Scenarios of e-Government in 2010 and implications for strategy design

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Abstract: This contribution focuses on e-Government as a comprehensive change programme and develops alternative scenarios with a view towards 2010. Empirical evidence of substantial risks to a successful implementation and operation of e-Government calls for a forward-looking approach and possible ways of correcting a wide-spread neglect of long-term innovation risks. The paper explores the scenario method as an established instrument for improving strategic decisions in a context of change, uncertainty and complex environments. Its application in a Europe-wide research project leads to three macro-scenarios with divergent implications for e-Government prospects. The conclusions suggest particular requirements for developing more robust e-Government strategies and encourage a wider use of scenario processes.

Keywords: e-Government, risk, future, scenario method, strategy, Europe.

1. Introduction

Governments around the world have set very ambitious goals and are running programmes with considerable financial volume for the implementation of electronic service delivery in the public sector. The European Commission stimulates and reinforces these innovation programmes with its “eEurope” initiative and related benchmarking studies (CGEY 2004). Measuring progress in e-Government is widely practised and used as a key instrument to motivate implementation efforts through a sense of competition. It is hardly surprising that e-Government has become one of the most widespread terms when it comes to the modernisation of public administrations (Lenk 2002).

Quality and cost of public services and public administrations have indeed become important issues: Every citizen and formal organisations encounter more or less frequent interactions with public agencies throughout their life cycle; public service quality affects quality of life, business activities and political legitimacy; choice of delivery has to match the already widespread use of the Internet in private life and business; service quality counts as an increasingly significant factor in decisions on business locations; and the costs and efficiency of public services and public administrations have become key concerns of public sector reform with the pressure to reduce fiscal deficits and to consolidate public budgets.

The realisation of electronic government and transformation of service delivery (Prins 2001) is accompanied by strategic policy frameworks intended to guide basic decisions and day-to-day practical actions. They set the course for far-reaching changes, but are inevitably confronted with uncertainty regarding their long-term sustainability. The paper explores how scenario methods can be used to cope better with the uncertainties of future macro-environments of e-Government and to arrive at more robust e-Government strategies.

2. Innovation risks and sustainability of e-Government strategies

Numerous studies show that e-Government has gained momentum as an innovation goal of governments world-wide (e.g. TNS 2003; Ronaghan 2002). Practical implementation involves major investments in human resources, technology and change management. They lead to more or less far-reaching interventions into administrative processes, structures and service delivery. The strategic design and realisation of these technological and organisational innovations face manifold challenges and uncertainties. What is more surprising is the low level of attention paid to the sustainability of e-Government strategies and structures in most of these initiatives. They entail risks on at least two levels: with respect to implementation success...
and with respect to long-term sustainability. Successful implementation and operation of e-Government projects depend on the interplay of a number of elements in each of the main factors – people, technology, organisation and financial resources, legal and political frameworks. In general, implementation risks correlate with the complexity and innovativeness of a project, but as RAENG and BCS (2004: p. 4) note, “... the importance of risk management is poorly understood”.

Examples of implementation problems, delays and failures in the area of e-Government can be found in practically all countries (cf. Heeks 1999: pp. 50-58). In Germany, for instance, the failure to set up a satellite-based highway toll system that should have gone into operation as planned in August 2003 has led to a national debacle, a loss of EUR 156 – 180 million per month since then and calls for resignation of the transport minister (Expatica 2004). In the UK, too, a front-runner in e-Government, there is a whole list of problem cases: E.g., Pathway, a social benefit-payment card scheme, is reported to have “collapsed after three years, wasting £300m. The Child Support Agency’s £200m system, ... is now expected to launch ... a year late and £50m over budget. In 1999, problems with the Passport Office’s new computer system caused chaos for thousand travellers. It was finally launched ... three years late” (Economist 2002: pp. 37-38). Another case to be added concerned the Customs and Excise’s switch to paying VAT online, which caused major problems around November 2002. In Austria, the implementation of an electronic insurance card in the health system has been delayed for several years. After the continued failure of an international consortium to provide the e-card, the Federation of Social Insurances finally cancelled the contract in spring 2003 after two years and started a new tender (Hauptverband 2003).

Causes of failures are manifold and range from technical problems to insufficient care for customer relations. However, our main topic here is the second category of risks, those concerning the more long-term sustainability of e-Government structures. In view of the enormous investments and change impacts on public service delivery which are at stake, it is imperative to take a more long-term perspective. That sustainability is a critical issue is illustrated e.g. by one of the greatest challenges faced by many e-Government initiatives today: the question of sustained service take-up, use and consent by citizens and businesses. At present there are certainly more warning signals indicating that more attention must be paid to these issues than cause for all-clear. For instance the discrepancy between Internet access and use of e-Government services: “Despite nearly two-thirds of Britons having internet access, fewer than one in three has visited even one of the 3,000 government and council websites. And only 5% of internet users say they regularly use government websites to access public services”, is reported in a recent UK study carried out by Hedra, a major consulting firm in the UK specialised in government organisations. The almost complete absence of elderly and socially deprived groups adds to the picture. No wonder that the report warns of the danger of creating “online millennium domes with just as few visitors” (Tempest 2002: p.10). As evidenced in the survey by TNS (2003), many other countries have similar usage problems.

It is therefore advisable to anticipate risks concerning the sustainability of e-Government as far as possible as early as during the development of strategies for its implementation, and to search for possibilities to reduce such risks. Unquestioned concentration on current or excessively optimistic views of general conditions endangers the sustainability of any strategy. The failure to identify potential changes in the environment of e-Government severely damages strategic policy. E-Government, like any organisation or project, is faced with complex sets of external drivers of change which create uncertainty about future environments and general conditions. What is required in this situation is an increase in the capabilities to explore and anticipate if not control possible future developments that impact on e-Government structures, and the corresponding adaptation of e-Government strategies. An established instrument to improve strategic decisions in a context of change, uncertainty and complexity is the scenario method (van der Heijden et al. 2002: pp. 142).
3. Scenario planning in e-Government

Scenario analysis and scenario planning have evolved into a great diversity of forms and applications over the last 50 years (van Notten et al. 2003). Despite the diversity of scenario methods, a common core element is to explore possible development paths and plausible, usually alternative images of the future. Alternative scenarios, i.e. pictures and stories that portray various future states, are able to challenge accustomed lines of thought and assumptions, to question the extrapolation of existing general conditions into the future, and to open up the view towards possible alternative and unexpected developments. This should enable decision-makers to sharpen their attention to critical factors and to take decisions which are better prepared for an uncertain future. In principle a scenario portrays a “possible future” which can then be used to assess strategies regarding its sustainability. An ultimate goal is to promote the design of strategies which are more robust, i.e. which fit different future scenarios.

Scenario approaches may differ in many respects even in their basic dimensions, such as project goal (exploration vs. decision support, descriptive vs. normative), process design (intuitive vs. formal), scenario content (complex vs. simple) and individual characteristics (van Notten et al. 2003: pp. 426). Endogenous and exogenous developments play an important role in the process of scenario building. A common approach to structuring and exploring external environments is known as STEEP analysis – the analysis of Societal, Technological, Economic, Ecological and Political variables (van der Heijden et al. 2002: pp. 156). Whether a resulting scenario represents a desirable or undesirable future, in any case it needs to fulfil certain criteria:

- It should be plausible, but it does not have to be probable. Indeed, given the uncertainty of the future, it needs to be explicitly stated that the scenario is not a prediction, but only a possibility, as likely as many other possibilities.
- It should be internally consistent in order to be plausible and in order to enable a coherent discussion.

4. Scenario development in the European research project PRISMA

The scenario process took place in 2002 and dealt – among others – with the future of e-Government towards a time horizon of 2010. It used the STEEP approach to analyse the overall contextual environment of e-Government in Europe in a two-stage process (Table 1):

- It should contain enough information to describe the functioning of a system” (Aichholzer et al. 2002: p. 8).

While scenario planning is widely used in many sectors and disciplines (van Notten et al. examine around 70 scenario studies), applications in the area of e-Government are less frequent. A case of systematic scenario planning in e-Government has been a project at regional level in the UK: Northshire Council in cooperation with a telecommunications organisation employed a facilitated scenario approach and elaborated four alternative scenarios of e-Government for the time-line from 2001 towards 2006 (van der Heijden et al. 2002: pp. 190). Outcomes and the resulting debate informed the strategic e-Government decisions and operational actions of regional government in Northshire in favour of a more viable, integrated and long-term perspective. Another interesting example is the development of four scenarios of “web-enabling government change” by Dunleavy and Margetts (2002). They are mainly differentiated by extent of change and relations to New Public Management (NPM), leading to possible scenarios labelled ‘Digital NPM’, ‘Digital State Paradigm’, ‘Policy Mess’ and ‘State Residualization’, respectively.

One of the most recent examples of the use of a scenario approach in the field of e-Government is the European research project PRISMA (Providing innovative service models and assessment). Funded by the European Commission’s action line on IST within the 5th Framework Programme and completed in spring 2003, this example aimed at enhancing current good practice strategies towards more robust, future-oriented ones (see also http://www.prisma-eu.net/). It allows for a more detailed look at the process and outcomes which should help to assess the strategic value of scenario approaches.
Table 1: Structure of the scenario process in PRISMA

<table>
<thead>
<tr>
<th>Stage 1: Macro-scenarios for 2010</th>
<th>Stage 2: Implications for e-Government strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors</td>
<td></td>
</tr>
<tr>
<td>PRISMA scenario team</td>
<td>Scenario team plus external experts</td>
</tr>
<tr>
<td>Input</td>
<td></td>
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<tr>
<td>Approx. 100 trends in five</td>
<td>3 macro-scenarios developed in</td>
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<tr>
<td>categories (STEEP)</td>
<td>stage 1</td>
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<tr>
<td>Output</td>
<td></td>
</tr>
<tr>
<td>3 alternative macro-scenarios:</td>
<td></td>
</tr>
<tr>
<td>(1) “A prosperous and more just</td>
<td>Expected implications for e-Government</td>
</tr>
<tr>
<td>Europe”</td>
<td>Design requirements in favour of more</td>
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<tr>
<td>(2) “A turbulent world”</td>
<td>robust strategies</td>
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<tr>
<td>(3) “Recession and re-orientation”</td>
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In a first stage the scenario-team identified a large number of empirically grounded influence factors and trends along the STEEP-dimensions which could play a major role for the design and future delivery of e-Government services. Nearly 100 variables were assessed with regard to impact, level of certainty, controllability and significance for Europe. From this analysis four scenario dimensions were determined: economy/society, governance, information technology and environmental sustainability. Eight possible scenarios were considered for development with different characteristics in these dimensions before a set of three was selected as sufficiently differentiated and manageable for further steps of analysis. All three scenarios are independent, internally coherent contextual macro-scenarios of e-Government which were elaborated and labelled as follows: (1) “A prosperous and more just Europe”, (2) “A turbulent world”, (3) “Recession and re-orientation”.

In a second stage, the implications of these macro-scenarios for e-Government services were analysed in workshops with external experts (eight persons from all over Europe, selected for both subject field and ICT expertise, moderated by the scenario team). The experts defined requirements for future-oriented e-Government services by analysing current good practice models against each scenario by way of a SWOT analysis (strength/weakness – opportunities/threats). This allowed both contingent (i.e. scenario-dependent) and robust (i.e. scenario-independent) elements to be identified. Both deserve to be taken into account in strategy development for improving the sustainability of e-Government strategies.

4.1 Macro-scenarios for e-Government in 2010

A graphic presentation of the basic profiles provides a first overview of the three alternative macro-scenarios (Figure 1). Scenario profiles are represented by polygons of different shape, constituted by different values on each of the four basic dimensions which are plotted along the coordinate half axes (economy/society; governance; information technology; environmental sustainability). The symbols + and – denote opposite poles or levels of these variables but should not be interpreted normatively. Positive poles are located outward, negative poles towards the centre (for technical reasons of visibility one unit off the origin). A brief explanation how to read the values of the four constitutive dimensions:

**Economy/society:**
- + prosperous economic and integrative social climate
- 0 economic, social and political stagnation
- – negative general economic and social climate (‘Euro-depression’)

**Governance:**
- + high level of clash between centralised government and private sector
- 0 balanced relation between government and private sector
- – falling apart of central governance, decentralised governance

**Information technology:**
- + dynamic progress of IT innovations
- – slow-down of IT innovations

**Environmental sustainability:**
- + high support for environmental sustainability
- 0 low/no support for environmental sustainability
- – The three macro-scenarios represent alternative portrayals of possible contextual conditions for e-Government in Europe. The following are brief outlines with implications for e-Government. They
cannot do full justice to the elaborate versions provided in Aichholzer et al. (2002) but should convey the major characteristics.

Figure 1: Profiles of alternative macro-scenarios

4.2 Implications of alternative scenarios for e-Government

4.2.1 Scenario 1: “A prosperous and more just Europe”

In this rather utopian, though most desirable scenario of all, Europe experiences an economic upswing in which practically all segments of society participate. Moore’s Law is still in force and ICT continues to contribute to the prosperity and sustainable development of Europe.

In the positive general climate citizens are very open-minded towards information and communication technologies (ICT) and trust in security standards and data protection. General prosperity has largely allowed the elimination of the digital divide so that a large majority of Internet users have access to a diverse range of electronic services. Investments in extension on a grand scale, Internet access from home and public access points guarantee the supply of a broad range of e-Government services practically all over Europe. Modernisation and digitalisation of public administration has brought online services which are easily accessible, of high quality and trustful. Internet portals integrate services for citizens according to relevant life events (e.g. birth, marriage, work) and for businesses along major business events (e.g. formation of a company, work contract). Personalised services respond to individual needs of users and the provision of multiple access channels to public services extends individual choice. New human agents offer support to users of e-Government services. Horizontal and vertical integration of back offices is of high priority for public administrations and increases service quality for citizens and businesses. Even under these generally favourable conditions for e-Government some elements of uncertainty and concern remain, e.g. concerning political apathy, centralisation of services through highly integrated networks and privatisation of basic services.

4.2.2 Scenario 2: “A turbulent world”

In this scenario economic growth is not sustained. In response there is a shift towards strong central government direction, while at the same time the market power of the private sector greatly increases. The two forces are frequently in severe conflict. Information technology continues its growth, but regard for sustainability is lost in the combination of economic volatility and conflict.

The private sector extends its range of electronic services and increasingly takes over tasks from the public sector. The administrative apparatus is rationalised by
“lean administration” and “new public management”, downsized, modernised with e-Government projects, including improved accessibility to public sector information. However, the enormous costs of securing a permanent level of service quality represent a financial burden and set clear limits. Trust of European citizens in technical systems is given and international security and privacy standards are of public concern. Fragmentation of society penetrates all spheres of life and also has negative impacts on access to and use of ICT: The digital divide has increased rather than reduced. Financial restrictions and skill deficits prevent large parts of the population from using other than simple e-Government services, e.g. accessing information. Only a minority of these segments have access to more complex transaction services or electronic signatures. Wealthy middle and upper class people profit from converging technologies and advanced innovations in the services offered. They carry out their administrative contacts completely online and enjoy the benefits of personalised and premium services. (It seems as if effective policies to counter the strong forces acting towards such a severe divide are still missing).

4.2.3 Scenario 3: “Recession and reorientation”

In the third scenario the European economy is gradually recovering from a severe crisis which had peaked around the middle of the decade. The experiences cause people to rebel against technology, government and markets in favour of decentralisation, environmentalism and de-globalisation. In essence, the scenario assumes slow economic development, a smaller and decentralised role of government, a slow development of ICT, but an increasingly sustainable environmental development.

EU member states have made progress in consolidating their budgets and achieved cost-savings through rationalisation in the public sector and closer cooperation with the private sector. In many countries privatisation and outsourcing of public functions have created “lean administrations”. A serious problem for citizens is the lack of transparency of government. The IT industry suffers from more than a lack of government investment. At the same time the dynamics of technology undergo a considerable setback. (Recent indications that overcoming the problem of heat generated by ever faster computer chips might hit a ‘technical wall’ make this appear even more likely; this could challenge the continued validity of Moore’s law). Advances in interactions with computers are also hampered by constraints set by environmental regulations and the increasing turn to life styles which favour personal interaction instead of electronic communication. Most of all, there is a special reason why citizens view IT applications with decided scepticism: Manifest scandals around the misuse of personal data by government agencies as well as private companies have caused a radical loss of trust in e-services. Citizens and smaller companies lack the knowledge and resources to secure data effectively. The result is that many avoid using e-services. Especially advanced transaction services in e-Government requiring authentication or personalised services lose attraction. On the other hand the low value added of many simple information services leads to a sharp decline in usage. Data security becomes a key issue at EU level. Citizens prefer to trust NGOs which deal with privacy, technology issues and democratic participation. In these networks e-services do play a role: Consultations and participation of NGOs in decision processes are increasingly carried out online. A more open question might be the implications for the use of online communication by social movements and political activists under this scenario.

5. Lessons for the design of more robust e-Government strategies

The implications of each scenario for the suitability of current good practice concepts in e-Government has been elaborately discussed in workshops with external experts and examined by means of a SWOT analysis. This exercise looked at the strengths and weaknesses of major good practice principles of today and held them against the opportunities and threats associated with each scenario. One of the results was to derive a number of design strategies which could be regarded as
more or less robust across different scenarios:

5.1 User and target group oriented design

One of the most basic design elements to be prioritised is demand and user centeredness. Decisions on the priority of individual services are a special aspect of this, i.e. concerning type, breadth and depth of online services to be developed. It implies investing in instruments such as demand identification, user participation and feed back, analysing frequency and volume of service usage, quality controls and cost/benefit-calculations. Exemplary approaches and practices can be found especially in Canada, whereas their role in many strategy documents is often confined to a mere rhetoric function. This is underlined, e.g. by a critique expressed by the Audit Office in the USA of the lack of citizen-centeredness in many initiatives (GAO 2002: p. 2).

E-Government services should also take account of the specific needs of different groups of users. However, except for the business sector where services need to be tailored to fit individual sectors (e.g. tourism vs. industrial companies), the extent of individualisation and personalisation has been assessed as scenario-dependent and therefore needs careful definition in practice. Another aspect is the optimisation of user friendliness of e-services by means of usability tests, standardisation and design guidelines (style guides). Good practice cases are e.g., e-Vienna, Bremen Online or single services such as the Family Fund in the UK or the Clermont-Ferrand birth certificate service in France.

5.2 Multi-channel service delivery

It will certainly be necessary to offer alternative forms of interaction with governments in the future, despite the increase of private Internet access. In a Bavarian study almost 80% preferred this form, but a high proportion opted for alterative channels including call centres, electronic kiosks, as well as traditional personal and mail contact (Accenture, 2002: p. 11). In British surveys digital TV and local libraries together with cybercafés are included among the preferred access channels.

“Public access points” in agency offices, libraries, schools, youth and cultural centres etc. are a robust element in all scenarios. They fulfil important social functions. The business sector also profits from publicly accessible electronic service options: Online transactions in situ allow for more flexible and efficient services both for customers and agencies, e.g. in tourism applications. Among good practice cases of electronic kiosk systems are those in Sheffield and Bremen, whereas experiences in Antwerp were negative due to organisational deficiencies. What is important is an environment of support and learning opportunities such as offered in libraries.

5.3 Increasing service quality and efficiency through reorganisation

Integrating e-Government services in the form of one-stop service and portals is a key characteristic of innovative services. Major advantages are simpler, more flexible and time-saving access and service delivery for users. They also support transparency of governments and – especially in combination with tracking facilities – public administrations. Structuring service offers according to user perspectives in contrast to administrative criteria is a related principle. Good practice cases demonstrate this with “life events” or “business events” as criteria of organisation. Such improved service quality at the “front office” normally requires substantial process redesign and reorganisation of “back offices”. This is especially the case when it comes to the implementation of one-stop service portals allowing for complete online transactions, eventually across different levels of government and sectors (CGEY 2004: p. 19).

