2. Lack of Interoperability
- 3. Rising Cybercrime and risk of low trust in networks
- 4. Lack of Investment in networks
- 5. Insufficient Research and Innovation efforts
- 6. Lack of Digital literacy and skills
- 7. Missed Opportunities in addressing societal challenges

3.6 Main Objectives of Implementation of European eGovernment Strategy-From Lisbon Strategy 2000 to Digital Agenda 2020

In this section we try to summarise the main strategic objectives of the implementation of European eGovernment Strategy.

The main scope of the Lisbon Strategy was not only to broaden and enrich the public debate on European matters, but also to encourage discussion on European values, issues and decisions using

ICT. Citizens should understand policy-decision mechanisms. Terms and procedures of eConsultations and eDemocracy appeared in legal documents of the EU. Europe decided to reform Governance and the concept of European Governance had to follow five political principles: openness, participation, accountability, effectiveness and coherence as well as to promote democracy in Europe, (see Figure 6).

The EU's Action Plan 2002, established policies implemented in the provision of public services for citizens and businesses through Internet. Education and professional occupation where two major areas in which ICT could help citizens be part of the digital era and employees become flexible and specialised in ICT. Priority was given to the connection of educational establishments as well as to the creation of a legal framework and institutions for eCommerce. The Lisbon strategy targeted 'more and better jobs' and a 'New European Labour market open to all', (see Figure 6)



Figure 6: Main Points of Objectives of eGovernment European Strategy-Lisbon Strategy

Furthermore, the EU's Action Plan 2005 promoted its belief that "Europe's public sector is today at crossroads, facing challenging economic and social conditions, institutional change and the profound impact of new technologies. Expectation is growing that as it is a major economic actor for boosting economic growth, the public sector can and will play a strong role in realising the Lisbon strategy for economic, social and environmental renewal" (Commission of the European Communities, 2003: 4). eGovernment was a central element in the eEurope 2005 Action Plan. However, there were barriers that had to be overcome, such as change mindsets, push through organisational change and sustain investment. Citizens expect authorities to safeguard liberty, justice and security in the Internet as

in real life. The main idea was accessibility for all, broadband connections and interactive public services. For this reason, an interoperable framework for pan-European services, electronic public procurements and public Internet points should be created, with priority given to elearning and eHealth (see Figure 7).

According to i2010, ICT could help make public health and welfare systems more efficient and effective. ICT could have an impact on cultural creativity in a large number of citizens. ICT could be used as a tool for environmental sustainability by using disaster management and by creating low energy efficient production processes. eEnvironment services, as a special category of eGovernment services, are either still under-developed, or fragmented along national borders and citizens are concerned for problems in everyday life, such as environmental problems, quality of life, unemployment etc. (Commission of the European Communities, 2005). In Europe, priority is given to the increasing supply of eGovernment services in the health sector (eHealth), and in the sector of education (eLearning) (EUSER). A new Lisbon Governance Cycle was outlined in the Strategic framework i2010 and thus, new objectives of European Information Society had to be followed. The main scope was:

- a. to create a Single European Information Space with the aim of creating an open and competitive internal market,
- b. to produce better public services that increase quality of life as well as jobs and sustainable development,
- c. to increase innovation and invest in ICT in order to increase growth and jobs EU (see Figure 7).

Last but not least, according to the Digital Agenda 2020 in 2010, taking of course into consideration the economic crisis, the EU realised that ICT via Internet Governance could propose actions for smart, sustainable and economic growth. Priority was given to the Internet but there are seven obstacles that prevent the exploitation of ICT, such as:

- 1. Fragmented digital markets,
- 2. Lack of interoperability,
- 3. Rising of cybercrime and the risk of low trust in networks,
- 4. Lack of investment in networks,
- 5. Insufficient research and innovation efforts,
- 6. Lack of digital literacy and skills,
- 7. Missed opportunities in addressing societal challenges (see Figure 7).


Figure 7: Main Points of Objectives of eGovernment European Strategy Action Plan 2002, Action Plan 2005, Digital Agenda 2020

4. Objectives and Barriers of European eGovernment Strategy

In order to identify the barriers of European eGovernment strategy, decision makers and designers of eGovernment services should set some of the following questions to their selves:

• How many European citizens in EU-27 use eGovernment?

A critical factor that determines the added value of eGovernment services is the number of users of these services. The total average of eGovernment usage was 29 %, from 2006-2010. Approximately 3 individuals in every 10 individuals were using eGovernment in EU-27 from 2006-2010 (see Table 1, Graph 1).

Table 1: European Union (27 countries) eGovernment usage by individuals (demand side) in the last 3 months, total. Source: [isoc_si_igov], Eurostat

Year	2006	2007	2008	2009	2010
European Union (27 countries)	24	30	28	29	32



Figure 1: European Union (27 countries) eGovernment usage by individuals (demand side) in the last 3 months, total. Source: [isoc_si_igov], Eurostat

During 2006-2010, the total average of individuals between 16-74 that interacted with public authorities via Internet was: a) 12 % for individuals sending filled forms, b) 25 % for individuals obtaining information and c) 16 % for individuals downloading official forms (see Table 2, Figure 2).

Table 2: European Union (27 countries), Individuals using the Internet for interaction with public authorities, by type of interaction - Percentage of indi viduals aged 16 to 74. Source: [isoc_ci_ac_i], Eurostat

	2005	2006	2007	2008	2009	2010
Internet use: sending filled forms	6	9	13	12	12	13
Internet use: obtaining information from public authorities	21	21	27	25	26	28
Internet use: downloading official forms	10	13	18	16	17	18



Graph 2: European Union (27 countries), Individuals using the Internet for interaction with public authorities, by type of interaction - Percentage of individuals aged 16 to 74. Source: [isoc_ci_ac_i], Eurostat

• Can an individual use eGovernment at home if she or he has not internet access at home? How many European citizens in EU27 have internet access at home?

The total level of Internet access of households in EU-27 was 73 % in 2011. This means that 27 % households do not have internet access. In 2011, approximately 3 households in every 10 do not have Internet in EU-27 (see Table 3, Graph3).

