The Effectiveness of e-Service in Local Government: A Case Study

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Abstract: e-Technology has become a catalyst for enabling more effective government through better access to services and the democratic process. As public interest in the Internet and e-Technology solutions continues to grow, there is an increasing expectation that they will be utilised in national and local governments for not only more efficient governance but also improving public access to information and services. This paper, based on a case study discusses some of the key aspects of electronic government and e-Service. It examines the value and the effectiveness of e-Services within the public sector with a focus on four specific facets of effectiveness: the view of management and ICT strategists; social, cultural and ethical implications; the implications of lack of access to ICT; and the customers'/citizens' view of the usefulness and success of e-Service initiatives.

Keywords: e-Technologies, e-Service, e-Government, e-Readiness, Local Government

1. Introduction

The most prominent of the recent advancements in Information and Communications Technology (ICT) has been the emergence of the Internet, Web-based technologies (e-Technologies) and global networked economies. Today, e-Technologies play an increasingly significant role in our day-to-day lives. They have fundamentally transformed the technological, economical, political and social landscapes.

The competitive imperative of the private sector has driven businesses into the digital world. To deliver the products and/or services in a timely and cost effective manner, the private sector has had to increasingly streamline business processes. As a result, the private sector has steadily set higher standards of service (through the application of e-business and e-Service solutions) both domestically and internationally. The most significant reform in private sector has been that of revolutionizing the supply chain management and the value change management through the application of e-Technologies. However, as public interest in the application of e-Technology solutions grows, there is an increasing expectation that they will be adopted within both national and local government organizations alike. Public sector organizations (including local governments) deal with complex networks of suppliers (and distributor) and sophisticated value chain systems on an ongoing basis. Within the last decade, many public sector strategists have acknowledged the strategic value of e-Technologies (Figure 1). They also recognize the need for improved efficiency of business processes, enhanced citizens' access to information and services, and more productive relationships with both citizens and private sector agencies alike. Consequently, many innovative public sector agencies world-wide (e.g. Canada, the UK, Australia, New Zealand, Singapore, Hong Kong SAR – to name but a few) have had to create new ways in which to use e-business and e-Service solutions (known as electronic or digital government) so as to respond to the need for change (Heeks 1999). Local, regional and national governments throughout the world are attempting to broaden service delivery and citizen involvement by providing effective e-Services. This reflects a growing acceptance that achieving excellence in customer service is just as critical for the public sector as it is in private companies.

The introduction of e-Service solutions within the public sector has primarily been concerned with moving away from traditional information monopolies and hierarchies. What's more, e-Service and e-business (through digital government) have fundamentally transformed the ways in which the logistic processes and supply chain dynamics are managed within the public sector. However, e-Service remains a challenge to both citizens and public sector agencies alike. Governments must not only maximize the benefits that are offered (through the application of digital government and e-Service) but must also avoid the many pitfalls (economical, social and cultural) associated with rapid technological change. That is to say, despite advancements in technology solution, the challenges to effective government within today's knowledge society are profound.

Within the past few years, there has been much debate (e.g. Accenture 2001b, Asgarkhani 2002b, Asgarkhani 2003a, Asgarkhani 2004, Heeks 1999, Nath 2003 and Reschenthaler et al 1996) over the effectiveness of e-Service in the public sector. Technology is undoubtedly the backbone of the infrastructure that is required to support electronic government initiatives. Yet there is a danger in

placing too much emphasis on the technology aspect of e-Services. What's more, political and financial support for e-Service projects can be accompanied by political rhetoric and hype. The potential benefits of e-Technologies in the public sector can only materialise when they are introduced as part of a well-planned and properly supported social, cultural and political environment. There is also a need for

performance measures in order to assess progress (and effectiveness) and ensure that rhetoric of e-Service is matched by reality. If citizens are to benefit from the efficacy and potential cost-effectiveness of e-Service, it is essential that traditional public sector structures and conventional governance paradigms are revised.

Efficiency	
Time	Accelerating business processes and activities
Distance	Reducing geographical and distance inhibitors/barriers
Creativity	Enhancing existing business processes and activities
Effectiveness	
Time	Improving the flow of information and business intelligence throughout the supply and the value chain components
Distance	Enabling integrated control of the supply and the value chain processes
Creativity	Enabling new (and/or modified) processes
Growth	
Time	Obtaining early market entry/presence
Distance	Introducing new products to new markets
Creativity	Developing new products and services

Figure 1: The strategic value of e-Technologies

This paper elaborates on the strategic role, the value and the effectiveness of digital government that enables e-Service. Four specific facets of effectiveness have been examined:

- Effectiveness from the point of view of management and ICT strategists (concerning the implications of ICT and e-Service in the public sector).
- Effectiveness as it concerns social, cultural and ethical implications of e-Service and e-business.
- Effectiveness with reference to differences in access to ICTs (digital inclusion/exclusion).
- Effectiveness from the point of view of citizens - a preliminary study of the citizens' view of e-Service and e-business.

The paper is presented in two parts. Part one (based on a review of previous studies and analysis of digital government and e-Service cases (Accenture 2001b, Asgarkhani 2002b, Asgarkhani 2005a, Asgarkhani 2005b, Asgarkhani 2005c, Asgarkhani 2003c, Bhatangar et al 2001, COMNET-IT 2000, Heeks 1999, Lin et al 2001, Orrego et al 2000, Radics 2001 and Perri 2000) reviews the fundamental concepts of digital government and e-Service followed by discussing the effectiveness as outlined in (a), (b) and (c) above. Part two is based on a case study of a digital local government and e-Service project within the Canterbury region of New Zealand. The case study examines the effectiveness of e-Service as outlined in (d). The methodology for gathering information included interviews with project sponsors (and a number of other

stakeholders) and a combination of formal interviews and surveys of several focus groups of users.

2. e-Technologies and e-Service in the public sector: An overview

Electronic government forms the foundation for digital or electronic service (e-Service) and depends upon a sound technology infrastructure. However, e-Service is not a technical exercise, but rather an attempt to improve the political and social environment and to drive a fundamental change in the ways in which functions are performed. The introduction of ICT in order to automate public sector functions and introduce e-Service will not automatically create a better or more open government - unless it is based on policies to promote the effective utilization of technology. e-Service initiatives inevitably need to take into consideration issues such as new models of policy formulation; alternative forms of citizenship; different patterns and trends of relationship and power; new solutions for economic development; and alternative approaches for connecting people to the political process.

Extensive research has been conducted by various practitioners (e.g. Asgarkhani 2004, Asgarkhani 2003c, Asgarkhani 2003a, Samaranayake 2003, Radics 2001, Tapscott 1997 and Wiener 1984) in an attempt to answer questions about the key issues concerning the adoption of ICT and e-Service What's more,

certain advisory and interest groups have been formed in order to provide answers to some of the issues that were mentioned above (e.g. International Centre for e-Governance – www.icegov.org).

As the application of ICT in governments within developing nations becomes widespread, a progression through the various stages of e-Government and/or e-Service can be observed (Asgarkhani 2002b, Asgarkhani 2003a):

- *Basic Internal Functional Efficiency* - Improving internal functional efficiency through the application of ICT.
- *Improved Internal Communications* – Improving internal communications (through the application of electronic mail) and introducing workflow management systems for increased process efficiency.
- *Improved Access* - Providing access to information concerning services and the democratic process.
- *Electronic Interconnection of Services* - Putting in place applications that would not only enable citizen participation through feedback, but would also allow for transactions between citizens to government (C2G), businesses to government (B2G) and government-to-government (G2G).
- *Electronic Democracy* - Introducing digital democracy - technological solutions that would enable participatory action and democratic processes.
- *Total Electronic Service Integration* - Introducing integrated electronic or digital governance services through one central e-Service hub.

A review of various case studies of e-Government and e-Service (e.g. Webster 2001, Radics 2001, NIC 2000, Asgarkhani 2003b, and Asgarkhani 2004) suggests that local government objectives in introducing e-Service are likely to concentrate on:

- *Prompt, accurate service* – as local governments potentially receive millions of calls per year, setting a target to resolve a high percentage of these calls the first time they occur (through establishing a customer contact centre) can result in significant efficiency gains and cost savings.
- *Improved quality of service* (by reducing redundancy in service) - One client of a local government can potentially generate up to dozens of files in different locations. Local governments are seeking to convert these to one secure and accessible file - helping to provide continuity and coordination of local government support.
- *Removing barriers and tackling social exclusion* – Local governments are aware that

many clients do not have the skills to use electronic services, yet seem keen on setting up networks of learning centres in libraries and community centres that teach people relevant Internet and Web technology skills.

- *Local access points* – It appears (Webster 2001) that up to 20% of customer queries cannot be addressed immediately. Clients often need to meet with a "professional." Local governments can benefit from setting up community access points to let clients meet 'professionals' through online video links.

Today, e-Services appear in various shapes and forms. Typical applications (within both local and national governments) can include: providing access; connecting to a service or a process; facilitating consultation; and enabling active citizen participation (Figure 2)

3. The value of e-Service: Management and ICT strategists' view

A review of various viewpoints over the implications and effectiveness of e-Government and e-Service (e.g. Perri 2000, Asgarkhani 2002b) indicates that there are at least four schools of thought: pure optimism; optimism with some concerns; pessimism; and those who view technology as a tool only - but not a driving factor on its own.

The optimists argue that the use of ICT in governance represents a major once-and-for-all improvement in the capabilities of governance through a more effective management of all domains Wescott 2001. The only cost is the investment and the day-to-day operational running costs. They believe that e-Government can reduce the costs of decision making, management and day-to-day operational activities (such as acquiring, ordering, coding, organising, selecting, managing and using information) steadily over time. That is to say, the initial investment costs would be compensated through the cost savings and efficiency gains that are likely to be achieved over the lifetime of the systems (Reschenthaler et al 1996). This optimistic view appears to be based on the classical cybernetic theory (Wiener 1984) – that views information as control.

The second group (optimists who have some concerns) accept at least the possibility of greater control, quality and rationality in decision-making. However, they dispute that the efficiency gains achieved through e-Government come at a price. That is to say, unless safeguards are put in place, e-Government may result in compromising citizens' rights - such as the right to individual liberty and privacy; the right to influence

governmental decision-making (Perri 2000 and Raab 1997) and the loss of control over

politicians' decision-making agendas (Zuurmond 1988).