5.4 Social inclusion

A socially non-exclusive supply of e-services is closely related to target group orientation and multi-channel access. Basic general interest services have to be accessible in simple and affordable forms. For this reason, e-Government strategies need to include elements which avoid the creation or perpetuation of social divisions as a consequence of technology. Disadvantaged groups in society need special attention and support concerning access and use of e-Government services.
The “design for all” principle, multi-lingual services and special incentives such as peer group support are possible means which serve this goal. The importance is underlined by a study in the USA which observed an increase of premium services at higher fees and warned of the creation of a “two class” society for e-Government users (West 2002: p. 13).

5.5 Security, privacy and trust

In all three scenarios the trustful handling of data and related issues of privacy of citizens and businesses play a significant if not central role. The notion of trust concerns several key aspects of data and information: availability, integrity, authenticity, confidentiality, non-contestability (this latter point is pivotal for legal and commercial applications).

Enhancing security, privacy and trust deserves top priority in e-Government strategies and efforts need to include a large variety of measures and principles, such as collection and use limitation, purpose specification, security safeguards, accountability, encouraging the use of privacy enhancing technologies and quality certificates. Positive examples are the privacy provisions in Canada or quality seals for e-Government services such as introduced in Austria (see http://www.cio.gv.at/service/brochures/IPIII_Guetesiegel_final.pdf).

6. Conclusions

This paper focused on the sustainability of e-Government structures and the application of scenario analysis in support of this goal. It showed that scenario planning can raise the awareness of future uncertainties and aligns different frames of reference in a focused and systematic way. The scenario process stimulates active engagement with issues of long-term sustainability and an assessment of today’s strategies against alternative futures. The construction of multiple scenarios allows for a testing of robustness of current good practice and policy options. Those strategies, principles and practices which withstand the test of widely different scenarios can be regarded as more robust options than those which only fit specific scenarios. It was shown that the sustainability of particular designs of e-Government depends on a number of future developments and contextual conditions such as the position of e-Government on the political agenda, assignment of resources, attitudes towards technology, data protection and privacy, the development of the digital divide, and technical progress. Scenario exercises permit the exploration and assessment of the vulnerability of strategies against different future environments. Local and sector-specific application of such exercises allows tailoring and fine-tuning of strategies according to different institutional conditions and development states of e-Government.

However, the potential of scenario approaches also has its limits. It is certainly debateable how contradictory requirements suggested by scenario outcomes can be evaded, or how gains in the sense of more ‘future-proof’ e-Government can be balanced against possible costs such as a slower innovation rate or sub-optimal technical rationalisation. Moreover, it is questionable how far a direct translation of scenario insights into practical strategic measures is at all feasible and on what further elaboration should be based. But in sum, scenario approaches can be a useful tool for drawing attention to neglected risks, thus enhancing strategy development and promoting the sustainability of e-Government, which also helps to transform public administrations into more future-oriented, adaptive learning organisations.

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The Influence of Perceived Characteristics of Innovating on e-Government Adoption

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Abstract: Government agencies around the world are making their services available online. The success of e-Government initiatives is contingent upon citizens’ willingness to adopt these Web-enabled services. This study uses Moore and Benbasat’s (1991) perceived characteristics of innovating constructs to identify factors that influence citizen adoption of e-Government initiatives. To pilot test our adoption model we administered a survey to 140 undergraduate students at an accredited research university. This paper discusses the results of the study and their implications for research and practice.

Keywords: e-Government, electronic government services, diffusion of innovation, adoption

1. Introduction

E-Government is the use of information technology, especially telecommunications, to enable and improve the efficiency with which government services and information are provided to citizens, employees, businesses, and government agencies. The United States federal, state and local government agencies have implemented numerous e-Government initiatives to enable the purchase of goods and services, the distribution of information and forms, and the submission of bids and proposals. There are predictions of more than $600 billion of government fees and taxes to be processed through the Web by 2006 (James 2000). In the U.S., federal government spending is predicted to reach $2.33 billion in 2005 (Gartner 2002).

While there seems to be substantial growth in the development of e-Government initiatives, it is not clear that citizens will embrace the use of such services. The success and acceptance of e-Government initiatives, such as online voting and license renewal, are contingent upon citizens’ willingness to adopt these services. Numerous studies have analyzed user adoption of electronic commerce (Gefen & Straub 2000; Gefen et al. 2003; McKnight et al. 2002; Pavlou 2003). Yet, to date, few studies have explored the core factors that influence citizen adoption of e-Government services. According to a survey conducted by the International City/County Management Association (ICMA) administered to chief administrative officers (CAO) at government agencies, 74.2 % of CAOs reported that their government agency had a Web site. However, 90.5 % of these agencies have not conducted a survey to see what online services citizens and businesses actually want (ICMA 2002).

This study uses Moore and Benbasat’s (1991) perceived characteristics of innovating (PCI) to identify fundamental elements of e-Government adoption1. These constructs have been used in IT research (Karahanna et al. 1999; Moon & Kim 2001; Pavlou 2003) and e-Commerce research (Van Slyke et al. 2004). Based on similarities between e-Commerce and e-Government, PCI constructs are proposed as useful indicators of e-Government adoption.

2. Theoretical foundations

2.1 e-Commerce and e-Government

2.1.1 Similarities

E-Commerce and e-Government are both based on Internet technology designed to facilitate the exchange of goods, services and information between two or more parties. E-Commerce refers to the commercial use of Internet technology to sell and purchase goods or services. Laudon and Laudon (2003) identify three major electronic commerce categories: business-to-consumer (B2C), business-to-business (B2B), and business-to-consumer (C2C). B2C commerce refers to the retailing of products or services from businesses to individual shoppers. B2B commerce is the sale of goods and services between businesses.

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1 This study was presented at the First International E-Services Workshop in September 2003 (Carter & Belanger 2003).
services among businesses. In C2C commerce, consumers sell goods and services to other consumers online.

Comparable categories for electronic government - government-to-citizen (G2C), government-to-employee (G2E), government-to-government (G2G), and government-to-business (G2B) - each of which uses Internet technology to provide government services online, have been identified (General Accounting Office 2001). G2C government allows citizens to retrieve information and complete government transactions, such as license renewal, online. G2E government takes advantage of Internet technology by allowing government agencies to interact with their employees online. G2G government supports online communication and interaction among government agencies. G2B government allows businesses to retrieve timely government information and complete transactions with government agencies, such as bid submission, online. Other agencies and studies have identified variations on these categories (Hiller & Belanger 2001; Office of Management and Budget, 2002).

Not only are e-Commerce and e-Government categorized in similar ways, but they also provide similar services to individuals and organizations. Both e-Commerce and e-Government systems support the electronic mediation of transactions over potentially great distances. Both services also require consumer or citizen trust (Belanger et al. 2002; McKnight et al. 2002; Pavlou 2003; Van Slyke et al. 2004; Warkentin et al. 2002) due to the absence of face-to-face interaction.

2.1.2 Differences
Jorgenson and Cable (2002) identify three major differences between e-Commerce and e-Government: access, structure and accountability. In e-Commerce, businesses are allowed to choose their customers; however, in e-Government, agencies are responsible for providing access to information and services to the entire eligible population, including individuals with lower incomes and disabilities. The digital divide makes this task of providing universally accessible online government services challenging. Also, the structure of businesses in the private sector is different from the structure of agencies in the public sector. Decision-making authority is less centralized in government agencies than in other businesses. This dispersion of authority impedes the development and implementation of new government services. The third difference between e-Commerce and e-Government identified by Jorgenson and Cable (2002) is accountability. In a democratic government, public sector agencies are constrained by the requirement to allocate resources and provide services that are “in the best interest of the public” (Jorgenson & Cable 2002).

Warkentin et al. (2002) recognize the political nature of government agencies as a distinguishing feature of e-Government from e-Commerce. They also note mandatory relationships exist only in e-Government. For instance, legislation, such as the Government Paperwork Elimination Act of 1998, obligates government agencies to “give persons who are required to maintain, submit, or disclose information the option of doing so electronically, when practicable, by October 21, 2003” (Fletcher 2002).

2.1.3 Constructs
Previous research has found that PCI factors play a role in user acceptance of electronic commerce in the private sector (Gefen et al. 2003; Van Slyke et al. 2004). In the public sector, citizen adoption of e-Government should be subject to similar factors (Warkentin et al. 2002). Therefore, considering the similarities between electronic commerce and electronic government, we use these constructs in our study of e-Government adoption.

2.2 Perceived Characteristics of Innovating (PCI)
Moore and Benbasat's (1991) perceived characteristics of innovating (PCI) are based on Rogers' (1995) Diffusion of Innovation Theory (DOI), which is used frequently in information systems research to explain user adoption of technological innovations. Diffusion refers to “the process by which an innovation is communicated through certain channels over time among the members of a social society (Rogers 1995).” An innovation is “an idea, practice or object that is perceived as new by an individual or other
unit of adoption (Rogers 1995).“ Moore and Benbasat (1991) identify eight PCI factors that influence the diffusion of an innovation: relative advantage, compatibility, ease of use, result demonstrability, result visibility, trialability, and voluntariness.

Based on previous research (Karahanna 1999; Moore & Benbasat 1991; Plouffe et al. 2001; Tornatzky & Klein 1982; Van Slyke et al. 2004) we study the effects of relative advantage, compatibility, ease of use and image on citizen intention to use a state e-Government service. Tornatzky and Klein (1982) suggest that relative advantage, compatibility, and ease of use are the most relevant constructs to adoption research, thus we include these three constructs in our study. Relative advantage is “the degree to which an innovation is seen as being superior to its predecessor”; Compatibility refers to “the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters”; and perceived ease of use is “the degree to which a person believes that using a particular system would be free of effort (Davis 1989).” Given the amount of coverage Web-based systems have received in the popular press, we also include image in our model. Image refers to the “degree to which the use of the innovation is seen as enhancing to an individual’s image or social status” (Van Slyke et al. 2004).

3. Research model

Figure 1 presents a high-level research model that summarizes the constructs discussed above.

4. Hypotheses

In prior technology adoption literature (Karahanna et al. 1999; Moon & Kim 2001; Trinkle 2001) the factors illustrated in Figure 1 all demonstrate a positive relationship with use intentions. We expect the nature of these relationships to remain the same in the context of electronic government. Therefore, based on prior research in e-Commerce and information technology adoption, four hypotheses are posited (Table 1).

Table 1: Hypotheses

<table>
<thead>
<tr>
<th>Name</th>
<th>Hypothesis</th>
<th>Construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1.</td>
<td>Higher levels of perceived relative advantage will be positively related to higher levels of intention to use a state e-Government service.</td>
<td>Relative Advantage (RA)</td>
</tr>
<tr>
<td>H2.</td>
<td>Higher levels of perceived image will be positively related to higher levels of intention to use a state e-Government service.</td>
<td>Image (IM)</td>
</tr>
<tr>
<td>H3.</td>
<td>Higher levels of perceived compatibility will be positively related to higher levels of intention to use a state e-Government service.</td>
<td>Compatibility (CT)</td>
</tr>
<tr>
<td>H4.</td>
<td>Higher levels of perceived ease of use will be positively related to higher levels of intention to use a state e-Government service.</td>
<td>Ease of Use (EOU)</td>
</tr>
</tbody>
</table>
5. Methodology

5.1 Sample
To pilot test our model, we administered a survey instrument to 140 undergraduate students at a southeastern research university. Of the 140 surveys administered, 136 were complete and used in the analyses. The subjects had an average of 9 years of experience using a computer; the average age was 19; and, 63% were male. 98% of the sample uses the Web everyday; however, the majority (52%) use the Web to gather information about or from the government less than once a month, and 32% have never used the Web to gather information about or from the government. Also, 89% have never used the Web to complete a government transaction, such as a license renewal.

5.2 Instrument development
The items used in this survey were adapted from previous studies. The measures of compatibility, relative advantage, and image were adapted from Van Slyke et al. (2004). Ease of use was measured using items adapted from Davis’ TAM model (Davis 1989). The items used to measure use intentions were adapted from Pavlou (2003) and Gefen and Straub (2000). A list of the items is provided in the appendix. Each item is rated on a scale of 1 to 7 (Strongly Disagree to Neutral to Strongly Agree).

The reliability of the items was evaluated using Cronbach’s alpha (Cronbach 1970). Table 2 presents the results of the reliability analysis, demonstrating acceptable reliabilities (above 0.70) for all scales.

Table 2: Reliability Analysis

<table>
<thead>
<tr>
<th>Construct</th>
<th># of Items</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Advantage (RA)</td>
<td>5</td>
<td>.7773</td>
</tr>
<tr>
<td>Image (IM)</td>
<td>4*</td>
<td>.7824</td>
</tr>
<tr>
<td>Compatibility (CT)</td>
<td>4</td>
<td>.7469</td>
</tr>
<tr>
<td>Ease of Use (EOU)</td>
<td>4*</td>
<td>.7222</td>
</tr>
</tbody>
</table>

* Originally this construct was measured with five items. One reverse worded item was dropped to improve reliability.

Factor analysis using principle components with Promax rotation was used to evaluate construct validity. As shown in Table 3, most items loaded properly on their expected factors. However, relative advantage items and compatibility items loaded together.

Table 3: Factor Analysis

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>USE</td>
<td></td>
</tr>
<tr>
<td>USE1</td>
<td>USE/RA/CT</td>
</tr>
<tr>
<td>USE2</td>
<td>USE/RA/CT</td>
</tr>
<tr>
<td>USE3</td>
<td>USE/RA/CT</td>
</tr>
<tr>
<td>USE5</td>
<td>USE/RA/CT</td>
</tr>
<tr>
<td>RA1</td>
<td>RA/IM</td>
</tr>
<tr>
<td>RA2</td>
<td>RA/IM</td>
</tr>
<tr>
<td>RA4</td>
<td>RA/IM</td>
</tr>
<tr>
<td>RA5</td>
<td>RA/IM</td>
</tr>
<tr>
<td>IM1</td>
<td>IM/EOU</td>
</tr>
<tr>
<td>IM2</td>
<td>IM/EOU</td>
</tr>
<tr>
<td>IM3</td>
<td>IM/EOU</td>
</tr>
<tr>
<td>IM5</td>
<td>IM/EOU</td>
</tr>
<tr>
<td>CT1</td>
<td>CT/EOU</td>
</tr>
<tr>
<td>CT2</td>
<td>CT/EOU</td>
</tr>
<tr>
<td>CT3</td>
<td>CT/EOU</td>
</tr>
<tr>
<td>CT4</td>
<td>CT/EOU</td>
</tr>
<tr>
<td>EOU1</td>
<td>EOU/RA/CT</td>
</tr>
<tr>
<td>EOU3</td>
<td>EOU/RA/CT</td>
</tr>
<tr>
<td>EOU4</td>
<td>EOU/RA/CT</td>
</tr>
<tr>
<td>EOU5</td>
<td>EOU/RA/CT</td>
</tr>
</tbody>
</table>

Relative advantage and compatibility items also loaded together in other IT adoption research (Karahanna et al. 1999; Moore & Benbasat’s 1991) study. Moore and Benbasat conducted a rigorous study using multiple judges and multiple sorting rounds to develop reliable measures of diffusion of innovation constructs (Rogers 1995). Although the items for RA and CT were identified separately by the judges and sorters, all the items for these two constructs loaded together. Moore and Benbasat concluded, “this may mean that, while conceptually different, they are being viewed identically by respondents, or that there is a causal relationship between the two (Moore & Benbasat 1991).” For example, “it is unlikely that respondents would perceive the various advantages of using [state e-Government services], if its use were in fact not compatible with the respondents’ experience or [life] style (Moore & Benbasat 1991).”

In summary, model and hypotheses testing was conducted with four independent variables - perceived relative advantage, perceived image, perceived compatibility and perceived ease of use -
and one dependent variable – use intentions. The basic characteristics of these variables are presented in Table 4.

Table 4: Final Regression Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th># Items</th>
<th>Mean</th>
<th>Stand. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>4</td>
<td>5.0821</td>
<td>0.9240</td>
</tr>
<tr>
<td>IM</td>
<td>3</td>
<td>2.9333</td>
<td>1.1686</td>
</tr>
<tr>
<td>CT</td>
<td>2</td>
<td>4.6000</td>
<td>1.0217</td>
</tr>
<tr>
<td>EOU</td>
<td>2</td>
<td>5.6179</td>
<td>1.0047</td>
</tr>
<tr>
<td>Use</td>
<td>3</td>
<td>4.8714</td>
<td>1.0492</td>
</tr>
</tbody>
</table>

6. Results

The data were analyzed using multiple linear regression analysis. The purpose of a regression analysis is to relate a dependent variable to a set of independent variables (Mendenhal & Sincich 1993). Regression analysis was seen as the most appropriate analytical technique since the goal of this study was to determine the relationship between use intention (dependent variable) and citizen perceptions of state e-Government initiatives (independent variables).

Assumptions of multivariate normal distribution, independence of errors, and equality of variance were first tested. There were no violations of these assumptions. Multicollinearity was not a concern with this data set as confirmed by the main effect regression models with variance inflation factors (VIF range from 1.012 to 2.310). Outlier influential observations were identified with leverage, studentized residuals, and Cook’s D-statistic. This analysis indicated that there were no problems with respect to influential outliers.

The model explains 50 percent of the variance in citizen adoption of e-Government; adjusted R Square is .500, F=35.714, p<.0001. Three of the four adoption factors - relative advantage, image, and compatibility - were found to be significant in predicting citizen intention to use state e-Government services. Table 5 presents the results of the individual hypotheses being tested.

Table 5: Hypothesis Testing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff.</th>
<th>t-value</th>
<th>Sig.</th>
<th>Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 RA</td>
<td>.255</td>
<td>2.671</td>
<td>.009</td>
<td>YES</td>
</tr>
<tr>
<td>H2 IM</td>
<td>.206</td>
<td>3.421</td>
<td>.001</td>
<td>YES</td>
</tr>
<tr>
<td>H3 CT</td>
<td>.439</td>
<td>4.811</td>
<td>.000</td>
<td>YES</td>
</tr>
<tr>
<td>H4 EOU</td>
<td>.066</td>
<td>.817</td>
<td>.416</td>
<td>NO</td>
</tr>
</tbody>
</table>

7. Discussion

The purpose of this research was to use PCI constructs to test a model of e-Government adoption. Perceived relative advantage, image, and compatibility were found to be significant in predicting citizen intention to use state e-Government services. These factors are summarized in Figure 2. We discuss the results in this section, and present suggestions for practitioners with respect to what can be done to improve citizens’ perceptions in section 9.2 (Implications for Practice).

7.1 Relative advantage

Higher levels of perceived relative advantage increase citizens’ intentions to use state e-Government services. State government agencies should identify and communicate to citizens the advantages of using online services as opposed to other means of retrieving information from and completing transactions with state government agencies. As a result of e-Government services, citizens receive faster, more convenient services from a more responsive and informed government (Trinkle 2001). For example, state agencies could encourage the adoption of online license renewal by emphasizing its convenience and speed compared to the traditional method of visiting the brick-and-mortar Department of Motor Vehicles (DMV) office. Online license renewal can be completed from the home or office 24 hours a day, seven days a week. The availability of the service isn’t limited to standard business hours. The citizen can complete this transaction whenever and from wherever it is most convenient. The online service is also quicker than the traditional method since citizens don’t have to travel to a physical branch of the DMV and then wait in line. The online service is immediately available to each citizen individually. The
comparative benefits of other online services such as license renewal or tax filing should be shared with citizens by appropriate agencies to increase adoption of these services.

7.2 Image
Higher levels of perceived image enhancing value of e-Government increase citizens’ intention to use state government services online. In other words, those who regard the use of state e-Government services as prestigious will have higher intention to use state e-Government services than those who do not. For example, citizens who view the adoption of e-Government services as a way to appear technically savvy and/or politically progressive will demonstrate a higher intention to use e-Government services.

7.3 Compatibility
Higher levels of perceived compatibility are associated with increased intentions to adopt state e-Government initiatives. Many cultures now embrace Internet technology in business (e-Commerce and e-business) and leisure (instant messaging and virtual communities). Citizens who’ve adopted these Internet-supported initiatives are likely to adopt state e-Government services as well. Citizens who have adopted e-Commerce initiatives can be expected to view e-Government initiatives as compatible with their lifestyle. E-Commerce adopters are comfortable searching for information and services, providing personal information and conducting transactions electronically. These citizens will have higher intentions to use e-Government services than those who view these services as incompatible with their lifestyle.