Table 3: European Union (27 countries) - Level of Internet access (%) of households. Source: [isoc_si_lia], Eurostat

TIME	2005	2006	2007	2008	2009	2010	2011
Level of Internet access of households	48	49	55	60	66	70	73



Figure 3: European Union (27 countries) - Level of Internet access (%) of households. Source: [isoc_si_lia], Eurostat

The total average level of internet access of households in EU-27 for the period 2006-2010 was 60 %. That means that 40 % of households in this period did not have internet access. The proportion of households who have internet access rose to 94 % in Netherlands but decreased to 45 % in Bulgaria, in 2011 (see Table 4, Figure 4).

2011									
Bulgaria	45	Hungary	65	Belgium	77				
Romania	47	Czech Republic	67	Ireland	78				
Greece	50	Poland	67	Germany	83				
Cyprus	57	Estonia	71	United Kingdom	83				
Portugal	58	Slovakia	71	Finland	84				
Italy	62	Slovenia	73	Denmark	90				
Lithuania	62	Austria	75	Luxembourg	91				
Latvia	64	Malta	75	Sweden	91				
Spain	64	France	76	Netherlands	94				

Table 4: European Union (27 countries) - Level of Internet access of households. Source: [isoc_si_lia], Eurostat



Figure 4: European Union (27 countries) - Level of Internet access of households. Source: [isoc_si_lia], Eurostat

• Can an individual use eGovernmemnt if she or he has not the prerequisite internet skills to use internet?

As far as Digital Literacy and skills are concerned, it is essential to educate European citizens to use ICT (Comission of the European Communities, 2010) and digital media, and particularly attract youngsters to ICT education. The supply of ICT practitioner and eBusiness skills, i.e. the digital skills necessary for innovation and growth, needs to be increased and upgraded.

Moreover, a percentage of 37 % of the EU population had no internet skills accordingly to a Eurostat Survey for the European Union on ICT usage in households by individuals (Demunter, 2006) and the number of users are interacting with public authorities using the internet is relatively low and barely increasing in many European Countries (Foley, 2008 in in EJeP). Many Europeans are digitally excluded and do not use the Internet (Wauters & Lörincz, 2008 in in EJeP) and consequently, they cannot use eGovernment services for networking or for eParticipation and there is limited demand for eGovernment services online (United Nations, 2003). In EU-27 there are great differences between countries. The proportion of individuals who had never used the Internet or never did any of the listed internet activities. (see Figure 8) rose to 55 % in Romania, but decreased to 7 % in Sweden, in 2011 (see Table 5, Figure 5).

Table 5: European Union (27 countries) - Individuals who have never used the Internet or done any of the listed Internet activities. Source: [isoc_sk_iskl_i], Eurostat

2011							
Sweden	7	Slovakia	21	Malta	32		
Netherlands	9	France	22	Lithuania	34		
Denmark	10	Estonia	24	Poland	35		

Luxembourg	10	Czech Republic	26	Italy	40
Finland	12	Ireland	27	Portugal	41
Belgium	16	Latvia	27	Cyprus	42
Germany	16	Hungary	29	Greece	46
United Kingdom	16	Slovenia	30	Bulgaria	50
Austria	20	Spain	30	Romania	55



Figure 5: European Union (27 countries) -Individuals who have never used the Internet or done any of the listed internet activities. Source: [isoc_sk_iskl_i], Eurostat



Figure 6: Listed Internet activities

• Can an individual use eGovernment if she or he has never used a PC?

The proportion of individuals that have never used a computer rose to 50 % in Romania but decreased in Sweden to 4 % (see Table 6, Figure 6). According to Eurostat, the total average of individuals that had never used a computer in 2011 was 21 %.

Table 6: European Union (27 countries) - Computer use - Individuals who have never used a computer-Percentage of Individuals. Source: [isoc_ci_cfp_cu], Eurostat

	2011								
Sweden	4	France	15	Malta	28				
Denmark	6	Slovakia	17	Poland	30				
Luxembourg	6	Ireland	19	Lithuania	32				
Netherlands	6	Estonia	20	Portugal	36				
Finland	7	Czech Republic	22	Italy	37				
United Kingdom	9	Slovenia	24	Cyprus	38				
Germany	11	Hungary	26	Greece	41				
Belgium	13	Latvia	26	Bulgaria	45				
Austria	15	Spain	26	Romania	50				



Figure 7: European Union (27 countries) - Computer use - Individuals who have never used a computer -Percentage of Individuals. Source: [isoc_ci_cfp_cu], Eurostat

• Can an individual use eGovernment if she or he has not skills to use a pc?

The estimated proportion of individuals that have never used a computer or done any of the listed computer activities (see Figure 9), rose to 61 % in Romania but decreased to 11% in Germany, in 2011 (see Table 7, Figure 7).

Table 7: European Union (27 countries) - Individuals' level of computer skills - Individuals who have never used a computer or have not done any of the listed computer activities. Source: [isoc_sk_cskl_i], Eurostat

2011									
Germany	11	France	25	Malta	37				
Denmark	13	Slovakia	25	Portugal	40				
Sweden	13	Hungary	31	Italy	41				
Luxembourg	14	Spain	32	Lithuania	41				
Netherlands	15	Estonia	34	Cyprus	44				
Finland	16	Slovenia	34	Poland	45				
Austria	22	Ireland	36	Greece	50				
Belgium	22	Latvia	36	Bulgaria	57				
United Kingdom	22	Czech Republic	37	Romania	61				



Figure 8: European Union (27 countries) - Individuals' level of computer skills - Individuals who have never used a computer or have not done any of the listed computer activities. Source: [isoc_sk_cskl_i], Eurostat.

-Individuals who have used a mouse to launch programs such as an internet browser or word processor	-Individuals who have used basic arithmetic formulae to add, subtract, multiply or divide figures in a spreadsheet -Individuals who have compressed files	-Individuals who have connected and installed new devices, eg a printer or a modem -Individuals who have connected computers to a local area network	
who have copied or moved a file or folder	Individuals who have written a computer program using a	-Individuals who have detected and solved computer	
-Individuals who have used copy or cut and paste tools to duplicate or move information on	specialised programming language	problems (e.G. Computer runs slowly	

Figure 9: Listed Computer Activities

screen)

• Do European citizens have security concerns about eGovernment?