Type of Electronic Service	Typical Application(s)	Phase
Providing Access Making information accessible to citizens (public kiosk, Internet, CDs, and so on)	Citizen access to general information Directory and directions to parks and community centres Calendar of city-sponsored events and activities Manual of policies and procedures Phone directories	Improved Access
Connecting to a Process or Service Provide information and/or access to government ICT-based systems, information management solutions and true web-based services	Property information License renewal and payment Payment of parking tickets, court fines Registration for class and sports activities Online permits, business licenses, court documents Online auctions Electronic posting of commodity products with purchase order and invoice transactions Sales tax collection Job postings; online application forms Self-service benefits administration	Improved Access Electronic Integration of Services
Raising Awareness Provide information about the political process, services, and options that are available for the decision making process	Government functions and services Citizen services Business services (information) Employee services Employee newsletter Legislative agenda and pending legislation	Improved Internal Communications Improved Access
Facilitating Consultation and/or Communication Initiate and develop means of capacity building, exchanging prior gained experiences, access to experts, and any other information/knowledge of mutual interest.	Posting of RFPs (Request for Information) and Bid Documents Distance learning resources Web casting of City/County Council Meetings	Improved Access Electronic Integration of Services Electronic Democracy
Active Citizen Involvement/Participation Involve citizens in government decision-making, problem solving and election processes.	Digital democracy Communications with Council Members	Electronic Integration of Services Electronic Democracy

Figure 2: Typical applications of digital government and e-Service

The pessimists argue that e-Government actually compromises the quality of decision-making and that excessive demand for policy analysis (based on many categories of information) will cause delays in action – "paralysis by over-analysis." There is a fear that due to mechanical rule following (as suggested by overly simple data interpretations, overly simple modelling and overly simple expert system flows from analysis to recommendation) the cultivation and the exercise of judgement in decision-making will be downplayed.

The last group view technology as a tool only and argue that the impact of ICT solutions cannot be viewed in isolation - where it concerns technical or political rationality of decision-making. They view both continuities and changes in governance as being driven socially and politically, not by technology itself. Technology is seen as a tool for either changing or preserving the *style of governance* – e.g. *conservative* and *radical* styles of governance (Mackenzie et al 1985 and Bijker 1997).

Each theory that has been mentioned above has some empirical support - although most empirical studies have been of a rather limited scope and are not in general designed to test, let alone falsify these rival theories. It is fair to say that applying these theories in a unified manner to every case across the board would be unrealistic. These theories need to be discussed with reference to: social and cultural aspects; the technological infrastructure; experience with the application of ICT; and the level of education and interest in the political process.

4. Social, cultural and ethical implications of e-Service

The perceived effectiveness of e-Service can be influenced by public's view of the social and cultural implications of e-Technologies and e-Service.

Impacts on Individuals' Rights and Privacy – as more and more companies and government agencies use technology to collect, store, and make accessible data on individuals, privacy concerns have grown. Some companies monitor their employees' computer usage patterns in order to assess individual or workgroup performance (Asgarkhani 2002a). Technological advancements are also making it much easier for businesses, government and other individuals to obtain a great deal of information about an individual without their knowledge. There is a growing concern (e.g. Asgarkhani 2002b) that access to a wide range of information can be dangerous within politically corrupt government agencies.

Impact on Jobs and Workplaces - in the early days of computers, management scientists anticipated that computers would replace human decision-makers. However, despite significant technological advances, this prediction is no longer a mainstream concern. At the current time, one of the concerns associated with computer usage in any organization (including governments) is the health risk – such as injuries related to working continuously on a computer keyboard. Government agencies are expected to

work with regulatory groups in order to avoid these problems.

Potential Impacts on Society – despite some economic benefits of ICT to individuals, there is evidence that the computer literacy and access gap between the haves and have-nots may be increasing. Education and information access are more than ever the keys to economic prosperity, yet access by individuals in different countries is not equal - this social inequity has become known as the digital divide.

Impact on Social Interaction – advancements in ICT and e-Technology solutions have enabled many government functions to become automated and information to be made available online. This is a concern to those who place a high value on social interaction.

Information Security - technological advancements allow government agencies to collect, store and make data available online to individuals and organizations. Citizens and businesses expect to be allowed to access data in a flexible manner (at any time and from any location). Meeting these expectations comes at a price to government agencies where it concerns managing information – more specifically, ease of access; data integrity and accuracy; capacity planning to ensure the timely delivery of data to remote (possibly mobile) sites; and managing the security of corporate and public information (Asgarkhani 2001).

5. The implications of e-Readiness

Access to ICT is critical for economic and social development. There is much optimism that we are facing a myriad of digital opportunities where the means exist to broaden participation in the network-based economy and to share its benefits. At the same time, differences in diffusion and the use of ICT appear to be deepening and intensifying the socio-economic divisions amongst people, businesses and nations. Differences in access to and use of ICT and electronic networks can lead to: divides between countries; social divides within countries; divides within countries related to income, education, age, family type, and location; and business divides related to sector, region, and firm size.

Overall, developing effective e-Service solutions depends on the state of the ICT industry and e-Readiness within countries, organisations and societies (e.g. Information Society Index 2002 [www.idc.com], Workshop – Digital Divide – OECD 2000, META Group 2000 and Asgarkhani 2002b). That is to say, the digital divide can be

considered as a barrier to the successful rollout of e-Government initiatives. Some of the causes of the digital divide that can limit the successful implementation of e-Service include:

- lack of telecommunications and network infrastructure and limited PC access
- lack of financial resources for developing an infrastructure
- lack ICT literacy and cultural resistance
- limited networking and Internet access (lack of infrastructure or high cost)
- high cost of business investment
- strategic business impediments – applicability; the need to reorganise; the need for skills, security and privacy considerations

The digital divide can potentially limit the success of e-Service initiatives. Even though governments in a number of developing countries receive funding and support for introducing e-Government solutions and e-Service, the effectiveness of these solutions are limited – unless the barriers to e-Readiness within these countries are addressed.

A review of some of the studies on the digital divide and e-Readiness (e.g. UN E-Government Report 2001, Accenture 2001a, COMNET-IT 2000, META Group 2000 and UNESCO/COMNET-IT 2000) indicates that there are significant differences in the level of ICT adoption and network economy worldwide. In this section we review a small sample of these studies with a focus on the Asia Pacific region.

In 2000, the META Group (META Group 2000) examined the digital commerce competitiveness of 47 countries in an attempt to establish a digital economy index. The author, Howard Robin wrote, "Traditional industrial-age measures of production and performance have lost relevance in the information age. Currently, information processing capability is a better indicator of national competitive advantage." The countries were ranked in five different categories in order to establish an overall 'information age technological competitiveness' - knowledge jobs; globalisation; economic dynamism and competition; transformation to digital economy; and technological innovation capacity. The results (with regards to the overall technological competitiveness) as they concern some of the countries within the Asia Pacific region (including New Zealand and Australia) are: Japan (2nd); Australia (8th); Taiwan (10th); New Zealand (11th); Hong Kong SAR (15th); Singapore (17th); Philippines (25th); Malaysia (33rd); India (34th); China (37th); Korea (38th); Thailand (46th); and Indonesia (47th).

The 2002 Information Society Index published by the IDC (www.idc.com) considered 23 parameters

to compile a ranking list of 55 countries. The countries that featured in the ISI index were classified under four categories (along with examples of Asia Pacific countries that featured in the 2002 ISI index) – see Figure 3

Skaters	Countries in a strong position to take full advantage of the information revolution, as they appear to have advanced ICT and social infrastructures. Asia Pacific countries that were classified under this category included: Australia (ranked 9th); Taiwan (ranked 10th); Hong Kong (ranked 11th); Japan (ranked 12th); and Singapore (ranked 13th).
Striders	Countries that appear to be moving purposefully into the information age with much of the necessary infrastructure in place. This category included New Zealand (ranked 17th) and Korea (ranked 18th).
Sprinters	Countries that are moving forward in spurts before needing to catch their breath and shift priorities due to economic, social and political pressures. Malaysia (ranked 30th) was the only Asian country in this group.
Strollers	Those moving ahead but inconsistently, due to limited financial resources in relation to their vast populations. Countries that were considered under this category were: the Philippines (ranked 45th); Thailand (ranked 46th); China (ranked 52nd); India (ranked 53rd); Indonesia (ranked 54th); and Pakistan (ranked 55th).

Figure 3: Categories of the ISI index

The first eight countries in the 2002 ISI index were: Sweden; Norway; Switzerland; the United States; Denmark; the Netherlands; the United Kingdom; and Finland.

This relatively small sample of previous research cannot be applied to all countries. However, it appears that many countries (including some Asia Pacific governments) are still at the early or half-way stage of adopting ICT in order to introduce e-Service.

Studies (e.g. UNESCO/COMNET-IT 2000, Webster 2001, Wescott 2001, Asgarkhani 2003b and Asgarkhani 2003c, Lau 2004, Jenkins 2003, Muller 2004 and Nordby 2003) indicate that numerous other factors can hinder the successful the introduction of e-Government and e-Service initiatives including: lack of ICT skills; inadequate resources; too many initiatives; resistance to change; low take-up; and lack of public access.

6. The value of e-Service: A New Zealand local government case study

In December 2001, one of the local governments within New Zealand introduced an e-Service initiative. This particular local government (referred to as the Council hereafter) aims to introduce e-Services through the implementation of its electronic governance initiative in an attempt to facilitate improved two-way exchange of information and enhance its public image as a professional customer service oriented organisation. The Council acknowledges that successful implementation of electronic governance does not result in merely automating the collection and distribution of information, but results in the flow of useful information between the government organisation and its citizens.

The Council measures the success of its e-Service project on an ongoing basis – by looking at: website hits; customer feedback; and quantifiable efficiency benefits.

- *Customer Feedback*: The Council monitors customer feedback from facilities on the service websites. Feedback is assessed to measure customer satisfaction and service level impact. Suggestions may also result in changes to the services provided.
- *Website Hits*: are monitored to determine the utilization of services.
- *Quantifiable Efficiency Benefit*: Services provided by the e-Service project are intended to contribute to a reduction in operating costs. Services must continue to meet the desired levels of efficiency – which includes cost savings, time saving, and service level impact.

Overall, *Web-site hits* are not an effective measure of the usefulness and usability of a web site – unless it is combined with statistics concerning the number of users who actually proceed to access services past the home page. Customer feedback through service websites can be a more effective measure of user satisfaction. However, it would be beneficial to include feedback from other sources (e.g. phone calls).

A combination of surveys and interviews (focus groups) were considered in order to assess public knowledge and opinion of this particular e-Service initiative. Participants were chosen from various age groups - more specifically, 61% of the respondents were 18-34 years, 26% were aged between 35 and 49 and the rest were over 50 years. It appeared that 76% of the respondents were aware of the e-Government services that are provided by the Council online whilst 87% of those who were already aware of the Council's online

services viewed the electronic delivery of services as being useful. From those who were previously unaware of the Council's web site, 81% considered online local government services desirable.

Results indicated that from those who knew of the Council's online services, the majority (49%) became aware of the Council's website through word of mouth. Web surfing or search engines were second (32%) whilst 19% of them knew of electronic service delivery solutions through advertising. Those respondents, who provided additional information, seemed to have used the following services: library information/catalogue (42%); services and hours of operation (38%); events in the city (32%); maps (31%); community services and events (30%); rates information (25%); bus timetable (23%); permits (13%); art gallery (12%); job advertisements/applications (11%); water resources (10%); and population statistics (7%).

Most respondents (who had used the website services) rated the Council's online service as being effective. Those who provided additional information stated the following reasons: immediate access to information anytime/anywhere (77%); saving time – no need for time consuming phone calls and/or visiting the Council (55%); access to information with reasonable details, simple to follow (40%); high level of usability (27%); links to relevant and useful pages and sites (25%); and easy to navigate (20%).