7.4 Ease of use
Contrary to hypothesis 4, higher levels of perceived ease of use are not significantly associated with increased use intentions of e-Government services. This unpredicted outcome could be the result of the use of college students as subjects. Our sample consisted of experienced computer users whose perceptions of ease of use probably differ from the overall population of citizens. The subjects have an average of nine years of experience using a computer and 98 % of the sample uses the Web everyday. Since these college students are confident in their ability to use online services, apprehension provoked by potential complexity is not a significant deterrent of e-Government adoption.

8. Limitations
Our sample consisted of undergraduate students and the use of student subjects may limit the generalizability of the results. Although several studies in technology acceptance have used student subjects (Davis 1989; Gefen & Straub 2000; Moon & Kim 2001; Trinkle 2001) college student demographics, such as experience using the Internet, differ from the demographics of the overall population of citizens. A majority of college students frequently use and have easy access to Internet services. However, there are many citizens who are members of the digital divide, in the United States and other countries, who do not have easy access to or much experience with Internet technology. This study is the pilot of a larger scale study of citizen adoption of e-Government initiatives. The next phase of data collection will elicit participation from a broad diversity of citizens in age, gender, ethnicity, and social groups.

9. Implications
9.1 Implications for research
This study presents an introductory model that explains 50 percent of the variance in citizen adoption of state e-Government initiatives. This model can serve as a starting point for other e-Government adoption research, while encouraging further exploration and integration of additional adoption constructs. In the future, we plan to integrate constructs from the technology acceptance model (Davis 1989) and the Web trust literature (Belanger et al. 2002; Gefen et al. 2003; McKnight et al. 2002) to develop a more comprehensive, yet parsimonious model of e-Government adoption.

9.2 Implications for practice
The study reveals three significant indicators of citizens’ intention to use state government services online. State agencies should promote citizen acceptance and use of e-Government services by manipulating these factors:
perceived relative advantage, perceived image, and perceived compatibility. Specifically, state government agencies should capitalize on the unique benefits of online services, promoting their use as a status symbol, and indicating the services’ congruence with a citizen’s lifestyle. They could send citizens a letter explaining the speed, convenience and accessibility of online government services. In this letter, government agencies could also increase citizens’ perceptions of compatibility by noting the similarities between traditional government services and online government services. For instance, online license renewal may utilize the same form used in the manual process to allow citizens to easily incorporate e-Government services usage into their life. Another way to enhance perceived compatibility could be to provide tangible verification of transaction completion. Many citizens are accustomed to receiving a paper receipt that can be utilized to verify a transaction. The lack of this tangible record may make many citizens reluctant to engage in electronic transactions. Agencies could still make paper receipts available to citizens upon request via mail or fax. To enhance the perceived image of e-Government adopters, agencies could pursue endorsements from local celebrities or well-respected citizens in the community advocating the use of state e-Government services.

10. Conclusion
This study uses constructs from Moore and Benbasat’s (1991) perceived characteristics of innovating to develop a parsimonious model of citizen adoption of state e-Government services. Perceived relative advantage, perceived image, and perceived compatibility are significant elements of e-Government adoption. The model explains 50 percent of the variance in citizen intention to use e-Government services. As e-Government grows in importance and priority for governments worldwide, an understanding of the factors that influence citizen adoption of these online services is invaluable.

11. Acknowledgements
We would like to extend a special thanks to Marijn Janssen, chair of the eGovernment Services Workshop of the 5th International Conference on Electronic Commerce (ICEC) 2003, for his involvement in the publication of this study. We would also like to extend our gratitude to the Accounting and Information Systems Department at Virginia Tech for its support of this study.

References

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12. Appendix

State e-Government adoption items

Use Intentions (USE)
I would use the Web for gathering state government information.
I would use state government services provided over the Web.
Interacting with the state government over the Web is something that I would do.
I would use the Web to inquire about state government services.

Relative Advantage (RA)
Using the Web would enhance my efficiency in gathering information from state government agencies.
Using the Web would enhance my efficiency in interacting with state government agencies.
Using the Web would make it easier to interact with state government agencies.
Using the Web would give me greater control over my interaction with state government agencies.

Image (IM)
People who use the Web to gather information from state government agencies have a high profile.
People who use state government services on the Web have a high profile.
People who use the Web to gather information from state government agencies have more prestige than those who do not.
Interacting with state government agencies over the Web enhances a person's social status.

Compatibility (CT)
I think using the Web would fit well with the way that I like to gather information from state government agencies.
I think using the Web would fit well with the way that I like to interact with state government agencies.
Using the Web to interact with state government agencies would fit into my lifestyle.
Using the Web to interact with state government agencies would be incompatible with how I like to do things.

Ease of Use (EOU)
Learning to interact with a state government Website would be easy for me.
I believe interacting with a state government Website would be a clear and understandable process.
I would find most state government Websites to be flexible to interact with.
It would be easy for me to become skillful at using a state government Website.
FRAMES – A Risk Assessment Framework for e-Services

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a.evangelidis@napier.ac.uk

Abstract: e-Government projects are expected to increase efficiency and quality of government services, whilst decreasing the costs. Unfortunately though, together with its perceived positive potential, e-Government also entails risks. It is expected that the employment of proper risk assessment methods in the management of such projects will reduce the threats imposed by the various risks that surround these projects. This paper discusses about risk in e-Government and provides a high-level e-Government risk factor classification. Furthermore, this article proposes a novel risk assessment framework for e-Services in the public administration.

Keywords: e-Government, e-Service, Risk, Risk Assessment, Frameworks

1. Introduction

The recent trend for public administrations worldwide is to implement e-Government. This originates from the expected outcomes that the introduction of Information and Communication Technologies (ICTs) may bring to the public sector. The profits of the informatisation of the public sector may be increased efficiency and effectiveness, decreased costs and better quality of services. Therefore, governments are investing heavily and setting tight deadlines on e-Government projects in order to exploit the expected benefits.

In order to achieve such outcomes, e-Government projects have to be successfully designed and deployed. These are non-trivial tasks. Recent reports in the UK (Arnott 2003) show that the cost of cancelled or over-budget government IT projects has topped £1.5billion in the last six years. For example, just a single cancelled e-Government project on smartcards resulted in a loss of £698million to the British government. Similar situations may be avoided or at least better handled through appropriate risk assessment strategies. Such strategies may be able to enhance decision-making by turning threats into opportunities for success and provide better project management through the enabling of contingency plans.

Within that context, a current research programme investigates the risks associated with e-Government projects (see also Akomode et al. 2002; Evangelidis et al. 2002; Evangelidis and Macintosh 2003) in order to investigate the effect of a qualitative multi-perspective risk assessment framework for e-Government services (or government e-Services). e-Services for government are simply the ‘online’ services (Hoogwoot 2002 p.33) that are provided by the public administration within an e-Government environment. As Gordon (2002) explains government services are delivered with various levels of interaction. Three levels are usually identified: information, communication, and transactions. Information services deliver government information via static web pages and pages generated from databases to citizens, tourists, businesses, associations, public administration, and other government users. Communication services use groupware technology such as e-mail, discussion forums and chat to facilitate dialogue, participation and feedback in planning and policy-making procedures. Therefore, according to Gordon (2002, p.12) transaction services use online forms, workflow and payment systems to allow citizens and business partners to take care of their business with government online. Typical applications of transaction services for citizens include applying for social benefits, registering automobiles, filing changes of address or applying for building permits. For businesses, perhaps the application of greatest current interest is the online procurement of government contracts.

Such a framework is expected to be used by managers, researchers and members of e-Government projects. To explore this research topic an analytical framework is required. This paper describes the novel
framework FRAMES, which stands for Framework for Risk Assessment and Modelling in E-Government Services. This framework aims at the provision of a methodology for efficient risk assessment in e-Government transaction services and is expected to be evaluated within collaborating establishments, at both local and national government levels.

2. Risk in e-Government

e-Government projects are inherently complex, mostly sharing similar risks with their eBusiness counterpart projects. This is logical as both concepts (e-Government and e-Business/e-Commerce) share some striking similarities. Such common characteristics may be the similar infrastructures, the transformation of business, the collapse of organisational boundaries, as well as the common goals, just to name a few (for more on such comparison read Gisler 2000; Dridi 2001; Greunz, 2001; Traunmüller 2000). Hence, some scholars define e-Government in relation to e-Business or eCommerce. For example, Howard (2001) states that "e-Government is the application of the tools and techniques of eCommerce to the work of government". Similarly, Schubert (2001) portrays electronic business as a subset of electronic government. Within that context, there are also common risks that may be found in both areas.

Some typical risks that may be experienced in both domains can be listed as follows: a) uncertain timescale prediction, b) increased delays and costs, c) misinformed decisions, d) reliance on technology, e) security risks and f) risks related to the unpredictable nature of the ICTs. Of course such enlisting is far from exhaustive, but it gives a flavour of some common risks shared in both the e-Government and e-Business fields (for e-Business related risks read Labuschagne 2000; Frynas 2002; Adam 1996 and for e-Government related risks read Akomode 2002; Evangelidis 2002).

Implementing e-Government as a major development can be a daunting task, since it can involve many factors of risk that could threaten the success of the project. Adequate risk assessment procedures may help in avoiding major pitfalls, though sometimes failures cannot always be predicted precisely. Since electronic government projects have a broad scope, risks can be found in many diverse areas. To name a few, such areas may be related to the technological foundations of the e-Government phenomenon, may be involved to the social aspect of electronic government, there can even be some political areas where risks might arise. Therefore, risk assessment in e-Government, if explored holistically, should span on a very broad and multidisciplinary environment in order to have a reasonably adequate positive effect.

3. e-Government Risk Areas - STEPS

To support such a framework the need arises for a categorisation of the various risk factors that surround e-Government projects. This part of the paper shall introduce the main risk factors areas that will be considered for extracting risk elements to be used in the risk assessment process. It has to be stressed here this discussion will not delve any deeper as it is out of the scope of this paper.

Experience from the electronic commerce/business domain and the relevant literature show that some have attempted to classify risks in all sorts of high-level categories according to the nature of the risks. To name a few, Tchankova (2002) proposed seven different classes of risks, namely: i) physical, ii) social, iii) political, iv) operational, v) economic, vi) legal, and vii) cognitive environment. Additionally, Liebermann (2002) distinguished five different areas of risk in the eCommerce field, which are the: i) financial, ii) physical, iii) psychological, iv) social, and v) technological. Furthermore, in the 'Integrated Risk Management Framework’ (Treasury Board of Canada Secretariat 2001 p. 9) the following main classification of potential risks influencing an organisation are identified: i) political, ii) economic, iii) social, and iv) technological.

In that fashion and for the purposes of this research programme this paper proposes the following high level classification of risk factors that surround e-Government projects:
a) Societal – referring to the risks that usually affect the way people live and interact in the society
b) Technical – such risks arise from the way information and communication technologies are used in order to serve the purposes a particular project is meant for
c) Economical – where financial related risks are indicated
d) Political – here risks that erupt from government policies/decisions are discussed. It has to be stressed here that under the ‘political’ risk umbrella the legal-related risks are also included.
e) Security – since security has a major importance in e-Government projects it has to have a risk class on each own.

This paper names this classification STEPS (after the first letter of each class) and it is believed that such approach can be useful mainly for two reasons: i) to help (by giving a holistic view) the risk assessor create his/her risk assessment plan more efficiently, and ii) so as to put an order to the numerous high level risks involved, which will help in better exploiting such risk identification.

4. e-Government frameworks
To structurally develop FRAMES in its current form, various e-Government frameworks have been examined. The reason for doing so was the possible discovery of existing frameworks or models that look at the phenomenon in a holistic manner. Therefore, they could provide the foundations for the design of a risk assessment framework or even better, a suitable one could be re-used as is by ‘attaching’ risk assessment methods on top of it. These frameworks/models could be distinguished into two types: i) strategic, since they define the strategies that have to be followed to better realise e-Government, and ii) operational, since they describe various architectures of e-Government systems.

Four strategic designs have been found. One of them, the ‘Value Chain Model’ (Wassenaar 2000) demonstrates the way e-Government may add value to the public sector. As such, it explores the e-Government concept from a business perspective and it is all about helping public administrators to better understand and realise the potential of exploiting the ICTs in the public sector. A second one attempts to set the various viewpoints from which e-Government systems may be viewed (for more details read Lenk 2000; Papantoniou 2001). The ultimate aim of this framework is to shape the future of e-Government by setting some guidelines based on the following four perspectives: a) addressee, b) process, c) co-operation, and d) knowledge. A third strategic design for e-Government is the ‘three dimensional viewing of e-Government’ (Gisler 2000; Papantoniou 2001) of any e-Government system. A fourth strategic design for e-Government that has been identified from the literature review is the ‘Growth Model’ (Layne 2001) which describes four (growth) stages that lead towards fully functional e-Government.

Likewise, the literature survey divulged two operational models for e-Government. The first one simply discusses about two different types of e-Government architectures coupled with their advantages and disadvantages (Lapra 2000). These two architectures are called the ’integration’ and ‘fragmentation’ model and basically discuss about the ‘positioning’ of the back office and the front office. Finally, the second operational model provides another design principle for e-Government implementations. The ‘general model for e-Government initiatives’ (Dridi 2001) describes two perspectives; the external and internal ones that are equally important for developing e-Government projects.

Such frameworks, despite the fact that they can provide holistic views of the e-Government concept from various angles have been proven unsatisfactorily for the purposes of this research. The Value Chain Model is a very useful business oriented framework, but unfortunately it is deemed that is not applications specific, as needed for this research project. Then, two other strategic frameworks, the ‘three-dimensional’ and the ‘viewpoints’ ones, do pose very good designs in order to assist in setting policies and long term goals for e-Government implementations, but they seem to be rather too high-levelled for risk assessment to be efficient. In regards to the fourth strategic framework, the ‘Growth Model’ it has to be stressed that it is a very useful template in order to examine how e-
Government projects progress. Unfortunately though, it does not describe any structural elements of such projects, thus it may not be very useful as the basis of a risk assessment framework. Furthermore, and after examining the remaining two operational frameworks/models, the following may be concluded. In regards to the ‘integration/fragmentation’ model it may be said that it is a nicely structured architectural model for e-Government services that is focused on the back and front office and how these are positioned, but unfortunately it does not go any deeper. For instance, what happens in the back office? As such, it is too vague for the purpose of this research programme’s aims. And finally, the ‘general model for e-Government initiatives’ poses a very all-round high-level framework that may provide guidelines for effective e-Government implementation, but unfortunately it is not very descriptive at a more lower, more ‘apt’, level so that efficient risk assessment methods could be employed.

5. FRAMES – A Framework for Risk Assessment and Modelling in e-Government Services

As explained in the introduction, the Framework for Risk Assessment & Modelling in e-Government Services aims at the provision of a methodology for efficient qualitative risk assessment in e-Government services.

The main aims of FRAMES can be summarised in the following three statements:

- To provide a holistic view of an e-Government transaction service project
- To enable the decision maker in assessing the risks involved in the development of the electronic transaction service.
- To enhance decision-making at the feasibility stage of the project development.

This paper accepts that any electronic government transaction service can be seen as a socio-technical system (or STS). Socio-technical systems (Kavan 1999) usually consist of two subsystems; the social subsystem and the technical subsystem, which are interdependent (see Figure 1). The social subsystem contains two components: i) the structure (or roles), i.e. Communications, authority, workflow systems, and ii) the people that have various such as attitudes, skills, and values. On the other hand, the technical subsystem contains two components as well: i) the technology that is required for the system, and ii) the task(s) needed to achieve the goals of the system.

Within that context FRAMES provides a way of implementing risk assessment in e-Services. As such, any e-Government transaction service project is seen (Figure 2) as an STS that comprises of three main socio-technical subsystems that interconnect four main modules of the transaction service project. These four main modules are: i) the customers, ii) the e-Service, iii) the organisational level, and iv) the intra-organisational service.

Figure 1: Socio-Technical System (adapted from Bostrom 1980; cited in Kavan 1999 p.297)
The ‘customers’ module mainly refers to the customers/users of the transaction service. These users can be citizens or businesses (and in some cases other governments) that interact with the front end of the system. Such interaction is understood to be in the form of using the system and/or providing feedback to the system. The second main module of FRAMES is the e-Service itself and it is divided into two main parts; a) the front end that is the main application/function that the customer is interacting with, and b) the back end that denotes the point where the eService interacts with the ‘parent’ organisation, namely the public authority, which is responsible for the service, as well as other organisations that contribute, share information, interact with the eService. The third main module within FRAMES is the organisational level and it basically refers to the public authority that is responsible for the development of the electronic government transaction service. Within that level, the main actors / functions that support / develop the electronic transaction service can be found. Finally, the fourth main module within FRAMES is the intra-organisational level that usually entails, other than the public authority, organisations (governmental or non-governmental) that are needed to support / develop the e-Service.

As it was mentioned above, within FRAMES there are three major socio-technical subsystems that are formed between the modules of the system. One such subsystem is formed by the connecting relationship of customers and the front end of the eService. A second socio-technical subsystem is formed by the connecting relationship between the organisational level and the back end of the e-Service module. And finally, a third such subsystem is formed between the back end of the e-Service module and the intra-organisational level. Such subsystems are of crucial importance and are needed within FRAMES in order to better ‘customise’ the risk assessment process within any e-Government transaction service project. As mentioned earlier, each of these subsystems contains people that have different roles and utilize technology to achieve certain tasks that will work towards the system’s goals. FRAMES understands that there are various typical high level risks within these particular areas (and this is were STEPS is going to be exploited).

![Figure 2: FRAMES](https://www.ejeg.com)
FRAMES adopts from the BS-6079-3 Standard the risk assessment sub-process. Therefore, the risk assessment process within FRAMES will consist of the following stages (see figure 3 below): i) context establishment, ii) risk identification, iii) risk analysis, and iv) risk evaluation.

**Context Establishment** – The first stage of FRAMES is responsible for establishing the broad context within which risk assessment will be done. This stage mainly (but not limited to) includes knowledge acquisition, which will eventually set the measures of the various risks’ impact. The knowledge acquisition stage defines the long term (strategic) goals of the system/organisation, as well as the medium term (organisational) goals and the short term (management) goals. Then the risk assessor has to define the threats to these goals. Furthermore, another part of the ‘context establishment' stage is to develop various criteria, such as to decide on the key actors/stakeholders. The final phase of this stage is to decide on the structure, which will tackle the issue of choosing what sort of qualitative risk assessment approach/approaches is more suitable, as well as the initial presentation of the risk assessment area to the stakeholders.

**Risk Identification** – Here lies the process of identifying the risks, as well as how, what or why incidents may occur. To achieve risk identification various methods can be used each of them having their own advantages and disadvantages. FRAMES will employ risk identification techniques that enable qualitative risk assessment. Some of them may be the following: i) semi-structured interviews, ii) brainstorming, iii) Nominal Group Technique, iv) Delphi method, and v) checklists. Of course other suitable qualitative techniques can be used in FRAMES.

**Figure 3:** Risk assessment stages

- **Context Establishment**
  - SWOT Analysis
  - Context
  - Target
  - Criteria
  - Structure

- **Risk Identification**
  - Semi-structured Interviews
  - Brainstorming
  - Delphi
  - Checklists
  - Nominal Group Technique

- **Risk Analysis**
  - Probability
  - Impact

- **Risk Evaluation**
  - Risk Levelling

**Risk Analysis** – It is a stage, where an estimation of both the probability of the occurrence of a risk and the magnitude of the consequences of the risk happens.

**Risk Evaluation** – During this process the consequences of the risks are levelled after their impact/magnitude.

6. **Benefits and application**

Certain benefits are expected to be reaped from the introduction of appropriate risk assessment strategies in e-Government projects. First of all, the obvious may happen that is an overall reduction in risk exposure. Such strategies should also aid in the improvement of decision-making,
since there shall exist a comprehensive and structured understanding of the activities, opportunities and threats involved in the project. Furthermore, following the guidelines of a risk assessment framework, e-Government project managers will achieve to enable future activities happening in a consistent and controlled manner. The benefits of systematic e-Government risk assessment are also expected to improve the control of project costs, quality and time, factors that are extremely important, since they are the precursors for the balancing of ‘side-effects’ such as citizens’ satisfaction, public authorities’ image and others. e-Government is surely a quite modern concept and therefore its evolving terminology is still not ‘standardized’, meaning that e-Government managers might be using different terms whilst talking about the same subject, which results to undesirable effects. Fortunately, with the introduction of a holistic risk assessment framework people interested in e-Government will now use a common language, thus can better communicate about various e-Government issues.