In EU-27 there are great differences between countries, concerning the proportion of individuals who have security concerns that keep them from communicating with public services and administrations. More specifically, the proportion rose to 11 % in Italy but decreased to 1% in Czech Republic, in 2011 (see Table 8, Figure 8).

Table 8: European Union (27 countries) - Activities via Internet not done because of security concerns - Security concerns kept individual from communicating with public services and administrations (Percentage of Individuals). Source: [isoc_cisci_ax], Eurostat.

2010								
Czech Republic	1	Lithuania	3	France	7			
Malta	1	Slovakia	3	Portugal	7			
Austria	2	Slovenia	3	Belgium	8			
Cyprus	2	United Kingdom	3	Latvia	8			
Estonia	2	Hungary	4	Spain	8			
Greece	2	Bulgaria	5	Luxembourg	9			
Ireland	2	Finland	5	Sweden	10			
Poland	2	Netherlands	5	Germany	11			
Romania	2	Denmark	6	Italy	11			



Figure 8: European Union (27 countries) - Activities via Internet not done because of security concerns -Security concerns kept individual from communicating with public services and administrations (Percentage of Individuals). Source: [isoc_cisci_ax], Eurostat

• Can ICTs be the key drivers of growth and employment?

According to i2010, ICTs could be the key drivers of growth and employment. Can all these happen if a large proportion of European citizens in some countries has never even used a computer? (see table 6).

• Is it possible to create a 'single market' when they have security concerns that prevent them from interacting with public authorities?

According to Digital Agenda, there is no uniform legislation system in Europe, so eCommerce, elnvoicing and eSignatures and pan-European eGovernment services cannot be produced and transactions in the digital environment are too complex. In order to create a single market the need of digital confidence is imperative. Consumers will not shop online if they do not feel their rights are protected. Consumers and businesses are still facing considerable uncertainty about their rights and legal protection when doing business on line. The digital era should be about empowerment and emancipation; background or skills should not be a barrier to acces this potential (Commission of the European Communities, 2010). Almost after ten years of implementation of the eGovernment Strategy of Europe, there is still a lot of work to be done in order to create 'more and better jobs', as well as a 'Single Market Information Space'. Some European citizens do not have internet access at home because they estimate that content is harmful or they do not interact with public authorities because of privacy or security concerns (Table 9, Figure 9).

Table 9: European Union (27 countries) - Reasons for not having Internet access at home- Percentage of Households. Source: isoc_pibi_rni, Eurostat

year	Households without access to Internet at home, because the access costs are too high (telephone, etc.)	Households without access to Internet at home, because of lack of skills	Households without access to Internet at home, because access not needed (content is not useful, not interesting, etc.)	Households without access to Internet at home, because the equipment costs are too high	Households without access to Internet at home, because access not wanted (content is harmful, etc.)	Households without access to Internet at home, because of privacy or security concerns
2005	20	12	12	*	4	3
2006	20	13	13	11	4	2
2007	*	*	*	*	*	*
2008	15	9	10	8	6	2
2009	*	*	*	*	*	*
2010	12	10	8	7	4	2
2011	12	9	7	6	*	2

*Not available data



Figure 9: European Union (27 countries) - Reasons for not having Internet access at home- Percentage of Households. Source: isoc_pibi_rni, Eurostat

• Is the idea of Pan-European services accomplished?

Most public online services do not work across borders, to the detriment of the mobility of businesses and citizens. Public authorities have focused, so far, on national needs and have not sufficiently taken into account the single market dimension of eGovernment. Since future public online services will rely on effective and interoperable identity management and authentication frameworks, Europe needs better administrative cooperation to develop and deploy cross-border public online services. This includes the implementation of seamless eProcurement as well as practical eldentification and eAuthentication cross border services (including mutual recognition of security levels for authentication) (Commission of the European Communities, 2010).

• Are eGovernment services for all?

The benefits of digital society should be available to all and inclusive digital services should be produced (Commission of the European Communities, 2010). ICT should enable benefits for European society and the digital society must be envisioned as a society with better outcomes for all. The deployment of ICT is becoming a critical element for delivering policy objectives like supporting an ageing society, climate change, reducing energy consumption, improving transportation efficiency and mobility, empowering patients and ensuring the inclusion of persons with disabilities. A large percentage of EU population, about 40 % in 2007, have no Internet skills (DG Information Society and Media with the support of DG Education and Culture and Eurostat, 2008). The reasons behind low accessibility might be the lack of internet skills. Citizens without access to the Internet are likely to be left out (United Nations, 2004). The facts are very disappointing; there is a large proportion of

European citizens that do not use a personal computer (see Table 6) or do not have internet access at home (see Table 3). This means that eGovernment services are not for all. During 2005-2010, the reasons for not having internet access at home were, among others, that access and equipment costs were high, 12 % and 6 % accordingly, or that individuals had low internet skills 9 % (see table 9).

• A main question must be answered: Should all services become digital as it was proposed in Digital Agenda 2020? Is internet affordable to all? Is technology by its own enough to support eGovernment services?

According to the Digital Agenda 2020, digital content and application will be almost entirely delivered online. The trend is that all public services are to be transformed into digital ones. How can this happen when a large proportion of European citizens, does not have internet access, while the situation is quite different among countries in the EU-27? The findings vary among ages; the average total level of 'no Internet' use by individuals is in EU-27, during the period 2006-2010, 7,4 %, between 16-24 years old and it rises between 45-54 years old to 35,4 % and between 65-74 years old, to 76,4%, (see table 10, Graph 10). As mentioned before, individuals may not have internet access yet for several reasons (see Table 9).

year	Individuals, 16 to 24 years old	Individuals, 25 to 34 years old	Individuals, 35 to 44 years old	Individuals, 45 to 54 years old	Individuals, 55 to 64 years old	Individuals, 65 to 74 years old
2006	12	26	33	45	63	85
2007	9	20	29	40	57	80
2008	7	16	23	35	52	76
2009	5	13	20	31	49	73
2010	4	10	16	26	45	68
2011	4	8	14	24	42	65

Table 10: European Union (27 countries). Individuals never using the Internet - Percentage of individuals aged 16 to 74. Source: [Isoc_ci_ifp_iu], Eurostat



Figure 10: European Union (27 countries). Individuals never using the Internet - Percentage of individuals aged 16 to 74. Source: [lsoc_ci_ifp_iu], Eurostat.