One respondent mentioned that the website did not work correctly. Other difficulties mentioned by those who had used the Council's web site included: could not find the required information (9.5%); download time slow (26.2%); access time slow (32.1%); and navigation was difficult (8.3%).

Overall, participants did not have any major problems in locating the information they needed. This can be due to participants' familiarity with the basic requirements of using a computer and launching and navigating Web-based applications as well as the local government website's ease of use.

Participants suggested that the following services should be considered for online availability: rates payments (37%); other council fee payments (27%); additional general and contact information for the Council's service departments (25%); online submission of applications - e.g. building permits (30%); interactive services: online forums and discussion groups (23%); multimedia: streaming video and audio of local events (30%); and online voting facilities (23%).

Participants were asked to state their concerns about using online services. It appeared that data security was the greatest concern (71%); followed by confidentiality of data (66%), document compatibility (6%) and the technical infrastructure and speed of access (26%). However, 19% of participants had no concerns over using the Council's online services.

On a scale of 1 to 10, (10 being the greatest), the rating for the website contents was 7.18. Overall, on the scale of 1 to 10 (10 being highly desirable), results showed the average rating of the Council's online services was 7.52. Furthermore, respondents gave the importance of access to online services (in general, not just the Council's services) a score of 7.5 (10 being highly desirable).

The results of this pilot study have not yet been finalized. However, it appears that this particular digital government and e-Service initiative is rated as being reasonably effective - in enhancing public access to services and facilitating the democratic process. The results of this study to date appear to be consistent with New Zealand's state of access to ICT and its e-Readiness - as outlined in Section 5. We cannot assume that the preliminary outcome of this study is applicable to every digital government solution across the board. However, there is room for optimism with caution.

7. Conclusions

Within the past few years, much has been debated over the use of e-Technologies and their effectiveness in reform within the public sector. Some of the key issues concerning e-Government and e-Service (as discussed in this paper) can be summarised as follows:

- e-Government is to encompass the reform in public management through the improvement of service delivery to the citizen, the creation of economic activity and the safeguarding of democracy.
- e-Government must be oriented towards the citizen. As the citizen does not need to be aware of who exactly in the government provides the required service, inter-agency and intergovernmental e-governance dimensions are essential.
- e-Government requires electronic or digital citizens (e-citizens). That is to say, before we can call an e-Service initiative effective, it must be made available to all citizens - not just to a minority who can afford to have access to the required electronic infrastructure.

e-Government can provide opportunities for building viable and sustainable partnerships between the private and the public sectors whereby each party would be responsible to provide electronic infrastructure (e-capacity) so a competitive economic advantage can be achieved.

e-Government can be effective if it is adopted alongside business process re-engineering. That is to say, merely automating existing services is inadequate and does not necessarily produce results. The benefits of e-Government and e-Service can only materialise when they are introduced within an environment that supports public access to information and services.

We examined the value of e-Service and e-Government by considering the different aspects of effectiveness – including:

- The view of management and ICT strategists with regards to the implications of e-Government – ranging from the optimists who view e-Government as being an effective tool (without concerns) to those who view technology as a tool only (arguing that technology on its own cannot be a driving force for effectiveness).
- Social, cultural and ethical aspects of e-Service and e-Government – including the impact on information management, workplaces and individuals' right and privacy - to name a few.
- The implications of the digital divide and e-Readiness – the effectiveness and success of e-Service in a country rely on the country's state of e-Readiness and the ways in which the barriers to the 'digital divide' can be overcome.
- A case study of citizens' views of the usefulness and success of e-Government initiatives in facilitating public access to information and services – initial results of a study of focus groups indicate that citizens rate e-Government solutions that were offered as being effective. However, these results are not yet final and are not applicable to all e-Government initiatives across the board.

It appears that practitioners and management scientists tend to agree that the trend for government transformation and public sector reform through e-Service is irreversible. However, technical innovation on its own is not enough to drive the development of effective e-Service. E-Government is a tool and regardless of its potential power, it has limited value and relevance on its own. In other words, access to the right technology for enabling e-Service is essential but insufficient. Undoubtedly, most of the shortcomings (as they concern the effectiveness of e-Service) can be resolved by improving the

technology infrastructure and access to e-Technologies. Nevertheless, technology by itself does not necessarily result in better, more efficient and socially inclusive government. e-Technology solutions are only effective if they are considered alongside other key parameters such as: social structure; cultural values and attitudes; governance process re-engineering within governments; and ethical issues.

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e-Government and State Reform: Policy Dilemmas for Europe

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Abstract: e-Government policies are both a sub-set and a driver of government and public sector reform, and their implementation raises or amplifies a number of political issues in a wide number of areas. Particularly, the implementation of the current transnational e-Government agenda raises important political issues, including the further privatisation of the public sphere and the changing role of government. Moreover, conflicting policy elements within the agenda magnify the need for more public debate on the desired outcomes of e-Government.

Keywords: e-Government, governance, state reform, public sector reform, European Union

1. Introduction: e-Government and State transformation

In many European countries, the design and implementation of e-Government strategies convey a new vision for the entire public sector. It has often been suggested that e-Government has the potential to transform governance and the relationships between State, citizens and businesses. However, as considerable amounts of public funds are invested in e-Government projects, the outcomes of their implementation – in terms of value for money, public value, and overall contribution to good governance - often remain unclear. Perhaps more importantly, the very strategic goals of e-Government are often blurred by a screen of hype and *catch-all* concepts such as *information society* or *modernisation*. Combined with an obvious lack of public debate in many countries, these results in uncertainty regarding the strategic goals of e-Government and their relationships with the objectives of State reform.

In this context, two general questions emerge: what does government want from e-Government, and what do citizens and business want from it? While it appears that most governments know what they want, at least in the short term (e.g. cost cutting, efficiency savings, and increased control over citizens and businesses), it appears that most users have limited awareness of both the potential benefits of e-Government and its associated risks. Moreover, most users fail to grasp the wider strategic implications of e-Government and its dynamic relationship to State reform objectives. More public debate on the desired outcomes of e-Government and on the strategic goals pursued via e-Government programmes is thus a pre-requisite for informed decision-making and public opinion formation in this area.

The emergence of a transnational e-Government agenda

Since the 1990's, a transnational e-Government agenda has emerged resulting from strategic initiatives taken by a number of leading countries, multinational corporations, the European Union and international organisations. This transnational agenda and its commonly accepted principles are now inspiring supranational, national and regional e-Government programmes throughout the world. As noted by Michalopoulos (2003, p. 6), "international organisations are powerful mechanisms of spread public policies and this is particularly apparent in the case of administrative reform that took place in the last two decades towards managerialisation". In this context, the use of information and communication technologies (ICT) by European governments seems to be currently driven by five main goals:

- Transforming public administrations: improving the efficiency of public administrations, reducing their size and cutting costs.
- Putting services online: delivering government services over the Internet and other electronic channels.
- Improving the image of government: increasing the transparency of the public sector and creating a more open, participative decision-making process.
- Increasing government control over society: re-enforcing control over citizens, businesses and taking action against perceived security threats.
- Providing a symbolic direction for society: appear to be *modern*, working towards *progress* by following existing technological trends.

These issues should be publicly debated and dealt with by the political system before major strategic e-Government choices are made. However, this is rarely the case, as the transnational e-Government agenda provides a number of *obvious pre-made choices* deemed to be applicable to all situations regardless of

political preferences and often presented as the inevitable result of technological progress. Nonetheless, there is a number of conflicting policy elements within the agenda, such as 'increased government transparency' versus 'increased citizen surveillance', which undermine its coherence.

1.1 Global political context

A number of important geo-political events, socio-political trends, and technological developments – as well as their impact in terms of ideological references and widely shared political views - have not only paved the way for the emergence of a transnational e-Government agenda, but also influenced its content over the years - sometimes in contradictory ways. Such events and developments include the following:

- Fall of the Berlin Wall (1989): this set the stage for the expansion of American influence throughout the world, the ideological hegemony of the Anglo-Saxon mix of liberal democracy and free markets, and the acceleration of the globalisation of the world economy.
- The *universalisation* of the Internet (mid-1990's): the relative universalisation of personal computers and the Internet in industrialised countries has created the technological and societal pre-conditions for the emergence of e-Government and e-democracy models and services. The Internet and ICT revolution brought the communications phenomenon to occupy a central place in European societies.
- Approval of the EU *Lisbon Agenda* (March 2000): widespread use of ICTs in society, including the development of e-Government, is seen as the key enabler for further competitiveness, job creation and sustainable development.
- Terrorist attacks in the United States (September 2001): the terrorist attacks of 11 September 2001 have decisively contributed to shift the political priorities in the United States towards security - or at least the appearance of security - threatening the delicate balance between State control and security on one hand, and civil liberties and human rights on the other. Together with the so-called *war on terror*, the security and control agenda has quickly crossed the Atlantic.
- Enlargement of the European Union (May 2004): the enlargement to 25 Member States is likely to magnify the practical and political difficulties of on-going and future EU integration processes, highlighting the need for deep reform,

new decision-making processes as well as the daunting task of effectively bringing the EU closer to citizens.

1.2 e-Government: working definition

For the purpose of this paper, the definition of e-Government provided in the European Commission Communication 'The Role of e-Government for Europe's Future' will be used:

> *[e-Government is] the use of information and communication technologies in public administrations combined with organisational change and new skills in order to improve public services and democratic processes and strengthen support to public policies (European Commission 2003, p. 7).*

This definition is quite wide and includes aspects that are fundamental for successful use of ICT, such as organisational change and user skills. It does not assign a value to ICT or e-Government *per se*, but relates them to a wider effort to support public policies.

2. Beyond technological determinism: what is at stake?

The technological aspects of e-Government have often relegated the debate to a community of experts from the public, academic and industry sectors. We believe that the political aspects of e-Government should be brought to a more public debate. What is really at stake in the implementation of e-Government is the re-definition of the public sector, the role of government, and the relationship between public authorities and citizens and businesses. In this respect, the e-Government agenda is not really new, but it enables, magnifies, and accelerates the implementation of public sector reforms that have been at work – both in theoretical and practical terms – since the 1970's, and particularly since the 1980's in the so-called *Western world*.

Such reforms signal a shift towards liberal ideologies, slowly driving European governments away from the Welfare State and pushing the public domain into the private sphere. This long-term shift appears to be a *fact of life*, beyond any possible choice: "the reinvention of government or the New Public Management is considered as an inevitable convergence, as the only one left option" (Michalopoulos 2003, p. 5), echoing the concept of "the end of history" (Fukuyama 1992).

Although the managerialisation process of the public sector began in the Anglo-Saxon countries, reform towards a smaller, more efficient and less expensive government is now a common theme

across the European Union. Indeed, the EU Member States – and the European Union itself – are currently engaged in a joint effort towards what has been described as the "competitive state" (Palan-Abbott, 1996). As noted by Toonen, T. and Raadschelders, J. (1997):

Whether it is the British New Public Management (NPM) movement, the Clinton-Gore attempt at Reinventing Government or World Bank and OECD reports on Public Management Reform, many of the same items, slogans and principles seem to be returning in various cases. A dominant presupposition, though increasingly challenged, is that within this process the Anglo-Saxon countries (Great Britain; Australia; New Zealand; Canada) have taken the lead. Gradually it is becoming clear, however, that the Northern European Welfare States of Scandinavia and the Benelux have been engaged in drastic restructuring efforts as well […] France, Italy and Spain are also engaged in rather substantial public sector and government reform enterprises, be it also not necessarily along the same lines as the Commonwealth countries.