More specifically, it is expected that this risk assessment framework will provide numerous of positive outcomes to the users. First of all, FRAMES should act as a template which will show the main sources of risk that surround e-Government implementations. Additionally, it can be used as a template for risk assessment in e-Government projects that can be fully customised for the particular needs of individual projects. Furthermore, FRAMES will also assist in providing guidance on how to do efficient qualitative risk assessment in any e-Government project. Additionally, this framework is designed to provide electronic government users an integrated systems view of all major issues involved in the identification and analysis of high level risks. The ‘whole picture’ provided by FRAMES should enable e-Government managers to efficiently understand and use the various stages of the risk assessment process within electronic government implementations. It is also expected that this framework for qualitative risk assessment in e-Government should enhance awareness on the various threats and opportunities that are normally associated with e-Government projects as well as provide the opportunity to e-Government managers to calculate the significance of the various risks and aid them in a better decision-making process. For example, such awareness can be useful during contract negotiations or for the development of alternative contingency plans.

As it was originally thought and subsequently supported by the opinion of three experts in e-Government at a recent field research (for more on that read Evangelidis 2004) there can be at least two main areas of application that FRAMES is primarily aiming at. The ‘qualification’ stage may be seen as the first practical use of FRAMES. That stage is where many ideas for potential government eServices are proposed and FRAMES can be used there in order to avoid waste and to choose the best candidate for a potential e-Government service, thus saving resources and effort for the developing organisation. Furthermore, a second potential example of where such a framework may be implemented in practice is the planning of the actual e-Government services. It is apparent that by having a ‘knowledge base’ of potential risks and using it as a template, through FRAMES, planning for eServices could become so much easier.

7. Conclusions
The Electronic Government phenomenon is gaining momentum at a quick pace. Worldwide, public administrations seem to invest heavily on that trend. Unfortunately though, together with its expected dynamic potential this concept surely entails some risks, which can become threats (if not taken care of); or exploitable opportunities, if systematic risk assessment methods are put in place. This paper introduced the reader to the e-Government risk and provided a high-level risk factors classification termed STEPS. Furthermore, this article introduced and described a novel qualitative multi-perspective risk assessment framework for e-Services in the public administration, which is called FRAMES. Potentially, such risk assessment framework may find applicability in areas like planning or qualification for eServices in the public sector.
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Developing Generic Shared Services for e-Government

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Abstract: Currently e-Government initiatives have a highly fragmented nature and are hardly coordinated. An architectural approach aimed at reusing components as shared services can support government agencies in the implementation of their e-Government initiatives. In this paper we describe research aimed at identifying and prioritising the importance of generic services that can be shared among public agencies. Generic shared services are identified and prioritised by technical experts and government representatives using a group support system session. This has resulted in an action plan to implement the services and use them as part of future e-Government projects.

Keywords: Architecture, group support system, e-Government, shared services, data centres, shared service centre

1. Introduction

The Internet offers a tremendous opportunity for governments to better deliver its services and interact with its many constituents, citizens, businesses and other government organizations (Chen 2002). Politicians pay an overwhelming attention to more customer-oriented services provisions. The current economic climate is, however, forcing government agencies to focus on the efficient implementation and operation of their information systems. Politicians and managers of public organizations have become increasingly dissatisfied with the returns obtained from their investments in information and communication technology (ICT). Development and maintenance costs are rising too rapidly and technology seems to be changing so quickly that one single organization can hardly keep up with all the latest developments. Inevitably the costs of e-Government initiatives have become the prime concern of public management and collaboration between government agencies has become a necessity for cost-effective services provision.

The reality of today is the emergence of ‘islands’ of government that are frequently unable to interoperate due to uncoordinated efforts at all levels of public administration (European Commission 2003). This shows that there is a need to coordinate joint efforts on all levels of public administration. Initiatives to address this need do not learn or only partly profit from the experiences gained in similar projects and do not reuse services that are already developed. The attention of public managers is shifting from innovation to cost efficient operations using shared service or data centres (Leganza 2003). Within the Netherlands, this has sporadically resulted in collaboration between small municipalities aimed at avoiding duplication of efforts and to establish one shared back-office. Services cannot be provided at low cost and implemented at a local level only, as budget and expertise are limited. Small organizations cannot develop all the desired services and cannot have all kinds of expertise needed in house. By sharing services and expertise among organizations, a larger number of services can become available.

With the advent of web services technology it becomes technologically feasible to create components deployed as web services that are modular, easy to access, well described, implementation-independent and interoperable (Fremantle et al. 2002). Service-oriented paradigms are becoming more important in today’s design of information systems. Once developed to support one particular business process, the service can be reused in various other business processes. Moreover, new business processes can be constructed within a shorter time frame by using the pre-developed components.

Shared services can be developed by unbundling and centralizing activities. Shared services are often bundled in independent legal entities, call shared
service centre. They are usually geographically separated from the service requester through the application of information and communication technology. A shared service is a generic service that is jointly developed by public agencies and can be used many times in different business processes of various government agencies. Shared services can be developed using web-services technology, however, by not means this should be considered as a prerequisite. The use of shared services requires an architectural approach through which services can be gradually incorporated in the already existing architecture. In this way investments in legacy systems can be leveraged. An architecture should provide the flexibility to include common services and functionality provided by legacy systems, which cannot be replaced easily and would otherwise restrict further development.

To date most of the research has focussed on the extend to which public agencies present information via the Internet and on the types of access necessary. The goal of this paper is to identify and prioritise the importance of generic services that can be shared among agencies. We do this by first discussing the background and thereafter discussing service-oriented architectures. In section four we present a group session aimed at identifying shared services. In the section thereafter we discuss the assessment of the shared services identified in section four. In the last section we discuss some shortcoming of the approach and further research.

2. Background

Businesses and citizens have to operate within a regulatory regime of a government that includes frequent and mandatory dealing with that government. In the Netherlands, there is no such thing as a one-stop shop for all business and citizens. Constituents have to deal with a fragmented landscape of government organizations that sometimes are even hard to locate. Public administration can be characterized by independent agencies having all kinds of heterogeneous information systems and providing various kinds of services. The government agencies are free to design their own architecture and to choose appropriate software vendors.

The current situation is such that each governmental organization has developed its own information systems rather in isolation, and that for each product or service a separate information systems exists. The information systems are often monolithic packages. No generic architecture is available that enables communication between front-office and back-office applications, between back-office applications or with systems outside the own organization. Functionality like identification and authorization can be found in each of these information systems. Functionality is not reused within one organization, let alone between organizations.

Figure 1: The fragmented field of public agencies

Within a virtual business counter the Dutch Municipalities, Taxes and Chamber of Commerce have to cooperate to offer a one stop-shop to businesses. Although the
Dutch tax organization is geographically divided into districts, this organization is uniformly automated as shown on the left side of figure 1. The services they offer are well-defined and the level of automation is high. The chamber of commerce consists of 21 autonomous organizations that hardly share any information systems as shown in the middle of figure 1. The services offered to businesses can vary per district and are often not well standardized and structured. The most striking example of the fragmented landscape can be found when looking at the Dutch municipalities as shown on the right hand of figure 1. There are about 500 municipalities each providing about 290 services to citizens. The services are well standardized and uniformly described, although municipalities might have customized the services to match the local conditions. Each municipality is free to buy or design their own information systems and in the past for information systems were used to support each product. In the worst case this could have resulted into 500 * 290 information systems. No overview exists of the systems used by the municipalities.

With the rise of the Internet most of the government agencies have initiated some kind of web-based project. The current initiatives in the Netherlands often reflect the history of the organizations and only a small portion of the high ambitions of having 70% of the services online are realized. The services provided can be positioned in the two lowest phases of Layne and Lee (2001), the catalogues and transaction phase. Overall, projects have created a web-presence containing product information, there are some downloadable forms and for a limited number of services it is possible to conduct online transactions.

Governments' history with independent agencies and their sometimes overlapping functions and objectives has resulted in a slow progress. Each agency typically has a number of legacy systems and some web-based projects that make use of different technical architectures and support different business processes. Legacy systems run the agency’s key mission-critical applications and agencies have often invested a vast amount of resources to develop and maintain these systems. Some large legacy systems have been designed over years and they form the very basis of an agency. Often it is even not possible to replace operative legacy systems with a uniform solution at once. Developing new systems from scratch requires much time and money, is prone to failure and does not leverage investments in legacy systems. Consequently, it is critical to incorporate legacy systems in future architectures. Incorporating the existing applications as information or functional components can leverage investments in legacy systems.

The existence of isolated, highly fragmented and unrelated computerized applications that overlap in function and content within one public organization has resulted in ‘isolated islands of technology’ while information systems were viewed as being internal to the public organizations. The ICT-architecture has been vertically organized around agencies, and departments within the agencies, and does not share or hardly shares any common horizontal functionality. The public administration consists of stove piped organizations with no history of working together. There is no such thing as a department of architecture department that is responsibility for all systems under development. The role of central level initiatives has been a minor one, whereas the information managers within agencies have guided development.

By sharing administrative processes across agencies it is expected that a significant increase in efficiency and enhanced services delivery can be created. The ministry for Government Reform and Kingdom Relations of the Netherlands aim is to reduce the citizens’ and business’ bureaucratic obligations and burdens by 25% (Graaf 2003). That reduction will largely be brought about through reducing unnecessary regulation and by far better use of ICT. A first step is the creation of a service-oriented architecture providing a set of basic services that can be used by agencies in their business processes.

3. Service-oriented architecture

The term architecture has become increasingly over-used and denotes a wide variety of uses (Perks and Beveridge 2003). From a structural approach coordination theory can guide the
definition of architecture. Coordination is often defined as the management of dependencies between activities (Malone and Crowston 1994). From a coordination point of view, architecture is the description of a set of components and the relationships between them on various levels including business, process, functionality, application and technical infrastructure level (Armour et al. 1999). From a rational perspective the design of an architecture is usually seen as a set of trade-offs between available resources, e.g. money, personnel, time, and functional and technical requirements related to the architecture such as scalability, capacity response time, security and availability (Koushik and Joodi 2000). An architecture contains architecture description languages, common architectural patterns, trade-offs methods, service-oriented or component-based frameworks and technologies. An example is the IEEE 1471; a standard describing a framework for architecting.

From a more business process reengineering view an architecture aims to bridge the gap between business and ICT departments and between conceptual and implementation design by defining a systems composition from various viewpoints. In this conception architecture is not only a technical artefact but also a phenomenon having strong organizational connotations (Perks and Beveridge 2003). An architecture typically establishes a shared vision. It often incorporates a blueprint of the existing and desired design and an overall plan regarding the realization of parts. Stakeholders can use architectures to make decisions concerning system development strategies.

Architecture is an abstraction of the systems under study and can guide the development of these systems. A repository of experiences, components and services can support this process. A goal of architecture is often to reuse experiences and resources like services and components. The use of an architecture can have the following advantages.

1. Decreasing the complexity of the systems. A complex system can be analyzed by looking at the parts having a lower complexity than the whole system;

2. Increasing the reusability of and the connectivity between parts. Both experiences as well as components can be reused. When a service or component is developed by one agency other agencies can reuse this component or service;

3. Reducing errors and mistakes. As experiences with various architectures are stored, making the same mistakes over and over again can be avoided.

Currently, pleas have been made for more open, flexible architectures constructed of relatively small components that can be accessed using web services technology (Fan et al. 2000). Service-oriented architectures can leverage investments in legacy systems running the enterprise’s key business-critical applications (Arsanjani 2002). The concept of modularity in service-oriented architectures has the following three advantages (Baldwin and Clark 2000).

1. It increases the range of manageable complexity;

2. It allows different parts of a large system to be worked on concurrently;

3. It accommodates uncertainty.

The principle of modularity can be applied to the various architecture levels. For our purposes we focus on a set of services provided by software components on the application level.

Services can be shared by the various government agencies to avoid the development of similar functionality over and over again. Functionally of one system can be shared and provided to all the other agencies involved. Shared services have large potential for a variety of other public and commercial applications. Shared use can make IT infrastructure management and application exploitation and use more efficient. Sharing of services introduces new opportunities for, especially small, government organizations to (1) outsource non-core activities, (2) dimension the capacity of their ICT infrastructures efficiently and (3) to access and use ICT resources currently out-of-reach.

Services can either be coarse- or fine-grained and be used at different levels of information systems development. Fine-grained services are small-sized capturing source-code. Coarse-grained components are large encapsulating complete business
functions or complex systems. Current methods address services usually in a fine-grained connotation and provide little or no support for mapping business architectures to component-based software architectures (Arsanjani 2002). The services we are interested are coarse-grained and will be derived using the knowledge of ICT-experts and government representatives in the following sections.

4. Identifying shared services

One of the main issues in designing service-oriented architectures is the identification of services, including granularity and boundary definition. This is a highly intuitive process, which can have ambiguous outcomes and needs the input of expertise in the field of (1) technology, to ensure that services are technical viable and can be implemented, (2) business process, to ensure that generic services that are identified can be used in various business processes and (3) architecture, to ensure that the new services can be integrated in the existing architecture. This process requires the involvement of people that have the knowledge to take these factors into account. Apart from mobilizing the tactical knowledge of people in an effective way, the involvement of government representatives also creates the necessary commitment for making sure that the shared services will be used in new development projects. The execution of plans often depends on the support of central and regional public organizations.

The process of identifying and selecting services can be supported using a group support system (GSS). A GSS is suitable to deal with complex, unstructured problems and actors having incompatible interests, diverging areas of knowledge and multiple backgrounds (Herik en Vreede 2000). GSSs can be used to provide support during meetings in which groups share, structure, and evaluate ideas. Participants in a GSS meeting contribute by inputting their ideas, reactions or votes to PCs that are connected through a network. GSSs are used to send new ideas to all participants, to provide visualization of data, to calculate vote results, and so on. GSSs are aimed at making group meetings and group decision-making more effective.

A Group Support System is a computer based information system, which combines computing, communication and decision support technologies to facilitative collaborative work (DeSanctis and Gallupe 1987). The GSS provides parallel communication, anonymity, and group memory. GSS enhances participation of users as they can contribute freely without fear of evaluation of conformance pressure (Davison 2000). The advantage of using a GSS is that the employees within an organization can anonymously provide their own opinions about the matching mechanisms while having less or no pressure to conform to the organizations’ policy and all comments are stored. In the GSS at Delft University of Technology all participants have a computer terminal at their disposal and there is also a large screen to communicate and discuss ideas and results as schematically shown in figure 2.

Figure 2: Group session overview

Technical experts, information architects and business process experts from various layers of government participated in a GSS to identify generic services and to prioritize these services in order to come to an implementation plan. The session participants were coming from all levels of public administration including ministries, provinces and municipalities. In the first step of the session, a large number of ideas about possible services was generated. During the second step these services were elaborated and described in more detail. This long list was organized and reduced to the following 10 services having a generic nature and the potential to become a shared service.

1. Basic communication service: This service is responsible for ensuring a secure and reliable transport of data between government agencies, businesses and citizens;
2. Message exchange (generic) service: This service uses the basic communication facilities to transport and log messages from one system to another system. Message logging is necessary to ensure tracing of messages in case of indistinctness or dispute between organizations;

3. Identification and authentication service: Both the transmitting and the receiving party should be identified and authenticated. Identification can be implemented on various levels; on the simplest level by using a user name and password, and on more complicated levels by advanced technology like a chip cards or biometrical methods;

4. Directory (yellow pages) service: This directory service consists of references to the location of source data. When somebody searches the chamber of commerce information, this directory refers to information systems of the chamber of commerce having the requested information available;

5. Authentic registration: This principle of authentic registration states the organization who gathers the information at the sources, is responsible for keeping information up-to-date and for distributing the information to other organizations;

6. Channel integration: This facility is aimed at providing a uniform and consistent service provisioning among various channels. Information about the interaction in one channel is shared and used with the other channels;

7. Library service: Electronic documents are often not stored, however, storage is needed to ensure longevity and accessibility. This service aims at uniformly storing and making documents accessible in such a way that long-lasting availability and authentication of the document source is ensured;

8. Message exchange (specific) service: Aims at the syntactically or semantically integration of messages within particular domains like taxes or social welfare;

9. Authorization service: This service should provide access to only authorized persons;

10. Business process integration: A set of services aimed at the coordination of processes across various organizations. The use of this service should result in a virtual organization having one uniform face to the outside world.

The message exchange service is split up into a generic exchange function for data, like name and address information, and a domain specific exchange function for exchanging of data within a domain, like criminal records and details of permits. This is a typical example showing that the determination of the granularity of a service is a struggle, in this case between the economies of scale of a generic solution versus the customisation and applicability of individual solutions.

5. Assessing shared services

Shared services should help organizations to solve their own specific integration problems and provide economies of scale by sharing the standardized services among many participants. The session participants were asked to rank the shared services based on five criteria. The criteria were ranked on a three points scale, ranging from -1 to +1 and denoted as -, 0 and +. The results of this voting exercise per criteria and the total score are shown in Table 2.

<table>
<thead>
<tr>
<th>Table 2: Assessment of shared services</th>
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<tr>
<td>Basic communication</td>
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<td>Message exchange (generic)</td>
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<td>Identification and authentication</td>
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<td>Directory (yellow pages)</td>
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<td>Service</td>
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<td>Authentic Registration</td>
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<td>Channel integration</td>
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<tr>
<td>Libraries</td>
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<tr>
<td>Message exchange (specific)</td>
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<tr>
<td>Authorization</td>
</tr>
<tr>
<td>Business process integration</td>
</tr>
</tbody>
</table>

6. Conclusions and further research

The first criterion deals with the number of government agencies that might potentially use the service. Technological urgency is about the necessity of having this service to execute the other services. Basic communication is necessary for all the other services, and message exchange and identification and authentication services are necessary for operating the other 7 services. After ranking the services an in-depth discussion about the arguments for the ranking took place. The organizational impact criterion is about the efforts necessary for a government agency to make use of this service. For example, channel integration requires a long-term negotiation, standardization and business engineering process. Technological impact deals with the efforts necessary to integrate the service into the existing architecture of government agencies, i.e. how much work is required to change the information systems and integrate the service. The last criterion, availability of technology, is about the readiness of the technology to implement the service and the maturity and associated risks of the technology.

As a follow up of this session, an action plan has been written for the implementation of the generic, shared services (Dool at al. 2003). This action plan introduces a shared service centre for the provisioning and maintenance of shared services. A shared service center is a kind of outsourcing arrangement to one centralized party, where all parties are operating within or belong to one large private or public organization. The introduction of a SSC is a critical decision on a strategic level. It implies a long-term decision between the SSC and clients with considerable complexity and risks. Further activities are aimed at developing a complete architecture.

There is no over-arching framework, or reference architecture available guiding e-Government initiatives in The Netherlands. Each new initiative does not learn from or only partly profits from the services that are already developed in other projects. The use of shared services requires an architectural approach through which services can be gradually incorporated in the already existing architecture.

The identification of shared services is a highly intuitive process, which might yield ambiguous outcomes. In this research the tactical knowledge of people is mobilized by using a group support system. Technical experts, information architects and business process experts from various layers of government participated in a GSS to identify generic services and to prioritize these services in order to come to an action plan. The participants identified ten basic services that can be shared among public agencies and assessed them on a number of criteria. These services are the basis of a generic service-oriented architecture for the Dutch government.