The Digital Agenda2020 (Commission of the European Communities, 2010) was planning that, by 2020, digital content and applications would be almost entirely delivered online. Services are thus converging and moving from the physical into the digital world. These services could be accessible through any device, on a smart-phone, tablet, personal computer, digital radio or high-definition television. One of the major scopes was to create attractive content and services that would be available in an interoperable and borderless internet environment. In order these digital services to be used, citizens should be convinced to have internet access, and at the same time the content should be interesting and not harmful. Also they should not have security concerns nor believe that access costs and equipment are expensive.

5. Conclusions

The Survey that was based on the Eurostat database revealed that eGovernment usage was 32 % from 2005-2010, which is a very low percentage and shows that European Strategy must identify the barriers that prevent the increase of use. Different barriers of eGovernment Implementations have been pointed among member countries. In EU-27 a large amount of European citizens do not use a personal computer nor internet and often do not know how to use them, they do not have internet at home, either because access costs are too high (telephone, etc.) or simple because they don't need it. Some of them also find that the content is not useful or interesting and harmful, having privacy or security concerns. It is very important for the EU to create a 'Framework of Adoption of eGovernment Services' that ensures that eGovernment services will be adopted and used by as many citizens as possible. This could happen, if services are produced by taking into consideration during the design phase all the above mentioned barriers of adoption of eGovernment services.

In order for the EU to materialise its strategic plans, European governments should produce eGovernment services, which citizens will use in their everyday routine. In a period of crisis, money should be invested in eGovernment services, provided that the EU will guarantee for the adoption of eGovernment services.

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eGovernment Strategies The Case of the United Arab Emirates (UAE)

This article provides an overview of eGovernment and its role in revolutionising existing governmental systems. It argues that in order for eGovernment initiatives to truly succeed, we need to develop public trust and confidence to promote diffusion and participation. The article relates this to the recently announced UAE eGovernment Strategic Framework 2011-2013. The framework attempts to promote the electronic transformation of all government services within a period of three years. An important component of the strategic framework in question is the use of the existing national identity management infrastructure and the development of a government-owned federated identity management system to support Governmentto-Citizen (G2C) eGovernment transactions and promote trust and confidence on the Internet.



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Keywords

eGovernment, identity management, federated identity, identity card.

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Government-owned identity management systems that provide secure, unique and tamper-proof digital identities should become a primary component of national eGovernment strategies. Such federated identity systems can gain higher levels of trust, confidence and encourage public participation and has the potential to enable new levels of collaboration between different government agencies.

1. Introduction

Information and Communications Technologies (ICT) have affected the ways in which people, governments and businesses interact with each other. The rapid diffusion of the Internet, mobile telephony and broadband networks demonstrate how pervasive this technology has become. Today, ICT is considered as one of the fundamental building blocks of modern societies and digital economies (Castells, 2009; Varian et al., 2005).

Yet, the revolutionary pace in countries worldwide is dependent on the preparedness of several factors of both social and political environments (Gauld & Goldfinch, 2006; Loader, 2009; OECD, 2009). New technologies have revealed their potential to threaten existing power settings and economic relationships (Beer, 2011; Nixon & Koutrakou, 2007). The numerous applications of ICT over the past few decades have shown its transformative potential and its usage as an important tool for organising political dissent in countries worldwide (Hirschfeld, 2012; Reddick, 2010; Serageldin, 2011).

From a government standpoint, eGovernment adoption is becoming an unquestionable task. EGovernment deals with facilitating the operation of government and the distribution of governmental information and services. The ultimate goal of eGovernment is to be able to offer an increased portfolio of public services to citizens in an efficient and cost effective manner. Anticipated benefits of eGovernment include efficiency, improved services, better accessibility of public services, and more transparency and accountability (Atkinson & Castro, 2008), see also Figure 1.



Figure 1: Primary drivers of eGovernment.

The objective of this article is to examine some of the difficulties pertaining to the successful development and implementation of eGovernment programmes. The aim is to be pragmatic and focus on the problematic area from a practitioner's point of view, thus relating the identified concerns and mapping them to a case study drawn from the UAE eGovernment experience.

The article is structured as follows: The first section provides a snapshot overview of the literature around the objectives and outcomes associated to eGovernment. It then briefly discusses the issue of trust and security in virtual networks and how it may encourage or inhibit public trust and confidence. The following section gives an overview of eGovernment in the Gulf Cooperation Council (GCC¹) countries and some recent statistics about eGovernment diffusion. It then presents the case of the UAE eGovernment Strategic Framework 2012-2014 and explains its primary objectives and components. Finally, it sheds some light on the UAE government's strategic initiative, the national identity management infrastructure and its federated identity management system explaining its potential role in supporting the eGovernment transformation and successful implementation of the government's strategy.

2. eGovernment: The power of technology

eGovernment in its simplest form is about the use of ICT to provide access to governmental information and deliver public services to citizens and business partners. However, practitioners have still not figured out how to exploit its full benefits. There is an equilibrium problem with eGovernment applications and limitations arising from the difficulty to tangibly justify the gigantic investments in ICT systems for the past decade and a half.

The average public expectations concerning governments' efforts are shaped according to the ability of the government to successfully improve citizens' quality of life. Governments need to ensure that their policies, regulations and systems, enable citizen participation and address the needs of improving the delivery of services. The service delivery lifecycle needs to be reengineered and redesigned so as to meet citizen's expectations of enhanced social security and quality of life. Figure 2 depicts the role of government policy making in building a more citizen-centric and competitive government.