However, some authors have argued that the radical influence of New Public Management over public sector organisation and methods could be overtaken and superseded by the "holistic" demands of e-Government and the rise of the "Digital State Paradigm" (Dunleavy and Margetts 2000). Regardless of the relationships between e-Government programmes and underlying theories and paradigms, the e-Government drive can and should be used as an enabler and multiplier of public policy. Thus, it is important not to hide the implicit public policy dilemmas and choices behind a screen of technical jargon and marketing rhetoric.

At a general level, it is interesting to note that many of the strategic objectives of current e-Government programmes are similar to the components of public sector reform advocated by the OECD in 1995, i.e. in the early ages of e-Government: greater focus on results, increased value for money, devolution of authority and enhanced flexibility, strengthened accountability and control, client and service orientation, strengthened capacity for developing strategy and policy, and the introduction of competition (OECD, 1995, p. 25).

2.1 The role of Government

e-Government programmes and their implicit public sector reform agendas carry with them an even more fundamental issue, which is that of the role of government itself. Beyond the modernisation and efficiency priorities, the issue

of the future role of government – and of the definition of *public interest* remains open to debate. In spite of resistance to change in some quarters, it appears that most citizens and socio-economic agents are in favour of a public sector that is less bureaucratic, more transparent, productive and cost-efficient. However, the issue is not that simple - it's not like turning a non-competitive business into a competitive one - and it entails the question of the very nature of government. In rough terms, the e-Government debate may lead us to a more fundamental choice between a *privatised* government (in which most issues are dealt with according to commercial relationships and principles, with services paid for by clients) and a traditional, *public* government (in which many services considered to be of public interest are provided to citizens and businesses according to a variety of criteria not necessarily linked to commercial considerations).

In our view a third option is possible, which would allow the development of a more efficient public service – partly fuelled by ICT and e-Government services – without necessarily leading to a dramatic shrinking of the public sphere or representing a step towards compromising the rights of citizens and the solidarity principles that are characteristic of many European societies and the European supranational project.

In all cases, there is a need to discuss and define the role of government, its missions and the modalities of delivery of public services. This need has been comprehensively expressed by the eGovernment subgroup of the eEurope Advisory Group (composed of leaders and representatives of national e-Government initiatives from some 30 European countries), which issued a set of recommendations for modernising and stimulating innovation in public administrations until 2010. The document adopted by the subgroup, known as the *CoBrA Recommendations*, called among other things for an assessment of the role of governments in delivering public value and the related necessary actions to transform organisations and adapt services and processes. Such an assessment should provide valuable insight for "reconsidering the services that are to be provided – or not -, how service delivery is to be organised including partnerships with the private sector, which channels are to be used, which processes are needed and which inter-organisational forms of cooperation and distribution of responsibilities are required" (eGovernment subgroup of the eEurope Advisory Group 2004).

2.2 Privatisation of the public sphere

The on-going reform of the public sector and re-definition of the role of government has entailed changes in government functions and multiplied both the number and type of entities participating in the management and delivery of public services. The traditional role of government as manager of public affairs is thus evolving into a coordination role, reflecting the liberal trend towards less direct State participation in the economic system. As a result of this progressive privatisation of the public sphere - visible in the transformation of service provision functions traditionally managed by government – "many of the aspects of the welfare state accepted as fact for quite some time by European society have been called into question" (Alabau 2004, p. 29).

The transnational e-Government agenda calls for an increased use of private sector intermediaries in the delivery of public services, simultaneously following and feeding the ongoing trend towards outsourcing of traditional government functions and privatisation of public services. The increasingly important role of the private sector is already clearly visible in the definition, implementation and delivery of e-Government services. It encompasses a wide array of functions, such as strategic advice, training, infrastructure, hardware and software provision, service delivery and financing arrangements. For instance, as the result of outsourcing, the number of IT professionals in central government in the United Kingdom fell from some 12,000 in the early 1990s to about 1,500 in 2004 (eGov monitor, 18 October 2004).

Researchers have highlighted that such a trend towards private intermediation is expected to grow not only as a result of political and economic options but also as a result of increasing technological complexity. It is thus likely that, as part of this vision of "distributed e-Government" (Centeno, Van Bavel and Burgelman 2004):

New players, both virtual (e-agents or e-brokers) and physical (social actors, trainers, or citizens themselves) will emerge as new technologies and eGovernment applications are developed, to address cognitive overload and functional or procedural complexity. Even if usability is improved, it is expected that not everyone will have access to electronic public services – intermediaries will be needed, i.e. people who provide access to others, particularly in rural areas.

The potential roles of these new players – including their accountability, their contribution to the creation of public value, their own needs in terms of partnership with the public sector, and the necessary financial models – needs to be further investigated.

3. Key policy issues

e-Government policies are both a sub-set and a driver of government and public sector reform, and their implementation raises or amplifies a number of political issues in a wide number of areas. Particularly, the implementation of the transnational e-Government agenda raises important high-level political and policy issues in the following areas:

- Government and governance: ideology, policy, strategy. Further privatisation of the public sphere and the changing role of government.
- Public administration reform: impact on services, service delivery, service take-up, and the re-organisation of public administrations.

In addition, e-Government programmes can have an important impact in democracy practices (political participation, citizen engagement, and the future of representative democracy) as well as on a number of policy areas, such as the promotion of competitiveness (how to help both businesses and workers be more competitive in a globalised economy); justice and home affairs issues (identification, data-sharing, border security and the 'surveillance society'); and technology policy (interoperability, open standards, open source software, and public procurement of ICT).

This implies that, in democratic societies, stakeholders including legislators, citizens, government and other groups need to decide what kind of government they want in the future; what the ideal balance between the public and the private spheres should be; how public administrations should be re-organized; how public services should be delivered and over which channels; how participative or direct democracy should be; how much should privacy be sacrificed for additional security or personalised e-services; how best to use information and communication technology to foster competitiveness; and how to best manage public funds when it comes to technology policy and procurement of software by the public sector.

All of these themes raise important questions – implying a number of choices - within the framework of the EU and its Member States. In the following paragraphs the main issues related to the impact of e-Government on government and public administration are briefly analysed.

3.1 Government, governance, and the creation of public value

One of the most interesting aspects of the current trend towards the implementation of e-Government services is that it raises – albeit somehow inadvertently and rarely at the general public level – a debate about aspects such as the role of government, good governance, the mission of public services and their relationship with the private sector, and general policy priorities. In this respect, it would be desirable to establish clear links between e-Government programmes, ideological frameworks, and public policy choices.

Many observers see e-Government in the near future as an enabler for better governance in Europe, placing it

at the core of public management modernisation and reform, where technology is used as a strategic tool to modernise structures, processes, the regulatory framework, human resources and the culture of public administrations to provide better government, and ultimately, increased 'public value' (Centeno, Van Bavel and Burgelman 2004).

In our view, the creation of public value should be at the heart of e-Government programmes and specific projects, as well as at the centre of e-Government pre- and post-project evaluation efforts. Rather than being driven by cost-cutting priorities that in many cases appear to be founded on wishful and dubious estimates or by the assumption that smaller government is intrinsically better, more efficient, less expensive and ultimately superior for a country's economy - the question of a possible correlation between the size of government and economic growth has been dividing economists for a long time and has not been clearly established (Chevallerau 2005) - the generation of significant public value should be the key concept in guiding e-Government and wider public sector reform programmes.

Kearns (2004, p. 6) has clearly laid out the three important sources of public value:

First, public value is created by the delivery of high quality services. Perceptions of services are driven by a series of factors such as their availability, the satisfaction of users, the perceived importance of the service and the fairness of its provision and finally its cost. The second source of public value is the achievement of outcomes that are seen as desirable by the public such as improvements in health, reduced poverty or environmental improvements. Finally, trust in public institutions is an important source of public

value, making citizens more likely both to accept government action and to feel a sense of association with it.

Public value is the ultimate goal of government and, naturally, of e-Government as well. The European Union and its Member States should bear this in mind when formulating and implementing their strategies and policies in the current context of increased privatisation of the public sphere. While privatisation may generate public value, it is certainly not a miracle formula for better government. The debate about the changing role of government should not hide the fact that generating public value must remain the *raison d'être* of the public sector, even in times of change.

3.2 Public administration and sustainable e-Government

In terms of public administration reform, the strategic goals of the transnational e-Government agenda are closely derived from the "new public management" theory developed and refined since the 1970's. Its main concept, managerialism, implies the use of private sector techniques, practices and philosophy in the activities of government in order to *make more with less*. The direct relationship between e-Government and the new public management agenda has been clearly established by the European Commission:

The change towards an organisation according to the concept that the user is at the centre (customer orientation), which was already at the heart of the New Public Management approach, is reinforced by eGovernment and made visible at the front-office in personalised online services, a one-stop approach and a life- (or business-) event orientation (European Commission 2003, p.20).

Yildiz (2003) highlights that advocates of new public management sought greater efficiency by decentralisation, privatisation or outsourcing, while simultaneously emphasising the need for "transforming the culture of public organisations by underlining the importance of perceiving citizens as customers, concentrating on outputs and outcomes rather than inputs, and providing quality products and service in the public sector". However, because public administrations are not private sector businesses and thus not mainly driven by profit – i.e. they have to take into account public interest factors and the creation of public value - the economic and business primacy proclaimed by managerialists carries the risk of undermining public interest and the rights associated with democratic citizenship and civic engagement (DeLeon and Denhardt, 2000). The

EU and its Member States should thus leverage e-Government initiatives and related training, outsourcing and back-office re-organisation to carefully implement public sector reforms that make governments more responsive and efficient while protecting its key public interest functions.

Current investments in e-Government in Europe are not sustainable in the medium-term if their effectiveness is not clearly demonstrated. Such effectiveness cannot always be calculated purely in financial terms because of the particularities of the public sector (related for instance to service pricing issues or to difficulties to measure public value and associated outputs and outcomes). The effectiveness and success of e-Government initiatives should thus be measured against a complex set of criteria (Kearns 2004): the provision of services that are widely used, Increased levels of user satisfaction, increased information and choice available to service users, greater focus on the services that the public believes are the most important, increased focusing of new and innovative services on those most in need, reduced costs of service provision, improved delivery of desired outcomes, and a contribution to improved levels of trust between citizens and public institutions.

In addition, e-Government policies will need to take more account of demand side realities and societal factors if they are to lead to the successful take-up of e-Government services (Burgelman and Clements 2003). In this respect, delivery of significant value and service *improvements* is also the key to increasing take-up of public electronic services by users, as demonstrated by the results of a survey commissioned by the Dutch Presidency of the European Public Administration Network (Capgemini and TNO 2004). The survey revealed that improvements to service – other than the convenience of online access - were only experienced by 30-40% of European e-Government users. Thus, we believe that governments should abandon the idea of enforcing quantitative, *quality-blind* objectives (such as putting all services online), and focus on improving the quality of important services – both online and offline – for which a user demand for improvement and online delivery actually exists.