The identification and implementation of shared services that can be used by many agencies is only a first, small step on the road towards an integrated government. The transition to e-Government offers many opportunities but also major challenges. Well-designed and smoothly functioning services can enable e-Government. Future research should support the development of an architecture consisting of generic and specific services. This architecture should be assessed regularly due to architectural drift.
References
Implementing e-Government Services in East Africa: Assessing Status through Content Analysis of Government Websites

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Abstract: A content analysis study was conducted to determine the status of government websites of three East African countries -- Kenya, Tanzania and Uganda -- using establishment year, visibility and usability attributes. The results were matched with a four-stage model of e-Government growth based on the status of websites from simple to sophisticated features. The study identified 98 government websites including 33 for Kenya, 37 for Tanzania and 28 for Uganda. More than 83% of the identified websites were established between 2000 and 2003 and their creators are still undergoing the learning experience. The website visibility test ranged from 27% to 40% and the average for three countries was 32%. Usability analysis revealed more interactivity features for Tanzanian and Ugandan websites than Kenyan websites. The study concludes that all of the East African websites are at the first and second stages of the website development and corresponding e-Government services. One of the theoretical and practical implications of the study is a move toward a standardized use of the website evaluation attributes among various researchers to gauge stages of e-Government implementation. These attributes can also serve as indicators for individual governments to strive toward advanced stages of e-Government implementation.

Keywords: Website visibility, website usability, website interactivity, East Africa, Kenya, Tanzania, Uganda, content analysis.

1. Introduction

In February 1997, a joint report of the National Performance Review (NPR) and the Government Information Technology Service Board of the United States elaborated the concept and implementation of e-Government (Relyea 2002, Salem 2003). The NPR was established during the Clinton Administration and was given the task of developing recommendations to 'reinvent' the Federal Government, with the aim of having a government with these qualities: "works better, costs less, and gets results Americans care about" (Salem 2003, p.15). Salem further notes: "Early in the process it became clear that the reinvention of government was tied to the proliferation of information technology. According to Vice President Gore, 'information technology (IT) was and is the great enabler of reinvention. It allows us to rethink, in fundamental ways, how people work and how we serve customers'." (p.15).

Several authors have since defined this concept in various ways but the keywords include the use of information and communication technologies (ICTs) to facilitate access to and provision of government services to people. The ultimate aim is to improve performance (efficiency, effectiveness, transparency and accountability) of government (Allen et al. 2001, Silcock 2001, Whitton and Davis 2001, World Bank 2003). This is connected to recent developments in ICTs -- especially the Internet and the World Wide Web -- that have created great potential for social and economic progress due to their effect in facilitating access to information for decision-making processes (ECA 2003, Hsinchun 2002, Mansell and Wehn 1998, UN 2001, World Bank 2001).

In utilising that potential, many countries have decided to employ ICTs to enhance delivery of government services to their citizens, and are thus at various stages of e-Government implementation (Ho 2002, Holliday 2002, Layne and Lee 2001, Netchaeva 2002, UN 2002, UN 2001).

Several developing countries have also taken up the challenge of exploiting the potential of the Internet to disseminate information and be accessed for the benefit of their citizens. This is especially so in Asian countries (Holliday 2002, Lu et al. 2002, Netchaeva 2002) and to a lesser extent in African countries (Mutula 2002, Netchaeva 2002, UN 2002, UN 2001, World Bank 2003). Likewise, many scholars have taken keen interest in e-Government services implementation as a research area particularly in Western countries and to some extent in Asia and
South America. These researchers have come up with findings or models that indicate the various stages of implementing e-Government services using specified criteria (Holliday 2002, Layne and Lee 2001, Netchaeva 2002, UN 2002, UN 2001). Similar empirical studies in Africa as a whole and specifically in East Africa are almost negligible despite a couple of emerging e-Government services (Netchaeva 2002, UN 2001, World Bank 2003). This study, therefore, attempts to fill this gap and aims to examine the status of implementing e-Government services in East Africa through a content analysis of government websites of three countries, namely, Kenya, Tanzania and Uganda. Since creation of a government website is considered the first stage toward full implementation of e-Government services, it is possible to determine the latter by analysing the status of the former. In determining the status, the study uses website visibility test and usability attributes in connection with the e-Government growth model.

2. Background

2.1 Which services?

There are various services that different governments are using to reach their users electronically depending on the level or stage of e-Government development and the users' needs. However, the basic service is dissemination of information about structures and functions of particular government agencies. Mutula (2001) elaborates this to include local political information, unit lists, official reports and speeches, tenders and draft bills. Silcock (2001) reports findings of a survey on user needs of e-Government services in the UK to include “National Health Service hospitals (non-emergencies), social services, doctor’s surgeries, local councils and the Passport Agency public services”. (p. 92).

Silcock further notes that one of the major potential areas of e-Government services is that it can facilitate democratic activities (‘e-democracy’) such as online voting, campaigning and fund raising, voter registration, opinion polling, representative-voter communication and public feedback. In connection to that, Netchaeva (2002) notes that Singapore developed a government portal, ‘e-Citizen’, to maximize use of e-Government to enhance people’s participation in democracy. Accordingly, this also led this country to be the first nation in the world to conduct population census online. In addition, Netchaeva reports that in many other countries, including the United States, studies have shown that people would like e-Government services to help with: renewing driver’s license, filing government tax, filing complaints, ordering government publications, searching reservations and parking information. Mutula (2002) suggests that in Africa people might be interested in information related to health, agriculture, small businesses, job opportunities, sources of credit and education destinations, among others.

2.2 Potential benefits associated with e-Government implementation

Several benefits are presumed to be associated with e-Government services which basically translate to provision of direct services to users instead of/for in addition to traditional flow of paper work between the government and its citizens (Ho 2002, Netchaeva 2002, Silcock 2001, Whitson and Davis 2001, UN 2002, UN 2001). The benefits include savings in terms of money and time. A fully-fledged e-Government service is expected to provide users with ‘one-stop shopping’ (Ho 2002, Fagan and Fagan 2001) to access and transact the information they need via a government website that is tailored to provide information irrespective of the various functional units of that particular government agency. This saves time for both parties involved, (i.e. the government and the users). Whitson and Davis (2001), enumerate costs and benefits associated with implementation of e-Government services by the Department of Energy’s (DOE) Office of Scientific and Technological information (OSTI):

Costs of transitioning to an e-Government were also absorbed by redirecting resources to focus on the new way of doing business. OSTI’s appropriations budget
to support DOE’s scientific and technical information activities was $15M in 1995. In FY-2000, OSTI’s budget was $8.6M, fully allocated to the development, maintenance, and administration of collaborative ventures, networks, systems, and tools that support the collection, organization, and delivery of useful and useable electronic information. Data from 1995 indicates that 808,500 customer transactions were served as the transition to electronic dissemination was underway. With an investment of $15 million, the cost per customer transaction was $18.55. In 2000, 3.4 million customer transactions were accommodated electronically at a cost of 8.6 million, for a cost per customer transaction of $2.59...” (p.87).

Whitson and Davis also argue that successful implementation of e-Government services affects the way the government agencies measure their transaction with users. They do so by focusing users as key to the transaction process. The main issue here is that e-Government services are affecting how the public sector provides services to the public by shifting from system-oriented to user-oriented focus.

Improvement of government accountability is another benefit that many observers have associated with e-Government services (Netchaeva 2002, Silcock 2001, Whitson and Davis 2001, etc). This is basically related to the above-mentioned benefits of cost-saving since the government uses less taxpayer money to provide more services that give results within a shorter period of time than did traditional processes. Certainly, these benefits can apply to different government environments and this study explores whether the emerging e-Government services in East Africa bear indications of benefiting the intended users via one-stop ‘shopping’.

Many observers have also noted a trend toward more partnership among governments, users and the private sector agencies because of implementing e-Government services (Allen et al. 2001, Ho 2002, Holliday 2002, La Porte et al. 2002, UN 2001). This partnership has led to the emergence of internal and external networks that are beneficial to all parties involved. The private sector is exerting pressure on the government agencies to improve efficiency while the governments are creating a spillover effect (acting as role models) to small businesses to improve efficiency by adopting e-commerce strategies.

2.3 Implementation strategies and associated challenges

One of key prerequisites for implementing e-Government services is to have the necessary infrastructure in place, such as include computer hardware and software, together with reliable telecommunications services for connectivity. To ensure users' easy access to government information online, availability of the infrastructure should be coupled with availability of human resources with necessary skills to collect and organize information. All these require political will and adequate commitments from top government officials for successful e-Government implementation². That brings us to barriers and challenges of e-Government implementation that need to be addressed if governments are to realize the potential of e-Government services. One of the fundamental issues associated with barriers is the question of access to e-Government services, that is the whole concept of digital divide: the gap between those with full access to electronic information and those without it due to such factors as socio-economic conditions, language barriers, physical situations, age, education, and so on (see Hargittai 2002, Holderness 1998, Miller 2001, Netchaeva 2002, Nanthikesan 2001, ² Silcock (2001) underlines the importance of these elements operating together: “Even though most of the excitement centres upon the Internet, governments must be aware that e-Government affects every aspect of how organisation delivers service to the public. It is not just business processes; it is not just human resources. It is all these areas combined. At the centre of it all is the customer. How well governments grasp the integration of all the components will largely determine how much value e-Government can bring to citizens and to governments themselves. Governments will need committed leadership...and a clear strategy for overcoming the barriers to change...” (p.88).
These are the real challenges to governments because establishment of e-Government services is one issue but access to those services by the intended citizens is another issue altogether, and the former can be easier than the latter.

Such barriers tend to be more pronounced in developing countries, especially Africa (Adam 1996, ECA 2003, Mutula 2002, Mutula and Ahmad 2000, UN 2002, UN 2001). In reviewing the contribution of Africa to the global Internet content, Mutula (2002) itemizes the following problems that face African countries in creating and accessing such content: Disparity in infrastructure development between urban and rural areas (the former being favoured) and associated poor power and telephone supplies; English dominated content which is only understood by a minority elite; generally low literacy levels of the population and uncoordinated e-Government activities. All these exacerbate the digital divide problem both nationally and internationally. In East Africa, for instance, out of a total population of about 91 million, only about 1 million people have access to the Internet (see Table 1). Likewise, the number of telephone lines per 100 people (teledensity) shown in Table 1 signifies the magnitude of existing digital divide. This implies that the people with telephone lines represent 1%, 0.5% and 0.3% of the population in Kenya, Tanzania and Uganda respectively. Moreover, these services are concentrated in urban areas; for example, Kenya has the teledensity of 0.16 in rural areas and four in urban area while in Tanzania 50% of telephone lines in the country are in the capital city where less than 3% of the population lives. There is, however, some hope and corresponding potential for the Internet access from the mobile phone services whose teledensity – though showing similar bleak trend of the digital divide – is about twice as much as that of the fixed phones in East Africa.

It is thus widely accepted that implementation of e-Government services should go hand in hand with strategies to narrow the digital divide. According to Silcock, “One of the fundamental differences between e-Government and e-business is that whereas business can, by and large, choose their customers, government cannot. For e-Government to succeed fully, the dream of Internet access for all has to become a reality” (p.94). Discussion on strategies to narrow the digital divide is beyond the scope of this study but several other authors have addressed them (e.g. Fagan and Fagan 2001, Holderness 1998, Mansell and Wehn 1998, Miller 2001, Nanthikesan 2001, Sagasti 2001).

The issue of political will is also important here because it reflects the government’s willingness to embrace e-Government services, and commit financial, human and physical resources to establish and maintain the websites; all of these will reflect the quality of government’s websites. In essence, the present content analysis study can also be considered as a website quality assessment. Allen et al (2001) note that governments should create suitable environments for e-Government services: “The rise of e-Government refers to the new patterns of decision-making, power sharing and coordination – made possible, or even necessary by the advent of IT” (p.94). They caution that implementation of e-Government services might face internal resistance from government leaders who would not like the organizational change from vertical to horizontal coordination characterized by new partnerships of sharing of government information delivery services.

### 2.4 Stages of e-Government Implementation

Various authors have described four to six stages of e-Government implementation (Layne and Lee 2001, Netchaeva 2002, Silcock 2001, UN 2002, UN 2001) but all of them show the development of e-Government services as an evolutionary process. For example, Silcock (2001) describes six stages which she characterises as dynamic; these include: information publishing/dissemination; official two-way transaction; multi-purpose portals; portal personalisation; clustering of common services; and full integration and enterprise transformation. Netchaeva (2002) describes more or less similar stages without giving them specific terms but she condenses them to five stages.

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3 See http://www.africaone.com/English/about/fact_sheet_indicators.cfm & http://www.ifla.org
whereas the UN (2002) categorizes five stages as emerging; enhanced; interactive; transactional; and seamless (fully integrated). Layne and Lee (2001) propose a four-stage growth model for e-Government development: cataloguing; transaction; vertical integration; and horizontal integration.

The above models can be summarized into four main stages, starting from simple to sophisticated and interactive websites:

### 2.4.1 Website creation

This involves setting up of websites to provide information about structure, functions and services of a government agency information publishing and dissemination). At this stage, there might be links to related websites.

### 2.4.2 Initial two-way interaction

At this stage, the website also includes downloadable forms that can be submitted offline and there can be a two-way interaction between government officials and users via e-mail.

### 2.4.3 Online transactions

At this stage, the website supports some formal online transactions; these can be payments or creating and submitting information such as renewing driving license and filing tax returns.

### 2.4.4 Comprehensive government portals

This stage exhibits availability of comprehensive government portals that can provide a wide range of information to users and supports one-stop transactions without the need for dealing directly with different agencies. The sophistication of the web design includes improved gateway points coupled with security/privacy/confidentiality features.

The present study helps to ascertain which stage(s) the three East African countries fall into in implementing e-Government services.

### 2.5 Assessing implementation status

The concept and implementation of e-Government services have become a recent addition to numerous challenges facing researchers in this area. Specifically, a number of scholars have conducted studies to assess implementation status, the quality of e-Government services, and to some extent the impact of e-Government implementation (Ho 2002, Holliday 2002, Kaylor et al 2001, Salem 2003, UN 2002, Whitson and Davis). For instance, the ‘cost-benefit’ assessment of DOE’s e-Government services has already been mentioned (Whitson and Davis 2001). Some of the studies have involved content analysis of government websites or a combination of methods to determine the quality and stages of e-Government implementation (Ho 2001, Holliday 2002).

The United Nations’ Division for Public Economics and Public Administration has developed the E-Government Index which is an indicator of the progress the UN member countries have made in implementing e-Government services. To come up with E-Government Index, several parameters and factors are taken into consideration. These include web presence measure (indicating stages of government websites), telecommunication infrastructure measures which define the capacity of a country’s ICTs (indicators are internet hosts per 10,000 people, percentage of a nation’s population online, and PCs-, telephone lines-, mobile phones-, and televisions per 100 people); human capital measure (using the UNDP Human Development Index, the Information Access Index, and urban/rural population ratio as indicators). According to 2001 survey results (UN 2002), Kenya, Tanzania and Uganda scored the E-Government indexes of 0.90, 0.84 and 0.42 respectively. These are considered to have deficient e-Government capacity but are classified as having enhanced web presence (equivalent to stage 2.4.3 above). Top e-Government-environment countries globally are USA, Australia, New Zealand and Singapore with E-Government indexes of 3.11, 2.60, 2.59 and 2.58 respectively. These are classified to have transactional web presence (equivalent to stage 2.4.4. above). The global average E-Government index is 1.62.

La Porte and colleagues (2002) have endeavored to measure the concept of organizational openness as a result of implementing e-Government services.
doing so, they conducted a cross-national comparison of websites using the Website Attribute Evaluation System (WAES), with such attributes as ownership, contact information, organizational or operational information, freshness and interactivity. Likewise, Holliday (2002) conducted a study to evaluate e-Government implementation progress of 16 states of East and Southeast Asia. He analyzed government homepages and sites by measuring their visibility and utility. Ho (2002) supplemented a survey study with a content analysis of city websites in the United States to determine whether the cities were indeed reinventing their local governments. Kaylor et al (2001) used 'e-scores' to benchmark implementation of e-Government services among various cities in the United States.

The present study adapts and integrates some of parameters used by these researchers to assess the status of government websites of East African countries; this helps to determine the stage of e-Government implementation of these countries based on the above four-stage model.

3. Study area

This study covered government websites of three East African countries, namely Kenya, Tanzania and Uganda. Geographically, these countries are located in eastern Africa and share common borders and Lake Victoria. They also border Ethiopia and Sudan to the north; Congo DP, Burundi and Rwanda to the west; Zambia, Malawi and Mozambique to the south; and Somalia and the Indian Ocean to the east. As well as their common borders, these three countries share common historical and cultural characteristics; and they have established a regional body, the East African Community (EAC), to facilitate their integration. Okello (1999) summarises the common characteristics:

Given East Africa’s common history (the three countries were colonized and got independence about the same time); common cultural practices; the existence of widely spoken languages (English and Kiswahili); the close economic interdependence (consisting of infrastructural linkages and intense trade); the political and social foundations for integration are strongly present (p. 3).


Some basic physical, social and economic characteristics of these countries are shown in Table 1.

Table 1: Basic characteristics of East African countries

<table>
<thead>
<tr>
<th></th>
<th>Kenya</th>
<th>Tanzania</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (sq. km[miles])</td>
<td>582,646[224,961]</td>
<td>945,087[364,900]</td>
<td>236,040[91,136]</td>
</tr>
<tr>
<td>Population</td>
<td>31,138,735 (02 est.)</td>
<td>34,569,232 (02 Census)</td>
<td>24,748,977 (02 Census)</td>
</tr>
<tr>
<td>Independence year</td>
<td>1963</td>
<td>1961</td>
<td>1962</td>
</tr>
<tr>
<td>Languages</td>
<td>National: Swahili</td>
<td>Swahili</td>
<td>English</td>
</tr>
<tr>
<td></td>
<td>Official: English</td>
<td>Swahili &amp; English</td>
<td>English</td>
</tr>
<tr>
<td>% GDP contrib. by sector (02 est.)</td>
<td>Agric 24%</td>
<td>48%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>Industry 13%</td>
<td>17%</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Service 63%</td>
<td>35%</td>
<td>36%</td>
</tr>
<tr>
<td>GDP growth rate (2001 est.)</td>
<td>1%</td>
<td>5%</td>
<td>5.1%</td>
</tr>
<tr>
<td>GDP per capita (US$)</td>
<td>1,000</td>
<td>610</td>
<td>1200</td>
</tr>
<tr>
<td>Literacy rate (2001 est.)</td>
<td>83.3%</td>
<td>76%</td>
<td>68%</td>
</tr>
<tr>
<td>Life expectancy at birth yrs</td>
<td>45.22</td>
<td>44.56</td>
<td>44.88</td>
</tr>
<tr>
<td>Human dev. Index</td>
<td>0.489</td>
<td>0.400</td>
<td>0.489</td>
</tr>
<tr>
<td>E-govt Index</td>
<td>0.90</td>
<td>0.84</td>
<td>0.42</td>
</tr>
</tbody>
</table>
4. Analysis of websites

Analysis of government websites was conducted between May 10 and May 31, 2003. The study focused on the websites of central governments only; that is the government ministries headed by cabinet ministers and their direct agencies, bodies or departments, as well foreign missions of these countries (all these hereafter referred to as government agencies); as such, local government units are not included\(^4\). First, it was necessary to establish whether government websites of the three countries exist. This was done by assessing their visibility (important initial indicator of e-Government implementation) and then conducting the content analysis to assess their status in terms of their level of development (stage) using usability attributes. I consider usability as a website’s quality or the ease with which the users can use it.

Hence, the study assessed each of the identified websites by employing a combination of selected attributes from WAES (adapted from La Porte et al (2002) and utility indicators (adapted from Holliday (2002). Additionally, dates of establishment of the websites were recorded together with languages used other than English; the latter attribute was categorised as a utility indicator. All the selected attributes, together with the names of government agencies and their website addresses, were recorded and compiled in tabular forms and the results were drawn by simple descriptive statistics. The attributes are described below as well as the results and implications:

<table>
<thead>
<tr>
<th>Internet users (2002 est.)</th>
<th>Kenya</th>
<th>Tanzania</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500,000</td>
<td>300,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Teledensity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed lines</td>
<td>1.03</td>
<td>0.46</td>
<td>0.26</td>
</tr>
<tr>
<td>Mobile</td>
<td>1.90</td>
<td>1.30</td>
<td>1.20</td>
</tr>
</tbody>
</table>


4.1 Website visibility

Using Holliday’s (2002) approach to assess the visibility of the website, the Internet was searched using three of powerful search engines - Google, MSN and Yahoo! - by typing separately ‘Kenya Government’, ‘Tanzania Government’ and ‘Uganda Government’. It was expected that early appearance of a government website, that is if it appeared within first 10 hits of the results, would confirm its visibility. Moreover, subsequent hits were taken note of for further observations if need be.