Government policies should enable governments to undertake radical organisational changes, that: (1) foster growth in services, (2) reduce unnecessary costs and regulatory burdens on firms, (3) strengthen education and training systems, (4) encourage good management practices, (5) foster innovation and new applications, (6) foster market conditions and create a business environment that promotes productive economy, and the list goes on.

¹ GCC is the acronym for Gulf Cooperation Council, also referred to as the Cooperation Council for the Arab States of the Gulf (CCASG). It includes six countries namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.



Figure 2: Development of a new revolution in Governments

Advocates of eGovernment point out the opportunities for citizens to play a greater role in public policy (Ambali, 2010; Bonina & Cordella, 2008; Navarra & Cornford, 2007; Torres et al., 2005). They also stress its potential to connect them, quickly and directly, to what their government has to offer - no queues, no waiting, service 24/7.

Cost-cutting is a major factor driving decisions to go online. Advanced eGovernment in our opinion has the potential to cut overheads by as high as 90 %, through streamlined communications and integrated systems that offer higher levels of efficiency, effectiveness and convenience. This is to say, eGovernment initiatives can reduce administrative burdens, process time cycles and improve responsiveness. Besides, compared with the traditional over-the-counter services, online services can reduce substantial tangible costs as they, for example, do not need buildings, people, electricity, service desks etc.

Indeed, ICT offers the potential for development and competition in the public sector specifically in areas of customer service and overall organisational excellence² programmes. Such competition not only helps lower the costs of government services through automation and computerisation but also strengthens pressures on firms to improve performance and change conservative attitudes.

² Though competition in the public sector was not relevant in the past, governments today use excellence models to recognise achievements and support the implementation of best in class tools and practices. Excellence programmes are perceived by governments as a tool to achieve sustainable growth and enhanced performance, create a breakthrough in public sector productivity, and boost engagement to improve bottom line results. The EFQM Excellence model, for instance, is one of the most common frameworks that is widely used in public and private sector organisations (http://www.efqm.org).

Private sector has always challenged the public sector and acted as a catalyst for better quality and for more effective budget utilisation (Suomi & Tähkäpää, 2002). Increased computerisation in the public sector is promoting new levels of balance between the two sectors (Das et al., 2010). Government agencies and public sector agencies in particular are paying greater attention to core capabilities and outsource other support functions to be delivered by the private sector (Suomi & Tähkäpää, 2002). ICT in this regard has played a central role in helping governments to achieve remarkable productivity gains (EIU, 2004).

On the other hand, and despite high spending and the widespread adoption of sophisticated ICT infrastructure, many other countries continue to lag behind on key measures of economic growth and productivity (ibid). Government investment in ICT to date has been very narrowly focused on administrative rationalisation, cost-cutting, and service reform without giving attention to create public oriented systems that promote and encourage citizen participation (Longford, 2002).

The major deficiency in such efforts is that they have been thought of and executed from a 'government mindset' rather than being based on public needs and expectations. Such a narrow view of eGovernment calls for reported ICT achievements to be regarded with a sceptical eye (Longford, 2002). Unless measures are taken to address other aspects of society and governance, eGovernment alone may produce little if any net gain in leveraging ICT to rationalise and restructure administrative systems and service delivery systems (ibid).

Other researchers recommend that governments adopt a new approach that embeds a transformation in the logic underpinning the design and evaluation of public sector organisations (Lane, 2000). This is envisaged to have considerable implications for enhancing the services delivered by public administration and serious consequences for the public value associated with the services delivered (Bonina & Cordella, 2008).

In Arab countries, eGovernment is now viewed as the path to develop a more sustainable new economy. It is also considered as playing a vital role in managing and directing the process of change and reform that will boost public confidence. However, building trust in eGovernment is not a simple issue. Relevant literature shows that there are overwhelming concerns about the potential of digital networks to negatively affect public privacy and security (Conklin & Whiet, 2006; McLeod and Pippin, 2009; Nikkhahan et al., 2009; Palanisamy & Mukerji, 2012; Yee et al., 2005). The next section discusses this in more detail.

3. Trust and Confidence

Trust is probably one of the most important aspects in the implementation of eGovernment strategies. In order for eGovernment to achieve its ambitious objectives to develop and deliver high quality and integrated public services, citizens need to trust the virtual environment. Without trust, citizens will not participate in the eGovernment process.

A review of the literature and empirical studies on eGovernment identifies the criteria for the adoption of eGovernment from both a citizen's and government's perspective, which highlights trust and security as major factors (Al-Khouri, 2012a; Tassabehji & Elliman, 2006). Empirical evidence shows that the level of trust is simply not a gradual process that happens over time (Berg et al., 1995; Kramer, 1999), rather a cumulative process. There are several overlapping and consistent factors that have the potential to impact the building of trust. These are classified in two major clusters; pre-interactional and interactional factors, as depicted in Table 1 (Colesca, 2009).

Pre-interactional factors		
Individual citizen/consumer behavioural attributes	Subjective norms, individual demographics, culture, past experiences, propensity to trust, benevolence, credibility, competency, fairness, honesty, integrity, openness, general intention to trust and use of eServices.	
Institutional attributes	Organisational reputation, accreditation, innovativeness, general perceived trustworthiness of the organisation.	
Technology	Hardware and software that deliver security and effectiveness such as interface design, public key encryption, integrity.	
Interactional factors		
Product/service attributes	Reliability, availability, quality, and usability.	
Transactional delivery and fulfilment of services	Usability, security, accuracy, privacy, interactivity, quality.	
Information content attributes	Completeness, accuracy, currency, quality.	

Table 1: Factors that impact the building of trust.

For the successful adoption of eGovernment services, citizens must have the intention to 'engage in eGovernment' which encompasses the intentions to receive and provide information through online channels (Warkentin et al., 2002). With the increasing reach of digital communication tools and connectivity, governments' interactions with their citizens over virtual networks are becoming more popular. Citizens have come to expect and demand governmental services matching private-sector services in every aspect of quality, quantity, and availability.