If e-Government and its associated reforms fail to deliver a better public administration that provides citizens and business with demonstrable, measurable value, the use of ICT in government could become, as argued by Toonen (2001), the symbolic reform ideology of our times, similar to the ideology of scientific management in the 1930's and 1940's. Success will require innovative

transformational programmes that motivate - rather than alienate - civil servants at all hierarchical levels. As pointed out by Centeno, Van Bavel and Burgelman (2004), resistance to change will pose significant challenges to governments, which raise the need for further research regarding tools and methods for successful organisational transformation.

4. Conclusion: Addressing the e-Government agenda at the pan-European level

To date, the implementation of e-Government in Europe does not provide evidence that the role of nation-states is eroding, nor does it provide evidence that the role of the European Union is irrelevant in this field. However, the barriers that have been encountered to the formulation of a coherent European e-Government policy do demonstrate that there is a long way to go before existing structures metamorphose into new models, and national e-Government programmes reveal that governments have thus far used ICT to hold on to their sovereignty (Segedy 2005). Most policy issues raised by the implementation of the transnational e-Government agenda can and should be tackled at national level. However, some of them could also be effectively addressed at European Union level.

Although the EU has no competence over the government and public administration organisation of its Member States – and therefore no binding "policy" in this field – the European Commission has a "proto-policy", i.e. an "agenda" that it promotes both via other areas of competence, such as the internal market, and through programmes such as eEurope 2005, i2010, IDABC, and to a lesser extent, research/development programmes such as IST and eTEN. This e-Government agenda of the European Commission simultaneously derives from – and feeds into – what we have called the transnational e-Government agenda.

In spite of its current lack of both a coherent e-Government policy and effective competence in the public administration domain, the Commission has made a number of efforts, using instruments from its Industrial, Trans-European Networks, Research and Technological Development, Internal Market, Competition and Regional Development policies, to encourage national public administrations to implement e-Government, carry out organisational changes, and improve public services and democratic processes (Alabau 2004). For instance, the controversial Directive on Services in the Internal Market, proposed by the European Commission in

January 2004, calls for the mandatory establishment by the end of 2008 of online single points of contact for companies wishing to offer services across borders. The proposed text sets the obligation for Member States to allow electronic completion of all necessary formalities at the latest by 31 December 2008 (European Commission 2004).

The EU and its Member States need to perform a true assessment of the needs for e-Government implementation in Europe and determine how the EU can help tackle common problems and barriers. In this respect, the rationalisation of EU e-Government initiatives, the development of common technical standards and common infrastructure services (for instance in the field of e-identification or e-payments), and the establishment of a European e-Government competence centre for the effective sharing and transfer of best practices could be set up as EU-level policy priorities. In addition, there is a need to better understand how e-Government could support European integration – including future enlargement scenarios – and the transformation of the European bureaucratic apparatus.

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Factors Affecting the Successful Implementation of ICT Projects in Government

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Abstract: A government is a huge and complex organisation, whose operations and strategic focus could be greatly enhanced by the well focussed application of Information and Communication Technologies (ICT) to support improvements in productivity, management effectiveness and ultimately, the quality of services offered to citizens. While the benefits of ICT in government cannot be disputed, there are several concerns about its success as well as the strategies to be adopted in implementation of systems in various countries. In this paper, the characteristic challenges that developing nations face, which make ICT implementation in government fail to succeed are identified and synthesised. The paper presents results of literature review of case studies from both developed and developing countries and preliminary studies grounded in the Kenya e-Government reality. The key factors are identified, synthesised and categorised under common broad categories. This results in a rich picture of ICT implementation experience that helps to identify possible solutions. A descriptive framework for categorising key factors in ICT implementation in government illustrated with references to the literature is proposed. The input variables are categorised into factors for success (drivers and enablers), and factors for failure (barriers and inhibitors). The output variables are categorized into organisational and technological benefits. Finally, an action for success is proposed. This action includes suggestions for increasing the impact of factors for success while reducing the impact of factors for failure and use of available good practice.

Keywords: Government informatics, ICT projects implementation, e-Government, information system, ICT success and failure

1. Background

With the emergence of information and communication technologies (ICTs), and e-Government, it is possible to improve efficiency and effectiveness of internal administration within government and to re-locate government service from government offices to locations closer to the citizens. Examples of such locations are cyber café', telecenters or a personal computer at home or office. While the benefits of ICT in government cannot be disputed, there are several concerns about its success as well as the strategies to be adopted in implementation of systems in various countries. This paper therefore presents the findings of a literature review, knowledge acquired from reviewed case studies from developing countries and a preliminary study grounded on Kenyan government. The paper considers the characteristic challenges that developing nations face, which make ICT implementation in government fail to succeed. A descriptive framework for categorising key factors in ICT implementation in government and an action for success are proposed. The action for success is presented as response to situation specific challenges.

Informatics is a bridging discipline that is fundamentally interested in the application of information, information technology and information systems within organisations. Informatics is therefore the study of information, information systems and information technology

applied to various phenomena (Beynon-Davies 2002). Following this definition of informatics, government informatics can be defined as the *application of information, information systems and information technology within government.* This therefore includes application of e-Government which is "primarily to do with making the delivery of government services more efficient" (Bannister, Remenyi 2005).

In support of government informatics, Tapscott (1995, p.xv) argues that ICT causes a "paradigm shift" introducing "the age of network intelligence", reinventing businesses, governments and individuals. Ndou (2004, p.2) quoting Kaufman (1977) observes, "the traditional bureaucratic paradigm, characterised by internal productive efficiency, functional rationality, departmentalisation, hierarchical control and rule-based management is being replaced by competitive, knowledge based requirements, such as: flexibility, network organisation, vertical/horizontal integration, innovative entrepreneurship, organisational learning, speed up in service delivery, and a customer driven strategy, which emphasise coordinated network building, external collaboration and customer services" all of which are supported by ICT.

1.1 e-Governments initiatives

According to Kaul and Odedra (1991) governments around the world have been engaged in the process of implementing a wide

range of (ICT) applications. Countries have been classified by the United Nations according to their Computer Industry Development Potential (CIPD) as advanced or less developed Mgaya (1999). Advanced include, for example, the United States, Canada, West European countries and Japan; less developed include for example Argentina, Brazil, India, Mexico, Kenya and Bulgaria. For all countries, use of ICTs for government reinvention is increasing not only in investment but also in terms of visibility with a number of high-profile initiatives having been launched during the 1990s. According to Heeks and Davies (2000), this reinvention has taken place especially in the advanced countries. Western countries are convinced that the information society will result in economic and social benefits (Audenhove 2000). The author quoting Organisation for Economic Cooperation and Development, notes that information infrastructures are expected to stimulate economic growth, increase productivity, create jobs, and improve on the quality of life. Heeks (2002) observes that there is a big difference between ICT implementation and use between developed and developing countries. However, Westrup (2002) observes that similarities can also be expected. These similarities include funds which are never sufficient, bureaucracy and user needs. The difference is how problems are addressed in different countries. It can be argued that, with their adequate resources and advanced technology, the Western countries have an easier way of implementing ICT projects than DCs. Most developing countries are characterised by limited computer applications in the public sector, inadequate infrastructure and shortage of skilled manpower (Odedra 1993). Odedra (1993, p.9) notes that "this situation exists not merely due to lack of financial resources, but largely due to lack of coordination at different levels in making effective use of the technology". This uncoordinated efforts can only result in duplication if each department implements its own ICT projects without due regard to compatibility within the government.

2. ICT Implementation in Government of Kenya

Over the last five years, the Kenyan government has initiated some capital investment towards set up and installation of ICT infrastructure. Funding for these investments is achieved through partnerships between the government and development partners. The foreign funding component constitutes the largest percentage of this investment in terms of technology. The government contribution is usually in the form of

technical and support staff and facilities including buildings.

So far, the Government Information Technology Investment and Management Framework is connecting all ministries to the Internet under the Executive Network (Limo 2003). The government is also connecting the ministries to run integrated information systems for example the Integrated Financial Management Information System (IFMIS) and the Integrated Personnel and Pensions Database (IPPD).

While developing countries may have similar characteristics, the Kenyan context presents various challenges that affect the successful implementation of ICT projects.

Characteristics that define Kenyan ICT environment:

- Most ICT projects are initially donor funded.
- Some donations are made without prior consultation or carrying out a needs analysis by the recipient organization
- Operational/running costs are met by the government. Funding (capital and human resource requirements) ends with the project phase.
- The budgets for ICT are inadequate but rising.
- A lack of ICT policies and master plans to guide investment. To the extent that, with a number donors funding ICT, there have been multiple investments for the same product due to lack of coordination.
- A focus on ICT applications that support traditional administrative and functional transactions rather than on effective information processing and distribution within and without government departments;
- Unstable ICT resources.

This paper therefore helps to answer the following questions:

1. What critical factors or variables can be identified as important in terms of their effect on ICT project implementation in government?
2. Are there common variables and can the variables be synthesised and categorised under common broad categories for specific action to be taken?
3. Does the resulting analysis of the data lead to a framework that enables analysis and understanding of the ICT implementation experience in Kenya and can it help to identify problems and solutions?
4. Does this in turn result in a framework that can be used to guide ICT

implementation in Kenya and other developing countries?

5. Does the resulting framework build on previous frameworks either in terms of its applicability to real life situations, its inclusive nature, its cohesiveness, and its ability to generate questions for further research?

The research strategy envisaged is close to one used by Doherty, King et al. (1998), since the objectives are partly confirmatory but primarily exploratory. The strategy involves use of in-depth interviews, observation and documentary review. This approach provides new insights, grounded in the Kenya e-Government reality, into factors that contribute to the success or failure of ICT projects. It also shows the relationship between the adoption of good practice during implementation and the resultant level of success attributed to the operational systems. The methodology envisaged therefore has two dimensions, one theoretically based on ICT literature; and the other analytically based on case studies. This paper therefore includes knowledge acquired from a literature review and a preliminary investigation grounded in Kenya.

Figure 1 presents a research framework constructed from these preliminary studies. The framework specifies the area of research interest and shows how ICT implementation success affects ICT facilities quality and information system quality. In turn ICT facilities quality and information systems quality affect the perceived benefits. An ICT project implementation can only be perceived to have succeeded if the perceived benefits are realised. ICT facilities quality can be assessed after careful evaluation of the infrastructure to determine technical functionality. For example if the facilities were for networking different departments, the question may be whether this has been achieved successfully. This will involve a technical and user evaluation of the functional communication systems. Information system quality can only be determined by evaluating the information they generate. For example if the information is for budgeting purposes, the question might be whether the information system can generate accurate and timely financial information.

Perceived benefits are the end products that can be used to judge the success of the whole system. If the perceived benefits like easier communication, networking, and system integration, timely, relevant, complete and useful information are not realised, then the system will be perceived to have failed. Attributes of each component are shown for clarity and

focus.Planning and Implementation of ICT projects

A familiar maxim says, 'if you cannot plan it, you do not do it'. Another maxim says, 'I never planned to fail, I just failed to plan'. Planning spans a whole project period. It begins once the project planning activities determine the organization's strategy and identifies the ICT projects. Within the framework of a few fixed constraints, project plans evolve with the lifecycle. The constraints are time and money so each project has a clear deadline and a tight budget.