Table 2 shows the results of the website visibility test which range from 27% to 40%. The average for three countries is 32%. These results fall more or less within the same range that Holliday found in East and Southeastern Asian countries and considered them as under performers in terms of visibility. However, these results led the study researcher to official national websites that provided links to most of other websites. For example, the visibility of Kenyan websites using MSN search engine was only 10% but the only hit was the national official website that provided links to most of the ministries’ websites. In information retrieval terms, this particular outcome had a high precision.

Table 2: Appearance (%) of government websites of East African countries in 1-10 hits of three search engines

<table>
<thead>
<tr>
<th></th>
<th>Kenya</th>
<th>Tanzania</th>
<th>Uganda</th>
<th>EA Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google</td>
<td>30</td>
<td>20</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>MSN</td>
<td>10</td>
<td>70</td>
<td>20</td>
<td>33</td>
</tr>
<tr>
<td>Yahoo!</td>
<td>40</td>
<td>30</td>
<td>40</td>
<td>37</td>
</tr>
<tr>
<td>Average</td>
<td>27</td>
<td>40</td>
<td>30</td>
<td>32</td>
</tr>
</tbody>
</table>

There are also notable extreme results of web visibility between countries within the same search engines; for instance, the MSN gave 10% for Kenya and 70% for Tanzania. It seems the Tanzania’s websites are configured to be visible although the results were not as attractive with Google. This might be a subject of further debate and study.

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\(^4\) Although local government agencies provide such services as business licenses in their localities, major services that can be provided online such as issuance of passports and visa are provided by central government agencies in East Africa.
Further searching and analysis led to identification of 98 government websites including 33 for Kenya, 37 for Tanzania and 28 for Uganda. Each country has an official national website\(^5\) that provides comprehensive government information to a wide audience together with links to its ministries that have websites and full addresses to those with or without websites. One can argue that these websites have indications of becoming one-stop shopping gateways for government information delivery and access (e.g. the Tanzanian national website has links to government tender documents that can be downloaded by prospective bidders).

Nineteen Kenyan ministries out of 20 (95\%) have websites while 20 of 21 (95\%) Tanzanian ministries, and 14 out of 16 (88\%) Ugandan ministries have websites; this also implies a promising trend of e-Government presence in these countries. However, this trend does not correspond to these countries’ embassies abroad. Out of 39 Kenyan embassies identified only five (13\%) have websites. Likewise, out of 28 Tanzanian embassies identified, only seven (25\%) have websites, whereas five (24\%) out of 21 identified Ugandan embassies have websites. This is also an interesting trend which signifies that the embassies and their governments at home have either different or no policies in relation to implementation of e-Government services. This will be further explored in a subsequent study. It was also necessary to conduct further searches to identify more embassy websites (of 17 embassy websites identified, only 8 were linked to relevant government websites back home). In that case, the Internet sources such as ‘Governments on the www’\(^6\) were useful tools in assisting the study researcher to trace ‘invisible’ websites.

4.2 Website Establishment Date

The establishment date is an important parameter of a website as it helps us derive the extent of learning experience of the website owners (Ho 2002). As the website owners gain more experience in maintaining the website, they tend to incorporate more information for the users and the websites become more and more sophisticated and interactive (higher stages of development) with corresponding e-Government services. Moreover, capturing establishment dates will give us a pattern of growth in implementing e-Government services over time. Most websites give this date with the copyright information. For the present study, where this information was not available or it was not clear, the information was searched from the Internet Archives’ ‘Wayback Machine’ (See http://web.archive.org/).\(^7\)

The numbers of new websites and corresponding years of establishment are shown in Table 3. It is clear from the table that there is a general increase in the number of websites from the first year of their establishment, that is, from three websites in 1998 (all of them from embassies) to 31 websites in 2001 and 28 websites in 2003. However, there was also a sharp decline in the number of new government websites in East Africa, from 31 in 2001 to 7 in 2002. This might be due to a consolidation period after a massive establishment of the government websites in 2000-2001 (new millennium) when a total of 50 websites were established, especially in Tanzania and Uganda (only 2 were established in Kenya during that period).

A sharp increase from seven new websites in 2002 to 28 (24 of them from Kenya) in 2003 might be due to recent government leadership changes in Kenya. This will further be examined in a subsequent study by this author. It is also interesting to note that when the UN (2002) assessed the current e-Government indexes in 2001 (see also Table 1), Kenya had four government websites while Tanzania and Uganda had 28 and 24 government websites respectively. This implies that the UN measures the potential rather than real e-Government presence, owing to Kenya’s relatively well-established telecommunication system, higher literacy, with corresponding human development index (see Table 1). However, a study by McConnell International (See McConnell International’s summary report on e-readiness at


\(^6\) See http://www.gksoft.com/govt/.

\(^7\) I would like to thank Christine Borgman for drawing my attention to this important tool.
Janet Kaaya

http://www1.worldbank.org/publicsector/egov/docktor_mcconell.pdf) to assess ‘e-readiness’ of 53 countries worldwide places the assessed countries into four categories from low e-readiness in the first inner tier to high e-readiness in the forth-outter tier. Kenya is placed in the first tier, Tanzania in the third tier, while Uganda was not included in that assessment. Various assessment methodologies and criteria can thus produce different results. The results further show that there is still a very low rate of establishing new websites by missions representing the East African countries abroad. This will also be examined further in a subsequent survey.

Table 3: Number of government websites of East African countries established each year from 1998 to 2003

<table>
<thead>
<tr>
<th>Website Establ. Year</th>
<th>Kenya</th>
<th>Tanzania</th>
<th>Uganda</th>
<th>East Africa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Emb</td>
<td>Min</td>
<td>Emb</td>
<td>Min</td>
</tr>
<tr>
<td>1998</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1999</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>2001</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>2002</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2003</td>
<td>24</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Not avail.</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
</tbody>
</table>

(Min = Government ministry or department; Emb= Embassy; Not avail. =establishment date not available)

4.3 Website ownership

It is important to take note of the website’s owner as it reflects the seriousness with which the government agency takes in implementing e-Government services. La Porte et al. (2002) note:

*The aim is to ascertain if the agency itself is tailoring the material for the site or has shunted these content decisions to someone else...Agencies that own their own Web operations are more likely to consider it a key part of their organizations compared with those that leave the development of their Web site to others*.

(p.415)

The ownership data was captured from the copyright information given on the homepages of the websites. These were matched with the names of the government agencies under observation.

Results of the analysis show that the respective government agencies own the majority of websites. However, the ownership of 10 websites (1 Kenya, 9 Uganda) was not established from content analysis, while seven websites (2 Tanzania and 5 Ugandan) were designed and maintained by private companies. The study researcher also noted that several embassies representing their countries in Japan, including the Kenyan and Tanzanian embassies and even some few developed countries have subverted their websites to a company called KCOM Corporation under the Embassy Avenue8 program.

Although this study did not establish the terms and conditions attached to this program, it generally shows embassies are surrendering control of their websites to this body.

4.4 Website freshness

Like ownership, assessment of the website’s freshness gives a general picture of how serious a government agency considers e-Government services by committing necessary resources for costly updating of the website (La Porte et al. 2002). In this study, the date of last update of each website was captured from both the website and the Internet Archives. The websites that were updated more than 12 months ago were considered to contain outdated information and are thus slow in achieving full e-Government service delivery and access.

The results show that the majority of the websites were established between 2000 and 2003; as such, they seem to be pretty fresh. However, others have not been

8 See http://www.embassy-avenue.jp/index-e.htm
updated since their establishment. Thus, if we set aside 35 websites that were established in 2002/3 (27 Kenya, 6 Tanzania and 2 Uganda), 22 websites (2 Kenya, 15 Tanzania, 5 Uganda) have not been updated since 2001. For Tanzania, the figure represents nearly 40% of the websites and this signifies poor performance in delivering e-Government services especially at this initial stage of implementation. Overall, however, the freshness of the East African government websites is an encouraging step towards full e-Government implementation.

4.5 Website usability

4.5.1 Important links

A website providing links to relevant bodies within and outside the government system is considered user-friendly since the user just clicks to that link to access needed information instead of conducting a new search. The more user-friendly and usable the government website the more the country it represents is heading towards full implementation of e-Government services (Fagan and Fagan 2001, Silcock 2001). Thus, in this study, after recording the appearance of the website the study researcher took note of the links to other relevant government websites and sources of information.

All of the websites have important links ranging from the official national websites to the multiplicity of links to various government and international institutions. The national official websites were particularly instrumental in providing links to government agencies that constitute the majority of the websites analyzed. They also provided links or contact information for their embassies abroad. However, as noted under Item 4.1 above, only eight of 17 embassies representing the East African countries had their websites linked to their home country government websites. These were only identified after further searching.

4.5.2 Contact information

Contact information is an important attribute of a website important because it enables users to contact relevant officials in relation to that website’s content or any other queries. The information captured includes contact email address to the webmasters and, more importantly, names and full addresses (postal, telephone, fax, e-mail) of relevant government officials.

With the exception of 7 websites (3 Kenya, 4 Tanzania) with unclear or no contact information, the majority of the websites analyzed have some form of contact information including postal address, phone and fax numbers, e-mail addresses, as well as names of senior officials. However, during the study period, only six websites (3 Tanzania, 3 Uganda) had clickable e-mail addresses to their webmasters. This implies lack of permanent staff for day-to-day maintenance of the websites. It could also mean that they just do not want to deal with a lot of e-mail.

4.5.3 Interactivity

Website interactivity signifies the level of two-way communication between a government agency and users. Interactivity attributes captured from websites under analysis include hot-linking addresses for easy contact; provision for user searching, downloadable materials or forms; and feedback e.g. feedback forms or provision for electronic submission of downloadable material. Government websites with these attributes indicate a country is heading towards full implementation of e-Government services and is evolving into advanced stages of e-Government development (see items 2.4 and 2.5 above).

The results of analysis show varying levels of interactivity among the identified websites and among the three countries (Table 4). Generally, Tanzanian and Ugandan websites have outperformed Kenyan websites in interactivity with their users. This is probably because most of the Kenyan websites were just established in 2003 while the Tanzanian and Ugandan ones have undergone a longer period of ‘learning curve experience’ (Ho 2002). Ugandan websites have especially attractive user interactivity features like clickable hotlinks “ask the president”, “ask us”, provision for user searching, feedback forms and FAQs. All these features are crucial means of communication between governments and their users and they imply a promising e-Government presence (Fagan and Fagan 2001, La Porte et al 2002, UN 2002).
Downloadable materials observed in the study that were at the users’ disposal include: forms for visa, passport and license applications; tender bidding documents; various government publications; forms for student and nationals registration abroad; and so on. These are basic e-Government services that these countries offer in addition to general dissemination of information about government agencies that own the websites. However, these forms are to be submitted off-line with the exception of one website (the Tanzanian Embassy in Bonn) which has a provision for online submission of student registration form. These features correspond with stage two of e-Government growth model.

Table 4: Number of government websites in East Africa that exhibit user interactivity features

<table>
<thead>
<tr>
<th>Interactivity feature</th>
<th>Kenya</th>
<th>Tanzania</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot-linking contact</td>
<td>7</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>User searching features</td>
<td>0</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Downloadable forms/materials</td>
<td>4</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Feedback features</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Online submission of downloadable forms/materials</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>45</td>
<td>50</td>
</tr>
</tbody>
</table>

4.5.4 Language(s) used

The question that especially interested the study researcher is: “does the language used represent the languages used in the websites represent the languages understood by the population that the website intends to address?” Mutula (2002) observes that the general insignificance of the contribution by African countries to online content is the use of the language that represents only the minority of the population. For East African countries, English is an official language in government and commercial transactions. However, it is only spoken and read by about 3-9% of the population (Crystal 1995). Swahili is a national language in Kenya and Tanzania (it is also an official language along with English in Tanzania) and is somewhat spoken and read in Uganda. Baganda is another major language in Uganda spoken by 16% of the population. The website analysis checked whether the website contents of these governments contain languages read (since the Internet is also textural) other than English. This will signify governments’ intentions of reaching most users through the Internet.

From the results, almost the whole content of the East African websites is in English. Only the national website of Tanzania has a Swahili version and the users can choose between the two languages. Likewise, the non-English-speaking missions abroad have their websites in English and the languages of host countries (i.e. Chinese, French, German, Italian and Japanese). Two Ugandan websites have their contents solely in German. One Kenyan website provides a link to one website with the Swahili instructional materials. Eight Tanzanian websites have links to various publications and speeches in Swahili and one in Uganda has publications in tribal languages. This seems to be a good start. However, it is generally hard to draw concrete conclusion and implications relating to the language issue before we take stock of the users and problems of digital divide. Nevertheless, we know that the first potential users of e-Government services are current Internet users (Silcock 2001). In East Africa, these represent a very small fraction of the populations of these countries (see Table 1). Thus the question is: is the language of the website content going to alter this fraction of the users?

4.6 Other information

A look at the contents of the websites analysed revealed they basically focus on describing the mission, functions, structures and leaders of government agencies. They are also geared towards promoting these countries to foreign investors and tourists.

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9 According to Mutula, “The continent’s proportion of web content was estimated in 2001 to be 0.04% of the global web content. … This situation is exacerbated by the fact that Africa’s content on the web is largely in the English language, which is spoken by mostly the educated elite. The lack of local content in a widely spoken and understood language reduces the demand for Internet use in Africa” (p. 35).

10 See also SIL International. Ethnologue: languages of the world [http://www.ethnologue.com/web.asp].
4.7 A note on statistical analysis

An attempt to subject the data to tests of statistical significance could not yield satisfactorily meaningful results because most of the tables - even after collapsing the data - had cells of expected counts of less than five. Therefore, the preceding interpretation of results is based on descriptive statistics and raw observations (tables 2-4).

5. Conclusions and future research

This study has sought to examine the status of e-Government services in East Africa through content analysis of government websites. Specifically, the study has conducted visibility and usability tests of these websites and analyzed their establishment dates and other parameters. The attributes used to assess the websites include: visibility, establishment date ownership and freshness (up-to-datedness). Usability attributes include important links, contact information, interactivity and languages used. Interactivity attributes are extremely useful in determining the migration of a country towards e-Government implementation and have a bearing on assessing the country’s stage in e-Government service development. These include features for hot-linking to enhance easy contacts to the government, user searching, downloadable material, general feedback and FAQs.

The study has identified a total of 98 government websites\(^{11}\) in East Africa and there is a general trend of increase in the number and improvement of the websites judging from the analyzed attributes. For instance, each country has an official national website that provides comprehensive government information to a wide audience together with links to its ministries and other sources of information (this feature tended to offset their relatively low visibility of 27-40%). The national official websites bear necessary indications of becoming one-stop shopping gateways for government information delivery and access. Furthermore, almost all government ministries (95% Kenya and Tanzania, and 88% Uganda) have websites owned by government departments; this also signifies a promising trend of e-Government presence in these countries (most of them were established in 2000-2003). However, this trend is not reflected in these countries’ missions and embassies abroad and there is a need to improve coordination between the two sides.

Taking into account all the attributes assessed we can conclude that the three countries’ websites are generally in the second stage of the e-Government development model. This corresponds well with the UN’s assessment of these countries as having ‘enhanced’ web presence for e-Government services (UN 2002). However, in considering the interactivity attributes alone in this study, the Kenyan websites gave the lowest score of 17 while Tanzania scored 45 and Uganda 52. Despite this observation, Kenya scored the highest on the e-Government index by the UN due to this country’s relatively well-developed telecommunications infrastructure and stronger human resource capital in comparison with Tanzania and Uganda.

On the language question, and from the results, almost the entire content of East African websites is in English. However, it is generally hard to draw concrete conclusions and implications relating to this issue before the e-Government user study is conducted in these countries. However, one thing is certain: the future of successful implementation of e-Government services in East Africa and other countries is linked to the intended users’ universal access to the Internet.

This study bears both practical and theoretical implications relating to implementation of e-Government services in East Africa and other regions. Other researchers can easily use the attributes used to assess the websites in this study for similar studies. As such, this study contributes toward a more standardized methodology of assessing government websites and thus avoiding conflicting conclusions. Additionally, these attributes can serve as indicators for governments to strive toward advanced stages of e-Government implementation.

The study has also shed light on potential topics of future studies in this and other regions: Firstly, the need to study user

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\(^{11}\) A full list of assessed websites is available on request.
composition of e-Government services and the types of e-Government services they require. This will also address the issue of language. Secondly, there is a need to study insights of policies that govern implementation of e-Government services. The issue specific to this region is why the foreign missions of these three countries were the first adopters of e-Government services while they are now lagging behind home government agencies. In addition, the reason why, on the overall, Tanzania and Uganda started implementation relatively earlier than Kenya while the latter has relatively better-developed infrastructure and human resources than the former two. Thirdly, there is a need for conducting more visibility studies to compare various search engines and more countries. Finally, there is a need to extend this study to cover more countries and regions and to give a deeper analysis of the attributes considered in this study.

6. Acknowledgments

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MIDEM. Models for Interactive Decision Making

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Abstract: This article is a broad reflection on e-Democracy models used in several countries throughout the last 20 years. It is based on hands-on experience gained through experiments and projects with local authorities conducted since the days of videotex. In essence, ICT can be utilised to radically transform the shape of political decision making into a citizen-oriented vision. The realisation of this vision must involve the participation of people and continuous deliberation between citizens and political decision makers. Although e-Democracy is considered a way for creating genuine dialogue between interest groups in a society in the future, the technology needs motivated communities to ensure self-governance is developed. If used properly ICT will transform our understanding of political action.

Keywords: e-Democracy, decision making, ICT, deliberative poll, televote, electronic town meeting, funnel model, citizen jury, referendum

1. Introduction

New opportunities for democracy have been created by the contemporary societal transformation period, often called the post-modern information society. (Keskinen 1999). The rapid diffusion and introduction of new information and communications technologies (ICT) are increasingly providing many communities, primarily Western but also many others, with new tools and methods that aid them in evolving old-fashioned representative, thin democracies into participatory and deliberative, strong democracies (Held 1987, Rättilä 1999) The vision of this development emphasises the empowerment of all members of a community to more directly govern their own lives as independent planners and decision makers. This would mean changing today's democratic paradigm into a more open paradigm that promotes a plurality of values, needs, methods and procedures. (Keskinen et al. 2001, Rubin 2000).

The potential of ICT means whole new sets of concepts and practical solutions to be innovated when working with R&D on new democratic praxis in the knowledge era. (OECD 2000, Keskinen 2001). It is not sufficient to try to use ICT as a voting tool without first ensuring universal access to data, information and Knowledge bringing relevant data, information and knowledge to people in order for them to build their knowledge and secondly, empower citizens to become independent decision making collaborators. This interactive decision making approach calls for new models that will complement, evolve and reform the current representative democracy to better suit the modern needs of rapidly moving and changing societies. (Becker 1995, Keskinen 1997, Becker & Slaton 1997).

2. The basic assumptions of e-Democracy research

The basic assumptions of e-Democracy research are: i) employ ICT to aid decision making can contribute to better decision making procedures, ii) transformational politics can be pursued (Woolpert & Slaton 1998) that aim at changing existing power structures through empowering citizens, and iii) the representative model is still valid and other models are complementary to it. (EVE 2001). This does not mean that the present representative model should stay unchanged, rather, different models have their proper uses for different purposes during decision making processes. This calls for a conscious process of integrating new, participatory and deliberative models (Slaton 1992, Knight & Johnson 1994) with the representative one in new innovative ways. (Becker & Slaton 1981, TANN 1995 and 2000).

The sectors in which the multi-stakeholder societal decision making processes have the greatest benefits of e-Democracy are described in Figure 1. The use of ICT will help in the three levels: Decision Making, Knowledge Flow and Knowledge Base. In Decision Making, the processes and the political dialogue can be enhanced to include much more stakeholders than before. The Knowledge Flow is important for the interaction and discourse for producing relevant and new knowledge.
and it greatly benefits of the global communications networks. The Knowledge Base could not be created, maintained and enhanced without using the information society tools. It is also important to ensure the universal access to new data, information and knowledge in order to employ new interactive decision making models. The Hyper Cycle contains the continuous feed-back process, that is needed between the three levels and their actors for enabling a genuine dialogue to be created between the societal actors participating in the decision making processes.