In fact, such expectations put higher pressures on governments to develop quality services and delivery systems that are efficient and effective. However, the complexity arises from the fact that a citizen plays multiple roles while interacting with the government. Single role-based identities are decreasingly relevant in existing government transactions. This makes it imperative for governments to acquire citizen-centric qualities that provide services and resources tailored to the actual service and resource needs of the users, including citizens, residents, government employees, business partners, etc.

The next section provides a snapshot of eGovernment in GCC countries who have been recognised globally for their efforts in eTransformation and eReadiness.

4. eGovernment in GCC Countries

The latest United Nations Development Programme (UNDP) report on eGovernment shows a high level of preparedness in Middle Eastern countries, well above the world average, in terms of eGovernment adoption and readiness to interact proactively with citizens. The Internet usage in the Middle East is reported to be 35.6 % compared to 32.6 % worldwide (UNDP, 2012). See also Table 2.

Middle East Region	Population (2011 Est.)	Pop. % of World	Internet Users <mark>31 Dec</mark> 2011	% Population (Penetration)	Users % World	Facebook 31-03- 2012
Total Middle East	216,258,843	3.1 %	77,020,995	35.6 %	3.4 %	20,247,900
Rest of the World	6,713,796,311	96.9 %	2,190,212,747	32.6 %	96.6 %	815,277,380
World Total	6,930,055,154	100.0 %	2,267,233,742	32.7 %	100.0 %	835,525,280

Table 2: Internet	Users in the	Middle East a	and the World ³
Labre Et Internet	00010 111 0110	maate East	

Source: http://www.internetworldstats.com

Representing a total of 77 million internet users, Middle Eastern citizens are classified as heavy users of electronic social networks with high dependence on digital communications. The United Arab Emirates have the highest Internet penetration with nearly 70 % of the population followed closely by Qatar, Bahrain, Oman, Kuwait, Palestine and KSA. See also Figure 3.





³ NOTES: (1) Internet Usage and Population Statistics for the Middle East were updated as of 31 December 2011, and Facebook subscribers were updated as of 31 March 2012; (2) population numbers are based on data contained in the <u>US</u> <u>Census Bureau</u>; (3) the most recent Internet stats come mainly from data published by <u>Nielsen Online</u>, <u>ITU</u>, <u>Facebook</u> and other trustworthy sources; (4) data on this site may be cited, giving due credit and establishing an active link back to <u>InternetWorldStats.com</u>. Source: http://www.internetworldstats.com.

Overall, GCC countries have maintained leadership in eGovernment readiness among Arab peers. They have taken serious steps to support the diffusion of eGovernment in their societies (Al-Khouri & Bachlaghem, 2011; Al-Khouri & Bal, 2007). Several UNDP reports confirmed that the growing efforts of GCC governments to promote digital transformation and literacy have helped further enhance the region's collective ranking in the UN eGovernment Readiness Surveys (UNDP, 2010; UNDP 2012). These reports indicated that GCC countries played various roles for eGovernment in addressing the global financial crisis.

Governments of the GCC countries are considered to be in intense competition with each other to develop a new knowledge-based economy, away from the current dependence on oil, and to make their products and services competitive on a global scale (Awan, 2003). GCC countries are proceeding at a rapid space to use more service oriented and citizen-centric operating models. This rapid reform is bringing a paradigm shift in the way citizens in the GCC are interacting with their governments. There are serious efforts in these countries to develop electronic operating environments, with advanced capabilities to build the right conditions for the eCitizens concept to evolve.

The next section provides an overview of the eGovernment strategy of one of the GCC countries, namely the UAE government's strategic framework that aims to electronically transform all public services through a two-year action plan.

5. UAE eGovernment Strategic Framework 2012-2014

Although local initiatives in the UAE started earlier, the federal eGovernment programme started in 2001. One of the early eServices offered at a federal level was the electronic card known as the eDirham in 2001, which was issued to collect government services fees (Figure 4). Today, the UAE is considered to have one of the most advanced and world-class information and communication technology infrastructures.



Figure 4: UAE Federal eGovernment Evolution

The UAE is considered among the highest investing governments in adopting and implementing progressive ICT in its government and private sectors. The UAE has made a remarkable worldwide achievement in the field of eGovernment according to the UN eGovernment Survey 2012, which focuses on the role of eGovernment in sustainable development. The UAE achieved the 28th rank overall according to the survey against the 49th rank in the 2010 Survey. It scored 7th on online service index against 99th in the 2010 survey and 6th in the eParticipation index against 86th in the 2010 survey (Figure 5).



Figure 5: UAE in UN EGovernment Survey 2012

The UAE has recently announced a revised eGovernment Transformation Strategic Framework. This framework comprises numerous strategic initiatives at a federal level to transform all government services and make them available electronically through various channels. The following section will provide an overview of this strategy.

5.1 UAE Federal eGovernment Strategic Framework

The United Arab Emirates has developed a federal eGovernment Strategic Framework for 2012-2014 that charts out the initiatives and courses of action the government intends to take over a period of three years. The framework is aimed to contribute to:

- 1. UAE Vision 2021: which drives the UAE to be one of the best countries in the world, see also Table 3; and
- 2. UAE Government Strategy 2011-2013: that aims at putting citizens first and developing an accountable and innovative government.

The framework also makes reference to some of the existing federal strategies to ensure alignment with government strategic intents and plans. See also Table 3.