According to Moran (1998, p.39), plans fall into one of the two categories: vision without substance and a budget without vision. The identified problems of vision without substance are vagueness of future vision, lack of institutional vision, current position and time. Identified issues of budget without vision are questions as to what problem is being solved, what are the priorities and definition of the roles and responsibilities. With ICT projects being advocated for and financed by donors, budget without vision is likely to be the project plan. Maciaszek (2001, p.10) has suggested some planning models and methods for ICT implementation. Further, Aineruhanga (2004) observes that planning as a tool can help in reducing waste by identifying the pre-requites conditions for successful ICT implementation rather than "rushing into a complex e-Government strategy without having first finalized a national ICT policy".

Three reasons are identified for poor project planning in organisations. These are; risk management had not been addressed, business systems had not been justified to the full and lack of involvement from management Knott and Dawson (1999). These can be taken as the major reasons but are not exhaustive. This is due to the diversity of the implementation environments. Also, as noted by Bannister and Remenyi (2000), p.1), when it comes to complex decisions, managers often rely on methods which do not fall within the traditional boundaries of so-called rational decision making. It is observed that managers sometimes base decisions on 'acts of faith, gut instinct or blind faith' (referred to as strategic insight). As noted by Harindranath (1993), though developing countries commit a sizable amount of economic resources to ICT, for them to reap maximum benefits, ICT needs careful planning and coordination prior to implementation and use otherwise trial and error methods of implementation that characterise most government ICT applications will only succeed in the wastage of scarce resources
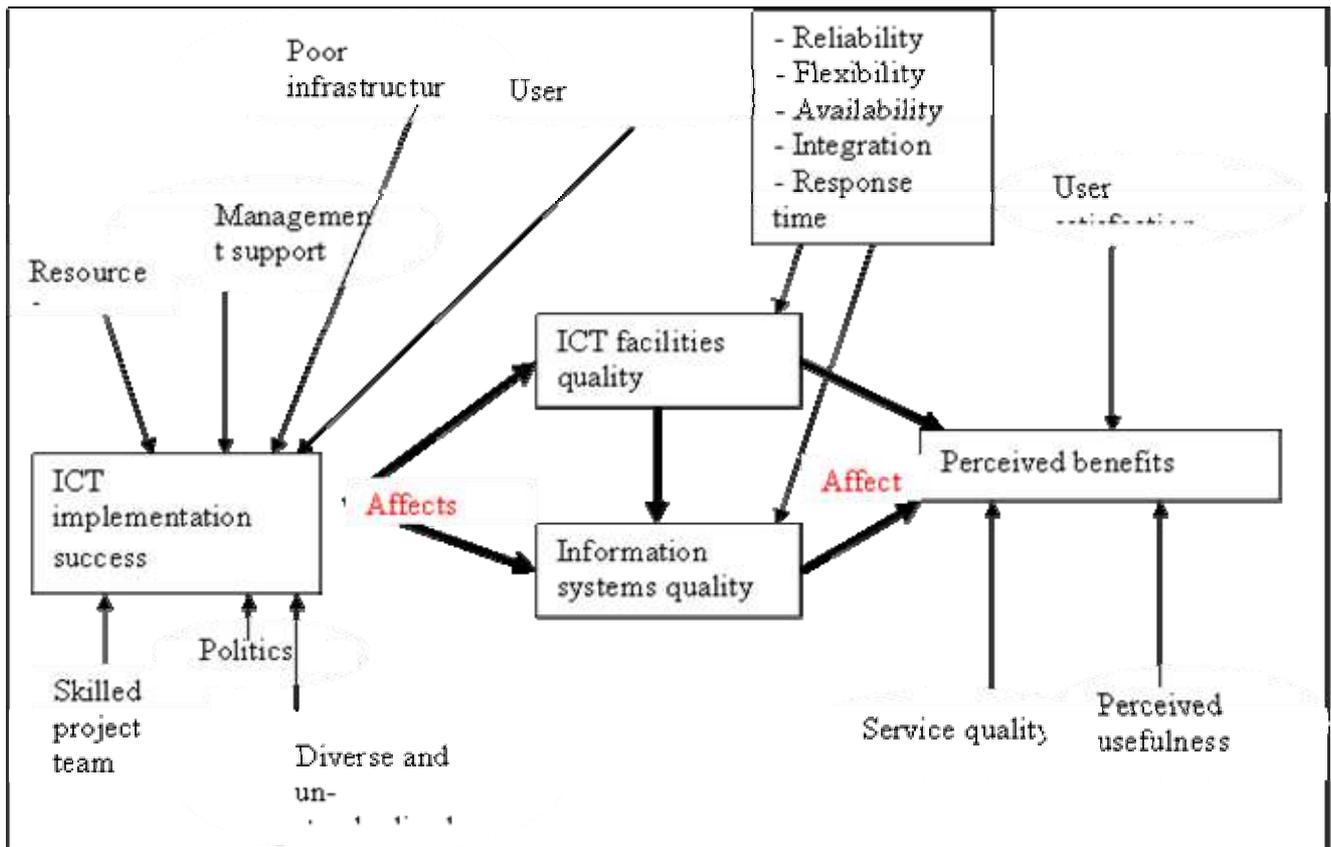
Figure 1: Research framework

3. ICT performance evaluation

ICT evaluation can be defined as establishing by quantitative, and/or qualitative methods the value of the ICT to the organisation Khalifa et al. (2004). Performance cannot be judged as good or bad without the successful implementation of the project. In this paper, the technical or operational implementation of ICT infrastructure is of interest.

Evaluating ICT projects can be quite problematic and can sometimes be quite subjective (Heeks 2002, Currie 1995, Bannister, Remenyi 2004, Irani 2002, DeLone and McLean 2002, Bannister and Remenyi 2000) and there is no single ICT evaluation method that can be applied to all situations (Khalifa et al. 2004). Currie (1995) justifies this position using various case studies drawn from businesses in various developed countries while Heeks (2002) observes that evaluation is subjective and can depend on circumstances including time. Evaluation leads to the determination of success or failure of an ICT project.

4. ICT and IS success and failure

Literature shows that planning and management of ICT projects has a very poor record in developing countries (Galliers et al. 1998, Qureshi

1998, Heeks 2002, Mgaya 1999). However, a careful review of reasons for failure identifies other factors whose presence or absence determines success or failure of projects. To begin with, the researcher looks at the output variables which are the benefits to be achieved if the initiative succeeds. The purpose of this is to clarify the goal of ICT projects. These goals may form a key element to the planning process as described above. Achievement of these goals helps to determine how to classify ICT projects. In addition, perceptions of, and reasons for ICT failure are reviewed and these helps to identify possible key variables.

4.1 Output variables

Many benefits can be achieved using ICT in government. However, a word of caution given by Saul and Zulu (1994) is in order. The authors see ICT as a means to an end and not an end in itself. The value of ICT lies in its ability to assist the government in finding solutions to its problems. ICT expenditure can only be justified if there are benefits accruing to it and not adopting it for its own sake.

The benefits are listed below:
- Cost reduction
- Quality of service delivery

- Increasing capacity of government
- Improved decision making
- Transparency
- Improved efficiency
- Improved access to information
- Other technological benefits for example cheaper and efficient and access to large storage capacities within larger and more advanced computers

4.2 **Categorisation of ICT projects failure**

Broadly, the assessment of worth of an ICT venture focus on considerations of the success and failure of IS. The issue of ICT failure can be analyzed by assuming that learning from IS failures will provide us with important lessons for formulating successful strategies for the planning, development, implementation and management of information systems. While discussing dimensions of ICT failure, Beynon-Davies (2002, p. 201) considers both the horizontal and vertical dimensions of the informatics model. The horizontal dimension is expressed in terms of the difference between development failure and use failure. The vertical dimension is expressed in terms of failure at the level of ICT systems, IS projects, or organization, or at the level of the external environment. Six types of IS failure is identified as follows:

- Technical failure
- Project failure
- Organizational failure
- Environmental failure
- Developmental failure
- Use failure

Beynon-Davies supports the argument with several case studies and quotes other models for IS failure put forward by Lyytinen & Hirschheim (1987).

ICT success or failure in developing countries can be categorized into three depending on the degree of success (Heeks 2002). First, is the *total failure* of an initiative never implemented or in which a new system was implemented but immediately abandoned. Second is *partial failure* of an initiative, in which major goals are unattained or in which there are significant undesirable outcomes. Associated with partial failure is the *sustainability failure* where an initiative first succeeds but is then abandoned after a year or so. The last is *success* of an initiative where most stakeholders attain their major goals and do not experience undesirable outcomes. For the purpose of this paper, Heeks categorisation is more relevant since it can be used to categorise the few projects implemented by the Kenyan government using the above criterion as the case may be.

5. Factors for ICT success and failure

While discussing factors for success and failure, it is necessary to clarify the "opposite" effect of most factors. This means if the presence of a factor encourages success, the lack of it encourages failure (examples are, proper infrastructure and well motivated staff). The converse is true such that if presence of a factor causes failure, its absence will cause success (examples are bureaucracy, poor project and change management).

5.1 Factors for success

Factors for success are those occurrences whose presence or absence determines the success of an ICT project. They can be drivers or enablers as described by (Moran 1998, Riley 2000, Doherty et al. 1998, Heeks 2003b, Mugonyi 2003, Heeks 2004, Khaled 2003). . Their absence can cause failure and their presence can cause success. *Drivers* are the factors that encourage or reinforce the successful implementation of ICT projects. Some of these are listed below:

- Vision and strategy
- Government support
- External pressure and donor support
- Rising consumer expectations
- Technological change, modernization, and globalization

Enablers are the active elements present in society, which help overcome the potential barriers. Some of these are listed below:

- Effective project, coordination and change management
- Good practice

5.2 Factors for failure

The factors for failure are those occurrences that constraint proper/smooth implementation of ICT projects in government. These can either be barriers or inhibitors as described by (Khaled 2003, Gakunu 2004, Aineruhanga 2004, Heeks 2003a, Ndou 2004, Bhatnagar 2003, Saul and Zulu 1994).

Barriers can be considered as those occurrences that hinder ICT implementation. Some of these factors for failure are listed below.

- Infrastructure
- Finance
- Poor data systems and lack of compatibility
- Skilled personnel
- Leadership styles, culture, and bureaucracy
- Attitudes

Inhibitors do not necessarily prevent the implementation of ICT projects but they do prevent advancement and restrict successful implementation and sustainability. Some of these factors for failure are listed below.

- User needs
- Technology
- Cordination
- ICT policy
- Transfer of ICT idolisers
- Donor push

6. Previous models for ICT project success

Several models for assessing success, failure and the way forward for ICT systems in general DeLone and McLean (2002) and developing countries Heeks (2002) have been suggested. These and other models are considered relevant to this paper. The model proposed by DeLone and McLean (1992, p.87) was later overlaid on a simpler scheme of functionality, usability and utility by Beynon-Davies (2002). This overlaid model introduces the idea of functionality and usability, which are considered relevant to ICT implementation. Beynon-Davies argues that, the worth of an IS will be determined in the three contexts of functionality, usability and utility.