Figure 1: Sectors of e-Democracy

3. Objectives
Democracy is not a steady state phenomenon, it is a dynamic process. (Keskinen 1997). Many researchers have recently pointed out that the old deterministic approach to democracy based on the Newtonian philosophy of objective truth is in doubt. A new dynamic approach based on probability, uncertainty, chaos and the quantum theory is being developed by and tested in many Western countries. As Ted Becker & Christa Slaton (2000) argue, a transformational politics paradigm is needed, which involves applying such concepts as chaos, randomness, probability and change. Classic and Newtonian systems were based on ideas of hierarchy and dominance. The new paradigm shift asks how we can empower citizens and enhance their understanding and realisation of democracy. (Becker 1995, Keskinen 2001) Methods to this effect emphasise more lateral, equal and interactive relationships like mediation, the recognition of interdependencies, and networking. In fact, uncertainty, ignorance and misconceptions can somewhat contrariwise seen as productive processes for learning and finding new alternatives for society and its governance provided lessons from this type of interactions are learned. (Sotarauta 1996).

Thus, the objective of research and development calls for several approaches to be integrated, 1) political action development, 2) proper ICT software development for new interactive decision making processes, 3) proper ICT software for genuine dialogue, 4) opening and reforming decision-making processes in order to allow for innovative win-win based solutions to problems, and 5) a socio-cultural approach.

4. Methods and models
There are several methods of participatory, deliberative and direct approaches for interactive decision making where authorities, politicians and citizens have co-operated around a given issue. However, there is no general knowledge or recognition of a global model that would suit all situations. This is a matter to be considered seriously as it indicates that parallel to the increasing diversity of communities there will be a diversity of
decision making models that suit varying problem solving situations. Hence a new citizens-oriented model is proposed.

Certain methods have been extensively tested in the last 20 years. Examples of successful methods include: 1) A citizen’s jury which is assembled using statistical sampling techniques such as simple random sampling or allocated sampling. The process followed by the jury is a long term negotiation and preparation method for a dedicated decision making problem; this process has been used in Australia and New Zealand (Carson & Martin 1999, Carson et al. 2003), 2) A deliberative poll (TELEVOTE) that aims at gathering well argued alternative ideas that aim at defining solutions by using sampling techniques. However, the opinion poll on which the deliberative poll is based is formed from the opinions of several communities and is not an individual polling method (Slaton 1992), 3) The Electronic Town Meeting (ETM) model that has been successfully used in the US, Canada, New Zealand (Becker 1995). According to Becker and Slaton (1997), there is ample reason to expect that computer voting is near at hand and that citizens around the world will welcome this new method of citizen participation in the election processes for e.g. leaders and representatives, or for voting on referenda.

4.1 The scientific deliberative poll (TELEVOTE)

TELEVOTE is a "scientific, deliberative public opinion poll" (Becker 1981, Slaton 1992). Conventional public opinion polls are a part of the weakness of modern representative democracies. Rarely are they used to allow citizens to state preferences for political agendas or to set priorities. Questions are often superficial and alternatives are confined to a narrow range of choices determined by out-of-touch elites. And citizens who are civic-minded enough to respond are usually caught in the midst of their daily routines and are not thinking about the issue of the poll when they are asked to give their opinion on it.

The modern "deliberative poll" is clearly and rigorously structured to present a range of balanced information and expert opinion based on a scientifically objective format of randomly selected samples of the public. In addition, each citizen is treated with great respect, is given abundant time to think about all the data and opinions and furthermore is provided with opportunities to "deliberate" privately and publicly. The result is a far more in-depth, high-quality breed of "public opinion," one that earns the description of being "informed and deliberated". Some of these models use a face-to-face "jury" style procedure pioneered by The Jefferson Center in Minneapolis, Minnesota. Some use the telephone and have citizens deliberating in their homes (The Hawaii Televote model (Becker & Slaton 1981)). Some use large face-to-face groups, some use small groups. All have been eminently successful, particularly in the responses of the participants who almost unanimously applaud the new methods of polling as being "empowering".

4.2 Electronic Town Meetings (ETMs)

Over the past 15 years or so, there have been a number of authentic ETM experiments, whose purpose is to emulate and improve on the traditional New England Town Meeting (Becker & Slaton 1981). Thus, there must be discussion, deliberation among ordinary citizens and a vote that determines the outcome. In addition, there must be some use of electronic media to facilitate this process. Most of these experiments have tried to mix in several of the following components: interactive TV, interactive radio, scientific deliberative polling, telephone voting, plus a wide variety of face-to-face meetings including those facilitated by the use of electronic handsets. Some have focused on problem issues, some have involved planning or envisioning processes. Most have been at local, state or provincial levels. One of the most interesting ETMs - because it was to be binding for 5 members of Parliament - was conducted by the Reform Party of Canada in Calgary, Alberta. It used random samples from citizens in 5 parliamentary districts, who watched a televised debate on the important issue of "physician assisted suicide" (euthanasia), and then voted by phone. The ETM seems to promise an alternative way to set public agendas and priorities for various legislative bodies to follow as well as being an alternative method of putting referenda
before the public - a tool of direct empowerment. (Becker 1995).

### 4.3 Funnel model

The Funnel model is based on the multi-use of different decision making models (see the Figure 2.)

**Figure 2:** Funnel model

The Funnel Model includes direct democracy in the first phase when new ideas begin to form in a population. In the second phase a participatory model is chosen for finding arguments for alternatives that can be supported by actor groups. The third phase finds genuine dialogue between the parties concerned - experts, citizens, decision makers. For this phase several deliberative models are suitable. The final decision is made using an ordinary representative method. This model has been successfully tried by Youth Parliaments in several municipalities of Finland, and by the Maunula suburb of Helsinki since the mid 90's, see. Table 1 compares the successful models used e.g. in Finland (Keskinen 1997 and 1999), Australia (Carson & Martin 1999, Carson et al. 2003), Sweden (Ohlin 1998), Denmark (Schmidt 1993) and the USA (Becker & Slaton 1981, Becker 1981 and 1995, Slaton 1992).

The comparison shows some common factors of all the methods: they on the one hand aim to genuine dialogue, representativeness, deepening understanding of the complexity of the issues to be decided on and enhancement of the knowledge base and involvement of several new multi-stakeholders, and on the other hand, they specifically challenge the decision making processes and the time spent on preparing the arguments for good decisions. (About complexity, see Santa Fe Institute 2001, Keskinen & Aaltonen & Mitleton-Kelly (2003)).

**Table 1:** A Comparison of e-Democracy models (revised and complemented from Carson et al. 2003)

<table>
<thead>
<tr>
<th>Type of Method</th>
<th>Opinions Accessed</th>
<th>Weakness/Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens-oriented Model</td>
<td>Respondents are asked for well-argued and weighted opinions that have been formed by self-organising groups of people through direct and deliberative democratic dialogue processes. Funnel Model appropriate.</td>
<td>Model is time-consuming and in the beginning sensitive to those opinions that are voiced loudest. However, given enough time and varying combinations of group members, all voices will evidently be heard. Appeals to both self and common interests.</td>
</tr>
<tr>
<td>Type of Method</td>
<td>Opinions Accessed</td>
<td>Weakness/Strength</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>TelevoteETM</td>
<td>Explores what respondents think now, measured against what people think after they receive additional information (with encouragement to engage in discussion with family and friends).</td>
<td>If discussing only with like-minded people (or not discussing at all), respondents may become confused, anxious or entrenched in their views due to the unexpected complexity of an issue. Questions can only be answered if private research is undertaken. Self interest is tempered by conversation with others (if discussion occurs).</td>
</tr>
<tr>
<td>Multi-phase Referendum</td>
<td>What people think now, starting with agenda-setting, i.e. what issues will be processed and what are the options - several - and how the result will be treated. Opinion is expressed as a vote in several phases if decided so.</td>
<td>Several alternative responses are available, and respondents may be confused and anxious about the unexpected complexity of an issue in the absence of debate. Appeals to self interest, but gives the opportunity to converge after several rounds of votes. Time-consuming.</td>
</tr>
<tr>
<td>Citizens’ Jury</td>
<td>What people think after they have had access to full information, an opportunity to question specialists, and time to argue/discuss the merits of the case with their peers. Required to build consensus but not to reach it. The process is flexible to meet the group’s needs.</td>
<td>Allows for decisions (usually in the form of recommendations) that can take account of the complexity of the issue, minority opinions and new ideas. Diversity of opinions and independent, skilled facilitation. Time for deliberation means that any concerns can be allayed or confirmed. Appeals to common interest.</td>
</tr>
<tr>
<td>Funnel Model</td>
<td>What people think in several phases: 1) free forum for direct democracy, all tools and methods allowed, 2) alternatives selected for further work by participatory models, 3) dialogue in deliberative mode between decision makers and citizens, 4) decision making through representative methods</td>
<td>Wide array of opinions come together, long hyper-cycle type knowledge development process assures that all voices are heard and minorities stay minorities. Time for deliberation granted. Time-consuming. Appeals to common interest.</td>
</tr>
</tbody>
</table>

### 4.4 New Citizens-oriented Model

The most important approach to new democracy modelling is that different decision models can be used during different stages of the decision process. This means that all the models of citizenship are not mutually exclusive but that they play different roles during "the life cycle" of the process, and, furthermore, this should also be decided by the citizens. In a citizens'-oriented model citizens are considered to be decision makers with equal opportunities to reach representative decision makers. In this model the vital difference to all other models is that the citizens set the agenda, not the politicians, or rather - this process should be interactive and based on win-win strategies. (Henderson 1996). However, there has to be a procedure to coordinate this process and avoid the continuous need for voter input. In plain language, all citizens should be able take part in strategic decision making, whilst "conventional" decision makers take the role of executive decision makers. (OECD 2001).

### 4.5 Multiphase referendum as a tool of the citizens'-oriented model.

Almost all deliberative/participatory democracy models can be utilised in this model as tools for a chosen phase. A list of relevant and already used tools can be listed as follows: The internet, text messages, digital TV, local TV and radio, on-line debates, on-line polls, citizens jury, deliberative polls, drawing lot, e-voting, multiphase referendum. (Keskinen 1997,
OECD/PUMA 2000). It is also clear that the present state-of-the-art of interactive communications methods must be further developed for facilitating genuine dialogue amongst the parties concerned. As an example, a multiphase referendum could be used in local and regional decision making arenas. The multiphase referendum has been discussed by Keskinen (1997) and is described below.

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Phase 5</th>
<th>Phase 6</th>
<th>Phase 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agenda setting: what is the opinion poll to be organised about? What for? The aim: binding or recommendatory?</td>
<td>What will be asked? The background research and its results are disseminated. Dialogues, discussions, learning processes, developing the alternatives needed for the Phase 3</td>
<td>What are the alternatives for the referendum?</td>
<td>What are the methods used in the referendum? Technical solutions, alternative tools for opinion giving?</td>
<td>The referendum process</td>
<td>Presenting and disseminating the results, public dialogue and debates</td>
<td>Decisions based on the results, other action or events recurring from Phase 1.</td>
</tr>
</tbody>
</table>

The questions raised here are: where do the citizens participate? How? Who will co-ordinate the processes? In the case of deliberative and direct democracy citizens will participate throughout all phases starting from Phase 1. In participatory democracy they will participate in Phases 2, 5 and 6, and in present representative democracy only in Phase 5. Furthermore, the E-vote method can be considered as a tool for this model too if it is understood as a complementing tool (used in on-line polls or multiphase referenda etc), and is not used as a conventional voting system of representative democracy.

4.5.1 New ICT Software for e-Democracy

As far the new ICT software needed for e-Democracy is concerned the question arises: what technical solutions should be developed to improve public participation? The first and most important tasks are as follows:

Task 1: Create tools for the continuous collection and analysis of huge amounts of input information given by millions of citizens. Any kind of answer, whether it is a zeros, or multiple hits etc. must be transferred into a simple and understandable table giving scientifically meaningful figures.

Task 2: Create tools for genuine dialogue. Notice that dialogue means not only information and opinion transfer but also the transformation and synthesis of opinions for building a better common understanding. In dialogue people are ready to compromise in the process of creating new knowledge and new innovative alternative solutions.

Task 3: Create tools for the citizens to monitor decision makers' actions to add accountability. Text messages, digital TV etc. can be used for instance. This can mean an imperative mandate for citizens, changing representatives on-line or anything else. This is an area where more R&D is clearly needed.

4.6 The challenges of the citizens'-oriented model

There are three major challenges that need to be studied and developed: the challenge of inclusiveness: Technological development itself is thought to be useful for the increasing empowerment of citizens in Europe, and on national and local levels. However, there are three different kinds of deficits that need to be addressed.

- **Participation deficit:** The main concern in many countries at the moment is the participation deficit. There are no legally binding reactions that can be expected of policy makers and non-institutional decision making procedures with regard to policymaking.
- **Legal deficit:** Present legislation has been fixed along lines set two
hundred years or so ago for practising representative democracy, and it has no flexibility towards any ad-hoc type management of common affairs. Local politics, though, have recently been opened up for more participatory methods but the pace is too slow compared to the development of societies, communications facilities and their diversity.

- **Representation deficit:** The representation deficit seems to be unsolvable, as long as mainly "elites" participate in deliberation processes and there is not enough research on the present frames used in public spheres, such as; what is the role of a representative or a deliberative process and how can we guarantee inclusiveness in decision making? Furthermore, the development of tools without knowing what citizens need is a futile task. In actuality, it is a secondary question to whether citizens need to send letters to public representatives or use on-line debates to express their opinions on the web, if these deficits prevail.

The challenge of creating a process can be seen in discovering what can be done to activate a sufficient number of citizens to participate in a decision making process. In order to do this and enable citizens to participate in virtual communities three requirements are to be filled: Access- Competence - Motivation: (Viherä & Nurmela 2001)

- **Access:** Citizens must have universal access to information and the means of communication. Problems in this area include scarcity or bad networking, digital divides and other equality deficits. For example, there are people who do not have the access to the relevant ICT.

- **Competence:** There are many people who do not possess the adequate know-how to use ICT or who do not feel that they know enough about the issue to be able to participate in the public affairs.

- **Motivation:** Without motivation citizens will not participate in the public issues. To be motivated people need to feel that their opinion is heard and can have an impact. They should also be able to feel that they are part of a social community when preparing and agreeing/compromising on a decision.

On the other hand, the free-rider problem decreases the motivation. Some people think that if all is going well without their interference, why should they bother. Also, a very basic social need is human face-to-face interaction and "doing-together". This need cannot be completely fulfilled by ICT. Formerly, voting and political farmhouse meetings were part of leisure time and social interaction, whereas today political participation has to compete with many new forms of social interaction.

The challenge of outcome: Does e-Democracy as described by the Citizens-oriented Model result in different decisions when compared to traditional democratic models? How does one define "better democracy", or "better decisions"? Two fundamental questions are: Will democracy have a different content in the Future Information Society from that it has to today? (Keskinen et al. 2001). What can be said about the ontology (ethical and political questions) of e-Democracy compared to traditional democracy? (Held 1987).

**5. Future challenges**

Technically, the future models of democracy are very open as almost all technologies can be used for implementation. The question is more of a political and social one: what type of citizenship models does European society want to develop for what type of decisions? The Citizens-oriented Model can be created in a technological or political sense, but is this type of participation wanted, and by whom and for what aim? More participation in every decision is not necessarily compatible with an efficient modern state, even a democratic one. The basic elements of the Future e-Democracy (Tele-Democracy) have been discussed by Becker & Slaton in their book: The Future of Tele-Democracy in 2001.

The Basic Elements of the Tele-Democracy Paradigm are : (Becker & Slaton 2001)

- Global direct democracy movement
- 21. Century democratic communications methods - horizontal and interactive
• Modern Mediator Movement - heterarchy, quantum politics
• Internet based transformational political organisations

Finally, it is interesting to note that in Finland several new projects on e-Democracy were launched in 2002/03. A project called "The Future of e-Democracy" aims to find future ways to tackle and exploit the global networking opportunities and their use in interactive decision making. A new initiative for the Second Call of the EU RTD 6th FP/priority 7 (Citizens in the Knowledge Society) was co-ordinated by the author in 2003 resulting to a proposal called "ECCE - European Citizenship through Co-operation and Engagement: Developing Inclusive Participation". The author also steers a 4 -year project at University of Tampere, Finland, funded by the Science Academy of Finland (2003-2006), called: ONDIS "On-line Discussion as Political Action". Here, political participation and activity on the internet's online fora and the relationship between democracy and the political activity taking place in Internet will be studied. The research problem is approached from the point of view of public participation and by discussing the relationship of information and knowledge to political action.

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When e-Government is Opposed by Unwilling Clients; Case Studies on e-Enforcement

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Abstract: e-Enforcement is the use of electronic tools in law enforcement. We examined the consequences of using two forms of e-Enforcement for several aspects in the relation between government and inspectees: weigh-in-motion and the digital tachograph. Inspectees are ‘obligated clients’ of enforcement. They usually do not appreciate government enforcement and have strong incentives for ‘strategic behaviour’ or ‘game playing’. Our research shows that, contrary to our expectations, e-Enforcement does not reduce all strategic behaviour and in fact even stimulates some new forms of it. However, e-Enforcement turns out to be successful when embedded in interaction processes and when providing added value for the inspectees.

Keywords: digital/electronic/e-government, automated/electronic/e-enforcement, customer, client, strategic behaviour, public sector, transport, weigh-in-motion, tachograph

1. Introduction

The past years have shown the rise of ‘e-Enforcement’. e-Enforcement is the use of electronic tools in law enforcement. In some sectors, the use of such tools has been common for some time, such as the use of cameras to prevent red light running and speeding offences. Recently, however, several new initiatives have been developed, such as tools to combat truck overloading and enforce driving and rest hours for drivers.

In this paper, we pay attention to these new developments, focussing on the special position of the clients of the enforcement. These clients are the offenders or potential offenders, whom we will refer to as ‘inspectees’ for the purposes of this article. What characterizes these clients is that they do not want the service and generally show uncooperative behaviour. They may, for example, actively evade the ‘service’ of enforcement, or commit information fraud. What do these client characteristics imply for the use of e-Enforcement? Can modern technologies force inspectees to comply? Our answers to these questions are based on two case studies, carried out at the Netherlands Transport and Water Inspectorate in 2003. They provide an insight into the social aspects of e-Enforcement and explain why merely implementing a technical solution is insufficient to make enforcement work.

The structure of this paper is as follows. In the next section, we present a state-of-the-art overview of e-Enforcement, based on literature. We will then introduce typologies of e-Government and its clients and explore the implications for e-Enforcement. Given these typologies, we will formulate research questions. We will present the two case studies and derive answers to the research questions, resulting in conclusions.

2. e-Enforcement: State of the art

e-Enforcement is the use of electronic tools in law enforcement. It is a form of e-Government. ‘E-Enforcement’ is an abbreviation for ‘electronic enforcement’ [Smith et al. 2000] and is synonymous with ‘automated enforcement’ [Ruby and Hobeika 2003; Smith et al. 2000; Wissinger et al. 2000; Wilmot and Khanal 1999; Bochner 1998; Turner and Polk 1998; Glauz 1998; Meadow 1998; Perone 1998; Retting and Williams 1996].

Some e-Government and digital government publications mention the area of regulation and law enforcement. Chen [2002a] mentions that the National Science Foundation in the U.S. has funded a number of digital government projects’ aimed at, among others, law enforcement. Chen refers to new databases and data mining technologies,
which ‘could become the catalyst for encouraging information-sharing and supporting collaboration and investigation among police departments, corrections offices, social services and courts’ [Chen 2002a]. Strejcek and Theil [2002] mention that bilateral and national treaties between E.U. member states are providing electronic government measures such as the exchange of data in the field of interstate cooperation in penal law and law enforcement. Chen et al. [2002b] have analysed Coplink Connect, an information and knowledge management system, for law enforcement.