Description	References
Is the highest reference strategy and provides the strategic vision of the country, for which the eGovernment strategy needs to be aligned with, and contribute to its realisation. The UAE vision 2021 envisages development of a knowledge-based economy that will be diverse and flexible led by skilled professional Emiratis. The vision contains four important components with detailed objectives related to national identity, economy, education and health. It seeks to make the UAE a land of ambitious and confident people who hold on to their heritage; a strong federation; a competitive economy led by creative and knowledgeable Emiratis; and finally a high quality of life in a generous and sustainable environment. http://www.vision2021.ae/	UAE Vision 2021
Provides a phased plan for the Federal Government to progress towards the UAE Vision 2021. http://uaecabinet.ae/English/Documents/PMO%20 StrategyDocEngFinV2.pdf	UAE Strategy 2011-2013
Government strategy to regulate the telecommunications sector. It represents the basis on which the eGovernment strategy was developed, as it defines and details the three dimensions of service, environment and readiness.	UAE Government ICT Strategy
Provides an analysis of the current state of federal government services, as well as detailed guidelines on how to develop them. It also includes many of the strategic initiatives that fall under the eGovernment programme.	Services Development Strategy
Alignment of eGovernment budget with the federal budget. http://www.mof.gov.ae/En/Budget/Pages/ ZEROBudgeting.aspx	Federal government budget
Covers three dimensions (environment, readiness and services), and contributes to the identification of gaps and opportunities that can be addressed through the objectives and specific initiatives in the eGovernment strategy. http://www.emiratesegov.ae	Current Situation Analysis
Comparisons of best practices in the field of eGovernment to support the development of the new strategy and define its primary objectives and initiatives.	Benchmarking

Table 3: The seven primary references in the UAE eGovernment strategy

There is a considerable leadership confidence that successful implementation of the federal eGovernment strategy 2012-2014 will help to improve the UAE's global competitiveness and enhancing the UAE's eTransformation. This is described clearly in the vision and mission statements developed as part of the strategy and as depicted in Figure 6 below.





As shown in the above diagram, the government adopted a seven-stage strategy development process. It included benchmarks with some international eGovernment practices and implementations, such as Canada, USA, Southern Europe, Singapore, the European Union and GCC countries. The outcome of this exercise was the definition and prioritising of the initiatives and the primary focus areas. The development approach took into account three primary dimensions of eServices, eReadiness, and ICT environment (Figure 7).





The eService dimension is concerned with the acceleration of the pace of eTransformation within government organisations and the provision of high quality electronic services through innovative delivery channels; e.g., Internet, fixed and mobile phones and kiosks, besides the traditional service centres. eReadiness focuses on strengthening the capacities of federal agencies in terms of ICT, organisation structures, HR capabilities and competencies, and their readiness for eTransformation. The ICT environment dimension covers organisational factors such as policies and legislations needed to support the implementation of eGovernment initiatives. This has resulted in the development of five strategic goals as depicted in Figure 8.



Figure 8: Strategic intents, goals, and work themes Source: <u>http://www.emiratesegov.ae</u>

In order to achieve these goals, the government has identified 38 initiatives to be implemented as part of the eGovernment strategy. Figure 9 depicts the initiatives for each of the four work streams. These 38 initiatives cover four vital eGovernment areas:

- 1. Strengthening the regulatory framework and governance mechanisms for eGovernment in the country. This is related to the legal and regulatory environment governing acquisition and use of information systems in government agencies, eGovernment services, and a high level plan for the overall development of the public sector in the country. Regulations and laws are considered primary enablers to support eGovernment and ensure security, reliability and data privacy. As such, this area also includes the development of strong governance structure to facilitate communication between the different stakeholders and attempts to capture their needs and turn them into electronic service systems.
- 2. Infrastructure support of information systems in the United Arab Emirates. This theme deals with creating a solid infrastructure for information systems to enable the delivery of world-class eGovernment services. It also focuses on aspects such as facilitation of exchange and sharing of data between government agencies.

- 3. Launching and providing eGovernment applications and services. This theme focuses on a set of applications and services to be provided to government agencies to support them in providing eGovernment services effectively and efficiently.
- 4. **Development of effective mechanisms for performance management.** This theme focuses on improving overall effectiveness and actual levels of performance of departments of information technology within government agencies. It also deals with developing automated tools and reports to monitor performance indicators and overall performance management.

	Work Themes
First axis Strengthening the regulatory framework and governance mechanisms for e-government in the country.	1- Development of a legal framework for e-government 2- Development of e-government security policies 3- Development of e-government policies 4- Development of a management system to measure & monitor e-transformation levels of government agencies 5- Development of e-transformation strategy for government services. 6- Development of an electronic platform to support the development of e-Content in government agencies. 8- Design of the institutional structure of the UAE government (AE). 9- Development of Cloud computing strategy 10- Development of the electronic maturity model. 11- Development of ICT skills and competencies strategy for federal government agencies. 13- Development of e-government environment-friendly, green ICT strategy and policies.
Second axis Infrastructure support of information systems in the UAE	 Build and operate the FedNet information network for the UAE Government. Development of data sharing model between government agencies Building and managing the data center and disaster recovery Launch and operation of customer relationship management centre Development of an integration (interoperability) model for federal government systems. Provide e-mail services to the staff of the federal government agencies.
Third axis Launching and availing e-government applications and services	 Development and management of the official portal of the Government of the UAE. Update standards for federal government agencies websites and conduct annual evaluation. Launch and management of electronic encyclopedia of the UAE. Launch and operation of e-government service via mobile phones and devices. The launch of open-to-all e-government program The launch of UAE e-Government Award. Specialized electronic portals - Phase I. Construction of Cloud computing for UAE government. Launch and operation of knowledge management system. Development of e-Service Service Level Standards. Build a model to calculate the return on investments for e-government projects.
Forth axis Development of effective mechanisms for performance management	Measuring customer satisfaction on e-services Measuring the quality of e-Government services Media Campaign to enhance the level of awareness & use of public access e-services & the different channels Develop and implement an action plan to improve the UAE ratings on the United Nations e-Government index Systematic documentation and marketing of e-government success stories. The development of a dissemination framework of successfulpractices in e-government. The development of business continuity governmental policies. Measuring the e-maturity of government agencies.

Figure 9: UAE eGovernment 2011-2014 initiatives Source: <u>http://www.emiratesegov.ae</u>

The government identified 20 strategic performance indicators across all five strategic objectives to measure the implementation success of the strategy. Figure 10 shows 8 of these key performance indicators (KPIs).