DeLone and McLean (2002, p.2) acknowledged the difficulty in defining information system success and noted that different researchers address different aspects of success, making comparisons difficult and the prospect of building a cumulative tradition for I/S research similarly elusive.

The ITPOSMO model seeks to explain the high rates of failures of information systems in developing countries Heeks (2002). This model assumes the designers of IS are remote which means their contextual inscriptions are liable to be significantly different from user actuality. It assumes the designers come from developed countries or have been trained in developed countries and their knowledge of the local circumstances is at variance with the local reality. This model can be used in explaining some of the reasons as to why implementation of ICT in Kenyan government fails. However, the interest of the paper is on the whole of the ICT implementation which views IS as a passenger.

The first two models deal with ICT/IS in general but Heeks model is for ICT/IS implementation in government and especially in developing countries. All these models act as useful guides in highlighting some of the key variables that affect ICT success. They are considered in this paper as

far as they help in shaping the process of identifying the areas of weaknesses in ICT implementation in government. In this paper, functionality is considered to depend on ICT systems and usability and utility are crucial in determining stakeholder satisfaction, which increases stakeholder acceptance, and reduces resistance to adoption.

7. Action plan for success

The best way to achieve maximum benefit for ICT implementation is to have all the factors for success with no occurrence of the factors for failure. However, in real world that is not the case. Given such a situation, an action to increase the chances of success is required. Clockwork (2004) suggests the following framework for implementing e-Government projects.

The framework consists of five stages:

- Examine national e-Readiness
- Identify and prioritize themes
- Develop a program of action
- Apply to target groups
- Implement solutions – the final stage of the framework, is to implement the solutions. A key factor in this implementation is to ensure that the organization is ready and in place to realize the new activities and corresponding changes.

Some ICT best practices that have been "harvested" from a review of successful applications are suggested by Clockwork. Given their simple situation, developing countries are in a position to make effective and speedy use of such best practices for their own purposes. This can be viewed from an angle of 'technology leapfrog' which can be achieved through appropriate technology transfer (Ifinedo 2005).

The suggested best practices in ICT are:

1. Do not underestimate the complex environment in which ICT programs evolve. ICT projects are too often believed to have a technology focus.
2. Be sure to select a project that is expected to demonstrate the greatest benefit for your target group.
3. Government staff should be 're-skilled' to anticipate the changes that accompany an ICT structure and new roles
4. Identify the right technologies.
5. Make a decision on how an organizational process fits your technology.
6. Strong program and project management is essential to develop and implement successful ICT solutions.

7.   Do not underestimate the total cost of ownership (TCO) of an ICT project.

The above best practices might not be sufficient but they can act as a basis for further research. In this paper, the best practices have been analyzed but their adoption in Kenya is not clear at this early stage of e-Government implementation.

7.1 Conducting e-Readiness assessment

In this paper, e-Readiness refers to the government ability to take advantage of the ICTs as a facility to enhance and improve its administrative functions. e-Readiness has several components, including telecommunications infrastructure, human resources, and legal and policy framework.

e-Readiness assessment suggested above can be conducted on:

- Data systems infrastructure
- Legal infrastructure
- Institutional infrastructure (standardization of various departmental means of communication and the technology that is used)
- Human infrastructure
- Technological infrastructure
- Leadership and strategic thinking readiness (short, medium and long term plans by specific government ministries)

In this regard, e-Readiness assessment can be used as an information-gathering mechanism for governments as they plan their strategies for ICT implementation. It can help the project team to better understand what impediments to ICT implementation exist and what initiatives are needed to overcome them.

7.2 Design divisibility

Divisibility of local design can decrease chances of failure as explained by Heeks using the Volta River Authority (Ghana) as an example (Heeks 2002, p.109). Divisibility is achieved by: modularity (supporting one business function at a time by allowing separation of, for example, accounting and personnel functions), incrementalism (providing stepped levels of support for business functions by allowing separation of, for example, clerical and management support). In Kenya this has been achieved to some extent. Both the personnel and accounting functions are computerised with varying degrees of success within the ministries. This has been done through the implementation of Integrated Financial Management Information System (IFMIS) and the Integrated Personnel and Pensions Database IPPD). Heeks (2002) observes that design divisibility is therefore a

prophylactic against failure and should be adopted more widely.

7.3 Local improvisations

According to Heeks (2002), local improvisation is done to reduce actuality-reality gaps. This can be through hybrids that recognize local capacities and improve success rates. However, Heeks notes that schemes to develop these hybrids in the DCs are virtually nonexistent thus hampering improvisation. Participative approaches to implementation e.g. group working and end-user involvement; have to be carefully considered since most have been developed for the industrialized countries. Examples of how these participative IS techniques were a failure, are the case of Mexico's General Hospital and an end-user development initiative for health IS in South Africa (Heeks 2002). The implementations failed because of the large gap between design assumptions and requirements and actuality of organizations into which ICT was introduced. The conclusion drawn is that these implementations failed because there was too large a gap between the design assumptions and requirements of those techniques and the actuality of organizations into which they were introduced and not necessarily because of participative design is necessarily wrong.

8. A descriptive conceptual framework for developing countries context

A framework for mapping the knowledge gained from both the literature and the case studies is given in figure 3. The framework gives a pictorial representation of a conceptual format of the literature for representational purpose. Input variables are all those factors considered as inputs to an ICT project. Some of these factors though necessary might be absent and are considered to be factors for failure. Other factors are present but their presence becomes obstacles to success. These are categorised as factors for failure.

The input variables that act as the foundation of the ICT project and are considered as main ingredients to ensure the success of the project are referred to as drivers or prerequisites while those variables that encourage success are referred to as enablers or essentials. As ICT projects are implemented, it is necessary to map the input variables to assess where action should be taken.

Output variables are represented as either organisational or technological benefits. The

organisational benefits are the benefits that accrue to the organisation. Technological benefits may not necessarily accrue to the organisation but are regarded as benefits resulting from implementation of the technology. These benefits can be enjoyed by individuals, the organisation and the public.

Lastly the framework shows the response which is presented as action for success. The response proposed has three characteristics. First, it analyses the situation, second, it looks at the various factors contributing to success and/or failure and finally an action for success to a

situation specific action. Input and output variables are considered as far as they affect the success and failure of ICT implementation. The framework takes cognisance of broad premises (benefits, challenges and impact) of the Kenyan perspectives discussed in this paper and those observed by (Avgerou and Walsham 2000, Berleur and Drumm 2003, Heeks 2002) for both research and action.

In the response, action is taken to increase the chances of project success by reducing the impact of the factors for failure and increasing the strength of the factors for success.
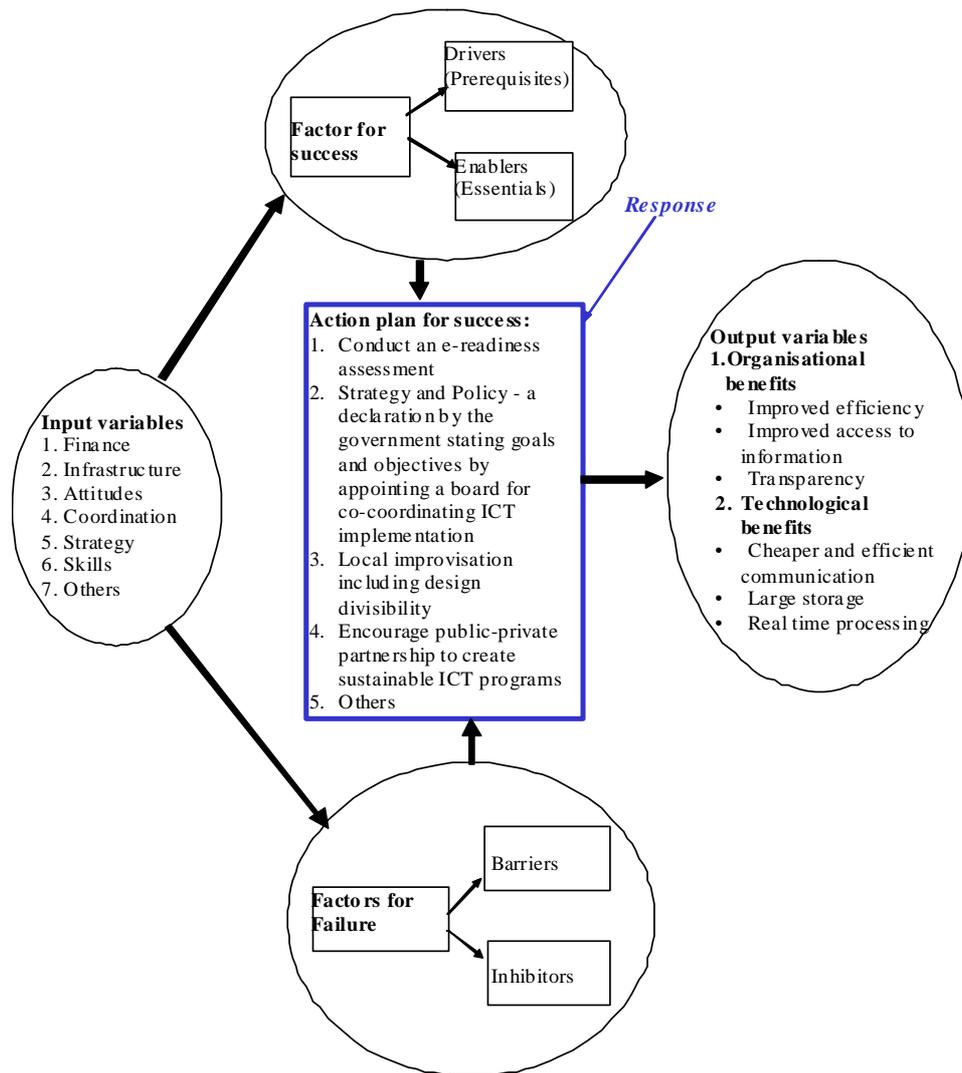

Figure 3: Descriptive framework

9. Conclusion

To fulfil the development needs of ICT projects, those involved in the design, implementation and management of IT-related projects and systems in the developing countries must improve their capacity to address the specific contextual characteristics of the organisation, sector, country

or region within which their work is located (Avgerou and Walsham 2000). As the literature reviewed suggests, developing countries are still far behind in implementing e-Government and it is hoped that successful implementation of ICT projects will act as a strong foundation for e-Government initiatives.

In this paper, the factors affecting ICT implementation have been categorised into factors for success and factors for failure. These have been further categorized as either drivers, enablers, barriers or inhibitors. The paper does not classify the factors in terms of their influence. However, vision and strategy and government support are considered important for success while lack of funds and poor infrastructure are considered as major factors for failure.

As many arguments for ICT planning prove, ICT project implementation is a complex exercise and more research is needed to identify challenges, good practice and solutions for successful implementation. This paper analyses and syntheses both all information gathered to develop a framework that hopefully can be used during ICT infrastructural planning and implementation in developing countries.