All examples and studies concerning e-Government in law enforcement mentioned above concern government-to-government interaction [Hiller and Belanger 2001]. In this paper, however, we are interested in government relating to businesses or citizens. Critical publications on this type of e-Government are found in the literature on automated traffic enforcement.


Automated traffic enforcement is found to be very effective in reducing violations and eventually in reducing accidents [Ruby and Hobeika 2003, Glauz 1998, Meadow 1998, Perone 1998]. Some authors mention that motorists may oppose the introduction of automated traffic enforcement by influencing politicians [Bartoskewitz 1998, Turner and Polk 1998]. None of the authors, however, mentions or investigates opposition of inspectees after the definitive introduction of the systems, which is the focus of this paper.

3. Clients of e-Government


A government delivering services deals with several types of service recipients or clients. Alford [2002] distinguishes the clients as being paying customers, beneficiaries or ‘obligatees’. In addition to clients, he introduces ‘the citizenry’, because, in some cases, society in general rather than the service recipient or client benefits from the service.

Paying customers exchange money for products or services they want. An example is commuters paying for public transport. The clients express their preference and pay for the value they receive. Examples of e-Government dealing with a paying customer are agencies selling passports to its citizens online [Tian and Tianfield 2003].

Beneficiaries receive services without paying for them directly, for example pupils at publicly funded schools. The client benefits from the service and is generally happy receiving it. The public or ‘citizenry’ express preferences for the service through a democratic process and pay for the service through taxes. Examples of e-Government to beneficiaries are social security requests online [Bovens and Zouridis 2002, Hiller and Belanger 2001] and electronic medical files [Szende 2003].

Obligatees do not want the product or service and may even oppose it, as is most obvious in law enforcement. Obligatees usually receive something they would rather not have, such as checks and inspections, possibly resulting in coercion.
imprisonment and penalties. The citizenry profit from the service, however. By restricting the client, society receives value, for example law and order, public goods and functioning markets [Alford 2002, Sparrow 2000]. Examples of e-Government dealing with obligatees are automated enforcement of speed restrictions by means of cameras [Bovens and Zouridis 2002] and tax transactions over the Internet [Hiller and Belanger 2001].

E-Enforcement is an e-Government service to obligatees. However, the image of customer focus that is often used in e-Government does not seem to apply to e-Enforcement, at first sight. After all, receiving this ‘service’ cannot satisfy the clients of e-Enforcement.

Still, at a closer look, the concept of customer focus does apply even to obligatees, as Alford argues. We will show this is also true for the clients of e-Enforcement. We even argue that the customer focus is an effective strategy when inspectees oppose e-Enforcement.

4. e-Enforcement, inspectors and obligatees

4.1 Strategic behaviour - First question

An important characteristic of obligatees is that they display strategic behaviour or game playing. This means that in the process of interaction with the inspector they continuously try to strengthen their own position. Patterns of strategic behaviour of inspectees might be one of the following choices [de Bruijn and ten Heuvelhof 2000, Hawkins 1984]:
- Promising future improvements to ensure that the inspector will adopt a cooperative attitude;
- Asserting that improvement of behaviour is technically unfeasible, or not yet feasible, to ensure that strict enforcement seems unreasonable;
- Continuing to violate the rules, even after sanctions are imposed;
- Threatening to start legal proceedings, which might embarrass the inspector;
- Using political networks to stress alleged unfairness of certain regulations, to ensure that the inspector lacks political support for his actions.
- An important aspect of strategic behaviour concerns the supply of information from the obligatee to the inspector. Obligatees tend not to cooperate and provide requested information voluntarily, as this might disadvantage them.

These observations lead to the first question addressed in this paper. How does the introduction of e-Enforcement affect the strategic behaviour of the obligatee?

This question is interesting for two reasons. Firstly, the literature on enforcement predicts strategic behaviour of inspectees. Literature on e-Enforcement however, has not yet addressed this issue.

Secondly, although the literature on enforcement predicts strategic behaviour of inspectees, e-Enforcement could turn out to be different, because e-Enforcement seems to potentially enable zero-tolerance enforcement. Offences can be detected more easily, no discussion is possible between the inspector and the inspectee, and the scope of enforcement could be enlarged, while the ticketing could be automated. If this is true, the expectation that e-Enforcement will end strategic behaviour is justified.

4.2 Interdependence and the need for interaction - Second question

Much of the enforcement literature distinguishes between two styles of enforcement. The first style is based on compulsion and the unilateral coercion of compliance by a government. This style works when the relation between inspector and inspectee is hierarchical. The second is based on cooperation and interaction between inspector and obligatee. This style works when inspector and inspectee are mutually dependent [Hawkins 1984:3, Sparrow 2000:34].

If strategic behaviour remains after the use of e-Enforcement, the second style seems more appropriate to deal with it, as the strategic behaviour implies mutual dependency. Using a style of cooperation and interaction is in line with Alford, who advocates an approach of customer focus, even when dealing with obligatees.
Alford [2001] argues that governments should treat the obligatee as a customer, just like paying customers and beneficiaries. If obligatees have value to offer to the government, then the government has a reason to treat the obligatees as customers and offer value to them. Alford argues that obligatees indeed have value to offer. They may not pay for the ‘service’ of enforcement, but they may choose to provide other things the government agency needs, such as information, compliance or cooperation [Alford 2001, Hawkins 1984]. Furthermore, they may choose to refrain from strategic behaviour.

Using the other style, applying coercion, also enables government to achieve these values, according to Alford, but this is costly. The literature on enforcement confirms this view. Compulsion is expensive; dialogue tends to leads to an intrinsic commitment of the obligatee [Hawkins 1984].

The government is thus dependent on the inspectee to optimise enforcement. Alford states that government is likely to receive the value wanted from inspectees, by treating them as customers. The government of course cannot satisfy inspectees by completely refraining from all enforcement. It is possible, though, to provide value to inspectees within the borders of coercion. Acting in a way that inspectees consider fair and just and making it easier to comply can achieve this.

When the introduction of e-Enforcement does not end strategic behaviour of inspectees, we advocate an approach of value exchange, dialogue and negotiation between the government and the obligatee. Our second question for this paper is therefore: do the cases on e-Enforcement offer starting points for such an approach?

5. Two case studies

5.1 Weigh in Motion with Video

Trucks can be overloaded either as a whole or on one axle. Both types of overloading are punishable. Weigh in Motion with Video is a system to conquer truck overloading. It was introduced in cooperation between various agencies within the Ministry of Transport and Water Management and the National Police Agency. The system consists of sensors in the road surface and overhead cameras for identification. Currently, there are six weighing points in the Netherlands. The case study is mainly based on the experiences with a pilot scheme lasting approximately one year.

The system has several applications. Applied ‘repressively,’ it is used for pre-selection purposes. A police team at the weighing point sees the images of overloaded trucks and pulls them over. The weight of the trucks is checked with a certified weighing system, sanctions imposed being based on these checks. Because inspectors know beforehand what vehicles are overloaded, all human inspection capacity can be spent dealing with offenders. In the future, the weighing system in the road surface may itself be certified, making weighing checks superfluous and allowing penalty notices to be sent automatically.

Applied ‘preventively’, the system gathers the data of all offences at all weighing points round the clock, turning them into company files based on registration plates automatically. Inspectors visit frequently offending companies, and solutions are worked out in cooperation with these companies. Unwilling companies may face a check offensive by inspectors at the company gate.

3 The research has been conducted between January and August 2003. For detailed results see Koopmans-van Berlo [2003] and de Brujin and Koopmans-van Berlo [2003]. The cases are based on semi-structured interviews with Inspectorate employees, representatives of the inspectee groups, and the system developers. On average we interviewed for each case six respondents extensively, most of them twice: a second time based on insights from other interviews. In addition we spoke shortly to five people on average, to confirm or supplement the respondents information. We supplemented the interviews with written sources: we asked respondents for supporting documentation and we conducted internet- and literature reviews.
5.2 The digital tachograph

Driving and rest hours for truck drivers are subject to regulation. A tachograph is a device in a vehicle that records drivers’ driving and rest hours. There is a statutory obligation for each truck or coach within the EU to have a tachograph on board. Inspectors can read on drivers’ tachograph charts whether they have taken enough breaks and rests. Inspectors can perform roadside checks, but they can also visit companies. Companies are obliged to retain their drivers’ tachograph charts and inspectors can impose sanctions for offences committed earlier, based on company visits paid later.

So far, a tachograph has always been an analogue device with paper charts. Fraud with analogue tachographs was the reason for the EU decision to introduce compulsory digital tachographs. Not only was tampering with digital tachographs believed to become more difficult, but also it was thought that enforcement would become more efficient and companies would be able to link the data from digital tachographs to their company records.

The future digital tachograph will measure the speed of a truck in the same way as the analogue tachograph but store the data digitally. The driver has a personal driver’s smart card, on which the data is also stored. A roadside inspector can read the device. When visiting a company, inspectors can check the whole company file, which can be analysed much faster than the pile of paper charts. In the future, companies may be obliged to send their data to the Inspectorate, which would make enforcement even more efficient.

It will be clear that these two case studies concern government-obligatee interaction. The obligatee does not want to be ‘served’ by enforcement. Both the rules for truck loading and for driving and rest hours conflict fundamentally with the primary processes of the road haulage firms. Some examples:

- Imagine a company receiving an order that involves the shipping of four concrete pillars. One truck can carry three pillars according to law, but has a technical capacity of carrying four pillars. By law, two trucks are needed to carry out the order, but the company that offers to take them on one truck has the lowest price and wins the bid.

- Delivering goods on time is a central value in transport. Driving and rest time regulations may conflict with that value. An example is a driver who may be too late to deliver his freight that day, if he takes his compulsory rest. Another example is a driver who may see his cargo of fresh flowers wither, if he is forced to spend the night at the truck park. Putting two drivers on one truck can solve these problems, but this doubles the costs. One company competing by driving longer than allowed puts pressure on all other companies to do the same.

- A driver may also choose to neglect driving and rest hours in order to be home the same day, instead of spending the night at a truck park. Drivers may get paid for doing overtime and thus be willing to exceed driving and rest hours.

Enforcement may be a service to the market as a whole—which is the reason for transport trade associations to favour enforcement—but not the inspectee who is breaching the law.

5.3 e-Enforcement and strategic behaviour

What does the introduction of these forms of e-Enforcement mean for the strategic behaviour of the obligatee? The following are some of the patterns.

Less strategic behaviour.... In the first place, that strategic behaviour is found to diminish. It is practically impossible to pass a Weigh in Motion point without being registered. It does not pay to behave strategically by taking another lane, as the sensors are present in the entire width of the road. It does not pay to tamper with the license plate, as the cameras photograph the entire truck, which is always recognisable.

Weigh in Motion even seems to be an incentive for non-strategic behaviour, as there are many positive developments in the sector: constructive dialogue with enforcers, information sessions about solutions for overloading problems, technological innovations and adaptations to the fleets of vehicles are all examples. Inspectors can give many examples of companies having mended their ways
after a preventive visit. The explanation is simple. Weigh in Motion will offer less room for strategic behaviour, thus creating an incentive for compliance.

An ex ante analysis of the digital tachograph presents the following picture. The current analogue tachograph is subject to fraud. Drivers throw away or manipulate charts; they tamper with the device, or pay workshops to tamper with it. The aim is to get rid of records that demonstrate infringements, or to prevent the creation of such records. The digital tachograph is designed to be fraud-proof. There are far fewer possibilities to tamper with digital tachograph devices. Every attempt to tamper with the device is recorded in its memory and will be visible to inspectors.

…but some strategic behaviour stays the same. E-Enforcement does not solve some of the strategic behaviour that already occurred in the days of traditional law enforcement. A simple example is that the proportion of overloads in the transport flow drops to almost zero shortly after an inspection team has taken up a position at a weighing point. Drivers are believed to use their on-board communication equipment to inform each other of the presence of inspection teams. Those who know or suspect that their vehicles are too heavy wait at a truck stop till the team goes home, or choose a different route. The inspectorate can react by placing inspectors at the circuitous routes. However, this makes the enforcement process more labour-intensive and thus more expensive. Exactly the same behaviour occurred in the days that inspectors stood by the road and selected and weighed trucks manually.

Drivers using the analogue tachograph can hold back intermediate charts. The digital tachograph no longer has any charts, but carries the risk of ‘loss’ of or sabotage to the driver’s smart card. Drivers are allowed to drive without a smart card for a week while waiting for a new one. The fallback option in case the driver drives without a smart card has the same disadvantages as the analogue system.

There is a risk of strategic behaviour on a collective level. Our analysis of Weigh in Motion shows that Weigh in Motion is not only relevant for the relation between individual obligees and the government, but that the tool also offers possibilities for intelligence at a collective level. Inspectors can gain insight into specific companies or types of transport where overloading occurs relatively often and subsequently focus on them.

We also find that e-Enforcement can cause strategic behaviour to shift from the individual inspector-inspectee relation to the collective level. As regards digital tachographs, Anderson [1998, 2001: 234-242] warns against the misuse of workshop smart cards. These are special smart cards, which workshops can use to change the settings of the device when they install or repair the digital tachograph. Past practice has shown that truck companies bribe the workshops to tamper with analogue tachographs [Anderson 1998]. Bribing the workshops to misuse or circulate the workshop smart cards would make large-scale fraud with digital tachographs possible. Inspectors confirm this risk. Large-scale fraud would also be possible if inspectees succeeded in cracking the security measures on downloaded data. The risk of the ‘crack’ being spread is greater for digital technologies than it is for analogue technologies. It is not clear yet whether these events will indeed take place. However, what is clear is that strategic behaviour on the individual level will become less simple and hence incentives and possibilities may arise for strategic behaviour on a collective level.

5.4 e-Enforcement and the value inspectors and obligees can offer

The case studies show that e-Enforcement does not solve strategic behaviour just like that. The relation between the inspector and the inspectee is a relation of mutual dependency. E-Enforcement should be embedded in an interaction approach rather than a compulsion approach. Both the obligee and the government have value to offer to each other. We found a surprisingly large number of issues, which the government and the obligee can offer each other as value. We expect that exchange and interaction processes facilitate the introduction of e-Enforcement.
Marieke Koopmans-van Berlo and Hans de Bruijn

The inspectee can offer value to the government in the following ways.

1. Not behaving strategically. The government agency would want the inspectees not to evade the weighing points. Guarding the circuitous routes is labour-intensive for the agency. Inspectees refraining from evading the weighing points would enable the agency to take a much fairer view of overloading. Inspectees would offer value by refraining from fraud with tachographs. The agency could then base enforcement on true information about driving and rest times.

2. Abandoning negative criticism of the new systems. Inspectees label the electronic enforcement as ‘big brother’. They perceive a loss of privacy and fear future applications of the system. For example, a large network of weighing points might enable government to track and trace all trucks. Another point of criticism is the supposed unfairness of the systems. The systems allegedly focus on specific regions or groups only. Negative criticism attacks the legitimacy of e-Enforcement and may influence politicians’ attitude towards e-Enforcement. This is why inspectees offer value by abstaining from criticism.

3. Offering technical support on the identification of bugs. As regards the digital tachograph, inspectees can offer value to the government by revealing the weak points in the security of the system.

4. Quickly adopting the new systems. Another value inspectees could offer the inspectorate is switching over to the digital tachograph early. The digital tachograph is only compulsory for new trucks. Considering the write-down term for trucks, there will be a transition period of about ten years in which analogue and digital tachographs will exist side by side. This is a disadvantage for the inspectorate, as it cannot change over to a new enforcement process completely and will only achieve limited efficiency gain. The more inspectees make a quick switch to the digital system, the more efficiency the inspectorate gains.

The inspectee can offer value to the inspectee in the following ways.

1. Providing equal enforcement intensities. Inspectees feel that if rules against overloading are enforced, they have to be enforced equally for all companies. They want the government to place weighing points everywhere in the country, not only in the crowded western part. Focusing enforcement on a specific region does not prevent competitors elsewhere in the country from competing unfairly.

2. Tolerating offences temporarily. Inspectees argue that overloading has become an issue in enforcement only since the introduction of Weigh in Motion. Only since then have they been making efforts to prevent it. As this is hard, the government should provide a transitional arrangement. It is true that overloading of the entire truck can easily be prevented by taking less freight. However, one-axle overloading, without necessarily the truck as a whole being overloaded, is a technical problem. The overloading is related to the way the truck is loaded and unloaded during the day. Preventing axle overloading implies investing in either technical devices or new trucks. Companies prefer to wait making new investments until it is time to buy a new truck. Inspectees thus argue time is needed for adjustments towards compliance. They feel the government should allow this time, for example by tolerating small offences on one-axle overloading for a limited period of time.

3. Focussing on the bad guys. Well-disposed inspectees want the inspectorate to focus on the bad guys and to be lenient to the good guys. This means distinguishing between total truck overloading, which is unfair competition, and one-axle overloading, which is a technical issue. Inspectees feel the penalties for one-axle overloading are too high. One-axle overloading is classified as an economic offence and therefore as a criminal-law offence. Inspectees argue that total overloading is an economic offence indeed, but one-axle overloading is not. They want the government to lower the penalties to the level of administrative offences.

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4. Adding functions to enforcement tools. As regards the digital tachograph, inspectees would value a digital tachograph tailored to the needs of their companies. This would be the case if they could use the system for the management of personnel, administration of working hours, fuel management, route planning, congestion information, and so on.

5. Not disturbing internal work processes. Inspectees do not want the process of enforcement to conflict with their own working processes. Unfortunately, they think the opposite is the case with the digital tachograph. Drivers personally have to collect their smart cards, which takes working time. Companies may need to offer drivers education on the operation of the new device. Downloading data from the single devices to a central company computer may require drivers abroad to return periodically.

6. Involving inspectees in decision-making processes: Road haulage firms want to be involved in the decision-making on the design of the digital tachograph and on the processes of operation, especially in decisions that bring on costs that are eventually shifted on to the road haulage firms.

7. Helping inspectees to find solutions to comply: Inspectees want the government to be involved in the process of finding and implementing feasible solutions for one-axle overloading. To prevent overloading, government could, for example, reduce the tax on trucks with extra axles. Inspectees complain that driving and rest hour regulations conflict with working hours. Adapting the scheme could increase compliance.

The issues mentioned can lead to processes of interaction and exchange, which benefit the introduction of e-Enforcement.

- If inspectors temporarily tolerate minor offences or if they add functions to enforcement tools, inspectees have fewer incentives to behave strategically. Government might further reduce strategic behaviour by helping inspectees to find solutions that will make them comply.
- By offering technical support in identifying bugs, inspectees can classify themselves as well disposed. The government may consequently be more willing to distinguish between good guys and bad guys among inspectees and focus on the bad guys.
- Increasing the perceived fairness of e-Enforcement, can reduce criticism from inspectees.
- If inspectors design enforcement processes that are compatible with companies’ working processes, thereby involving inspectees in decision-making, inspectees would be more inclined to quickly adopt the new systems. The same is true when tools contain added functions for the inspectee.

6. Conclusions

e-Enforcement does not solve the problem of strategic behaviour completely. It is true that e-Enforcement makes it easier for the inspector to collect information about the inspectee and use it intelligently, thus reducing some strategic behaviour. It seems also true that modern technology is more resistant to evasion and fraud at the level of one inspectee and one tool. It is hardly possible to pass a weighing point without being registered and a driver cannot easily manipulate a digital tachograph device.

However, using technology does not seem to prevent strategic behaviour at a system level. Drivers can still evade weighing points by taking another route. Furthermore, at a system level we see the risk of strategic behaviour shifting to collective forms, involving more than one inspectee. These risks are tachograph fraud by manipulating downloaded data, or by the illegal distribution of workshop smart cards.

If the government wants to prevent strategic behaviour, especially the more threatening collective forms, merely implementing e-Enforcement will not suffice. At a system level, the technology does not prevent strategic behaviour. Strategic behaviour at a system level can even be inherent to the technology, as the nature of digital systems makes fraud reproducible. Thus, governments should seek the solution neither in technology, nor in coercion and compulsion, but in interaction. Inspectors and inspectees...
have value to offer to each other concerning e-Enforcement.

Therefore, although inspectees are generally not pleased with receiving the ‘service’ of e-Enforcement and thus differ from other government clients, the government can still treat them as customers. By paying attention to the interests of inspectees, governments will promote the success of e-Enforcement.

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