Figure 10: Some of the UAE eGovernment 2011-2014 KPIs Source: http://www.emiratesegov.ae The government also developed an operating model that will be used to measure progress based on two variables: (1) citizen centricity and (2) efficiency and effectiveness factors associated with initiatives and projects. The model consists of six elements, as depicted in Figure 11. Each of these elements is managed through a separate and dedicated set of project portfolios. The most important element in the model is the construction of necessary security measures to develop trust and confidence levels between the service providers and the beneficiary.





One of the key programmes launched by the UAE to build trust and security in its eGovernment plan is the national identity management infrastructure programme. There is a high level of interdependence between these two initiatives. As part of the programme, the UAE issues a smart card with digital identities for all of its population which is estimated at around 9 million people. The next section will elaborate further on the objective of this programme.

6. UAE National Identity Management Infrastructure

The UAE national identity management infrastructure is a strategic initiative to enhance homeland security and develop a federated identity management system enabling secure eGovernment transactions (Al-Khouri, 2012b). A federated identity is the means of linking a person's electronic identity and attributes, stored across multiple distinct identity management systems (Madsen, 2005). Such systems would allow individuals to use the same user name, password or other personal identification to sign in to the networks of more than one enterprise in order to conduct transactions (Bertino & Takahashi, 2011; Roebuck, 2011; Windley, 2005).

As part of the programme, the UAE issues smart identity cards for all of its population. The UAE national identity card is one of the world's most advanced and secure smart cards. The card is provided with identification parameters stored securely in the smart chip. It thus enables establishing a person's identity on-site (physically) and remotely (virtually), enabling secure and trusted transactions. The multi factor authentication which provides both match-on-card4 and match-off-card5 features, facilitates validation, verification and authentication of any given identity. The cardholder can then access all identity based services as shown in Figure 12.



Figure 12: National ID Card: Key Enabler for UAE eGovernment.

The UAE ID card capabilities of on-site identification, remote identification and authentication are available to be used across the different applications enabling various forms of electronic transactions e.g., G2C, B2C, etc. These are facilitated by PIN verification, biometric authentication (match on card and match off card features) and digital signatures (Figure 13).

⁴ Match-On-Card (MOC): The process of matching a biometric sample against a previously stored template on the same smartcard. MOC is the best known approach to underwrite cardholder's privacy protection.

⁵ Match-Off-Card: The process of matching a biometric sample against a previously stored template outside of card or any portable personal object.


Figure 13: Enabling secure eGovernment transactions through smart identity cards

The UAE national identity management system eliminates the need to maintain distinct user credentials in separate systems. In an eGovernment context, this should result in greatly simplified administration and streamlined access to resources.

Government agencies in the UAE's federated identity management (FIM) system will depend on the National Identity Validation Gateway to authenticate their respective users and vouch for their access to services. Agencies will be able to share applications without needing to adopt the same technologies for directory services, security and authentication. This is enabled by the active directory services part of the FIM that allows government agencies to recognise their users through a single identity (Figure 14).





Figure 14: Federated identity management system

UAE is currently taking rapid steps in integrating its identity management infrastructure and its smart card capabilities in various public sector systems and applications. Some of the current deployments for card usage include the eGate service at the airports that allows cardholders to pass through immigration control using biometric authentication.

In addition, citizens in Abu Dhabi⁶, for example, have the ability to login to the online local government portal and avail themselves of various eServices and utility payments. Some additional services provided through the Abu Dhabi portal include viewing and modifying details of one's personal traffic profile with Abu Dhabi Police, such as address, licence plate, etc.

There is increasing motivation in the UAE's public sector to rely on the new identity card to provide its services. It is expected that all eGovernment services would eventually require registering for the UAE identity card and PIN to access online government services. Integration of the national identity card is ongoing in all the federal and local authorities.

The design of the UAE federated identity management system ensures reliable and secure access from multiple locations, and hence provides advanced mobility. This supports the vision set in the UAE eGovernment strategic framework to deliver public sector services through different channels; whether it is the internet, kiosk machines, mobile phone applications or any other electronic channel. The UAE national identity card is viewed as the cornerstone for enabling successful deployment of eGovernment and eServices strategy in the country.

⁶ Abu Dhabi eGovernment: The Abu Dhabi eGovernment Gateway provides a centralised electronic gateway for Emiratewide information dissemination between the Abu Dhabi Government and its customers. The Gateway provides citizens, residents, visitors and businesses with streamlined access to around 900 services, many of which are available as transactional online services, in addition to more than 250 general information pages, and 95 department pages. http://www.abudhabi.ae.

7. Conclusions

In an era of increasing digital communications and connectivity, governments are paying more attention to the interaction with their citizens within the virtual world (Bwalya, 2012; Reddick, 2010b). While making such attempts, governments are realising that conventional physical trust mechanisms are now insufficient and that there is a clear need to develop new capabilities to identify electronic identities (Andress & Winterfield, 2011; Basin et al., 2011; Howard & Prince, 2011; Sheldon & Vishik, 2011).

The government of the UAE decided, as part of its national development strategy, to own the identification process itself and provide secure, unique and tamper-proof digital identities to its population. This kind of identity management system owned by the national government is envisaged to offer improved security, gain higher levels of trust, confidence and encourage participation.

The federated identity management system, which is a fundamental component of the UAE's identity infrastructure, is foreseen to eliminate the need to replicate databases of users' credentials for separate applications and systems. It also paves the way to use a common framework to share information between trusted partners, where government agencies would not need to establish separate relationships and procedures with one another to conduct transactions.

The UAE eGovernment initiatives will be more successful when citizens will be able to transcend the physical borders to carry out their transactions. A citizen should be able to use his/her national identity card to conduct eGovernment and eCommerce transactions on websites verified and validated by a single identity validation service. This should be the future aspiration.

To the extent that the UAE federated identity allows government agencies to offer controlled access to data or other resources, it has the potential to enable new levels of collaboration between the different agencies. Identity management can support process re-engineering for extending access to valuable resources, using multi-factor authentication mechanisms, while the integration of systems across governmental and private sector spheres further broadens the opportunities for supporting eGovernment and eCommerce applications.

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