The response framework discussed in this paper is expected to be used to:

- Provide a basis on which to analyze and specify international support and cooperation from development partners on ICT projects
- To produce guidelines that the governments can use to help define their needs and agendas with regard to government ICT implementation and use
- Provide a basis for assessing good practice for ICT implementation in government
- Contribute to the body of knowledge on ICT implementation

According to Doherty et al (1998), the factors that influence the ultimate level of success or failure of informatics projects have received considerable attention in the academic literature. Doherty et al (1998, p.3) summarised studies on success factors and current research objectives involving empirical studies. Future papers will include the findings of cases studies done in 9 ministries of the Kenyan government. Therefore, this further research will identify and categorise the factors influencing ICT implementation according to their degree of influence in Kenya and suggest possible actions.

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e-Government in Greece: Bridging the gap Between Need and Reality

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Abstract: Currently in Greece, the Operational Programme for the Information Society (OPIS) is promoting ICT in the public sector. However, a content study of Greek government websites reveals that at local level e-Government has generally not progressed beyond the information presentation stage. The findings of an online survey of government employees and interviews with key government officials suggest reasons for this. Recommendations are made for facilitating the development and implementation of full interactive local e-Government.

Keywords: Information society, e-Government, EU, Greece, public sector, local government

1. Introduction

In June 2000, the European Conference endorsed the eEurope 2002 Action Plan designed to develop a "competitive, dynamic and knowledge-based" European economy based on ICT (Europarl, 2000). The eEurope 2002 plan had three objectives: "a cheaper faster more secure Internet; investment in people and skills, and stimulating the use of the Internet"(eEurope, 2005). The aim, articulated at the Lisbon Summit of March 2000, was to make Europe "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion" by 2010 (Sjaastad. & Thomassen, 2004).

This plan was superseded by eEurope (2005), presented to the Seville European Council in June 2002, which stated that "modern online public services" including "e-Government, e-learning services, e-health services" as well as "a dynamic e-business environment" should be prevalent in the EU by 2005. It was claimed in the plan that the "widespread availability of broadband access at competitive prices" operating in tandem with "a secure information infrastructure" would be critical to the successful implementation of the strategy. In a further refinement of the strategy, in September 2003 the European Commission defined e-Government as "the use of information and communication technology in public administrations combined with organisational change and new skills in order to improve services and democratic processes and strengthen support to public policies" (Europa, 2005). This definition could be described as the mission statement for e-Government in the European context, and implied that enhancing the democratic process was just as important as improving public services. In many ways the rhetoric surrounding e-Government initially echoed that of advocates of the expansion of ICT in the private sphere. There, for example, talk of open, transparent organisations evolving into flatter more democratic structures is a repeated theme (Healy & Iles, 2003). During this period, European Commission documents concerning e-Government talked of empowering citizens, "the improvement towards more transparent, accountable and open public institutions"; the fight against corruption and fraud; and the re-enforcement of democracy (Liikanen, 2003).

By October 2004, the focus of the EU's e-Government drive had undergone a significant policy shift. Now the e-Government target had become the improvement of public "administrative efficiency", recalling the objectives of the Lisbon Summit. In short, the dual focus on democracy and efficiency was effectively dropped in favour of the latter. At the same time, the EU was expanding from 15 to 25 members states. As a result, a persistent theme in many of the eEurope 2005 documents was the need to use ICT to encourage inclusiveness within the enlarged Union. Despite this, the emphasis was increasingly concerned with the efficient delivery of services.

The change in direction was articulated through the specific targets outlined in the eEurope 2005 Action Plan which covered interactive public services, public procurement, Public Internet Access Points (PIAPs), interoperability, culture and tourism; and secure communications between public services (European Commission, 2004a). Each of these areas had specific target dates by which a number of objectives had to be completed. For example, by the end of 2005 member states have been urged to ensure that…

"…basic public services are interactive, where relevant, and accessible for all. The Commission and Member States must agree on a list of public services for which interactivity and interoperability are desirable. Relevant issues include exploiting the potential of broadband networks and multi-platform access, and addressing access for people with special needs..." (European Commission, 2004a).

More recently, John Borras (2004) of the UK e-Government Unit has emphasised that "e-Government strategies are about harnessing the information revolution to improve the lives of citizens and businesses, and to improve the efficiency of government". However, none of the twenty basic supply-side public services key indicators defined by the European Commission to monitor progress on e-Government relates directly to e-democracy. In spring 2005, the European Council will undertake a mid-term review of the Lisbon objectives, and the evidence so far indicates that there has been less progress than anticipated. In the circumstances it is likely that the development of e-Government will focus ever more tightly on the efficient delivery of public services.

Given this focus, any exploration of e-Government should direct its attention to how EU member states have been in using ICT to improve the efficiency of public services and government as well as determining the extent to which these services can be effectively accessed and used online. Evidence collated by Eurostat in 2003 found, not surprisingly, a significant variation across member states in the extent to which e-Government strategies had been met (Eurostat, 2004). Whereas Denmark, Finland and Sweden had well-developed Internet interaction between government and businesses and citizens, Germany and the UK needed to enhance their provision. It was decided to focus this study on a particular case in order to illustrate the difficulties with implementing e-Government strategies and to identify the challenges facing the public sector. This paper concentrates on local government in Greece, and will now outline briefly some of the recent key developments in that country.

In February 1999, the Greek government published a paper 'Greece in the Information Age Strategy and Actions' (Greek Government, 1999). According to official reports and statements, the Greek Government was keen to promote ICT in general and e-Government in particular. However, relative to the then 14 other EU members, Greek online capability was low, with Internet household penetration less than 14% in 1999, a figure that increased only marginally between 2001 and

2003. On a range of measures including Internet access by household; Internet hosts; and PCs per 100 inhabitants, Greece in this period was bottom of the EU league (ITU, 2004). Despite more recent data indicating that within Greece Internet access is growing, it still is low compared with other EU countries' (ClickZ Network, 2005).

In addition, the broadband penetration rate in Greece is very poor. In January 2004, Greece held bottom place of the 15 members of the EU with just 0.1% penetration compared with the EU average of 6.1%. Four member states had achieved penetration rates higher than 10% in 2004, Denmark being top place with 12.7% (European Commission, 2004b). A year later, Greece had made little progress and remained in bottom place, the only EU member state with lower than 1% broadband penetration. The EU average in 2005 had risen to 10% for the old 15 states, and the average for all 25 states was 9%. Ten states had achieved more than 10% penetration, the Netherlands being in top place with 19% (European Commission, 2005).

The Community Support Framework 2000-2006, known as 3rd CSF, is "the development plan, agreed and adopted by both the Greek Government and the European Commission, to deliver assistance to the Greek regions for the period 1/1/2000 to 31/12/ 2006" (HellasKPS, 2004). This plan seeks to address a number of the ICT inequalities mentioned above.

"The 3rd CSF was approved in July 2000 and signed in November 2000. While the main priorities of this development programme were defined in cooperation with the Commission, the choice of projects and their management are solely the responsibility of the Greek national and regional authorities. Once projects are selected, they are financed from both national and community funds, since programme budgets always comprise European Union funds as well as national sources (public or private). The 3rd CSF aims to reduce the gap between Greece and the other member states of the European Union. Its priorities focus on investment in natural, human and knowledge resources." (HellasKPS, 2004)

An explicit part of this programme is the focus on ICT and is the responsibility of the Operational Programme for the Information Society (OPIS). OPIS is "an innovative horizontal programme, cutting across government departments, which aims to implement the essential features of the 1999 White Paper of the Greek government entitled *Greece in the Information Society*. It also follows through the eEurope initiative and the

conclusions of the Lisbon Summit of March 2000" (Infosociety, 2004).

OPIS is in effect a managing authority acting as an agent for the Ministry of Economy and Finance Secretariat for the Information Society. "Among the main objectives are to improve the competitiveness of the Greek business (in particular small and medium sized enterprises which are 98% of the total enterprises in Greece), to achieve higher quality of life and standards of living using ICT for better public administration (e-Government), better health services (e-health), better education, etc." (Mavrotas *et a*l, 2004).

There has been a degree of success in the development of e-Government at a national level. *Taxis* (an online tax facility); the National Printing House; *IKAnet* (a national insurance transaction facility); and *Syzefxis* (the national public administration network) are some of the examples of progress thus far (Greek Government, 2002). The *Syzefxis* programme is a project of the Greek Ministry of the Interior, Public Administration and Decentralization that aims to develop "an effective public administration with a modern information and telecommunications infrastructure and the easier coordination of state processes through IT and Tele networking" (Informatics Development Agency, 2004). Phase A of the project is included in the Operational reform Programme (OP) *Kleisthenis* whilst phase B will be included in the OPIS. In addition, a significant number of national public services had an online presence although there is a wide variation in their interactive capability. There has also been progress in the building general information sites and portals.[1] "The state organizations, which will be finally connected with the Public Administration's network, are the central and regional administration as well as the prefectural and local administration." For the project's pilot phase a representative group of 15 state organisations has been connected to a network, which will be "characterized by technical and functional completeness" (Informatics Development Agency, 2004).

Looking more specifically at local government, the Ministry of the Interior, Public Administration and Decentralisation implemented an OP called *Politeia* which "is the main element of a co-ordinated effort to promote reform of the structure and activity of public administration, with the primary aim to improve services offered to the public" (OECD, 2004). As part of this effort, Citizens' Service Centres (CSCs) designed as 'one-stop' shops for services to the citizen, were introduced under the Ariadne Project, and operate using up-to-date ICT. These centres "are institutions, running under the supervision of Greek local municipalities, realising a flexible citizen-centric mechanism, which aims to increase the flexibility and efficiency of the way citizens interact with the public sector" (Tambouris *et al*, 2004). Citizens using portals at the CSCs can obtain applications of around 851 standardised administrative services covering virtually all the public sector.

2. Methodology

In order to study the use of ICT in local government in Greece, various approaches were adopted. Mingers (2001) argues that different research methods focus on different aspects of reality and that therefore a richer understanding of a research topic will be gained by combining several methods together. Data were collected using a website content study, interviews, and using an online survey of mainly local government employees.

A content study of 460 central, regional and local government websites in Greece was conducted in August 2004. The Hellenic Agency for Local Development and Local Government (EETAA) maintains an online database of the local authorities in Greece that have a web presence.[2] All of the websites listed were visited.

Recognising there is no agreement on appropriate bench-marks or what constitutes an effective government website (West, 2004), the local government websites were reviewed on their operational state and what sort of interactive features they provided. Moreover, contact details such as email addresses were examined from the published list on EETAA's website.

Semi-structured interviews with major players in e-Government in Greece were carried out. The Secretary General for the Information Society and Head of the Information Society (OPIS) Managing Authority were interviewed. The Information Society Secretariat is a Ministry of Economy and Finance Agency responsible for promoting the Information Society in Greece and handling all EU funding destined for these programmes via its Managing Authority. Telephone interviews were conducted with officials from the Hellenic Agency for Local Development and Local Government, the Central Union of Municipalities and Communities of Greece and the General Secretariat of Public Administration and E-Government (an Agency of the Ministry of the

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[1]   These sites include: www.e-gov.gr, www.gspa.gr, www.ypes.gr, www.infosociety.gr, www.ebusinessforum.gr, www.goonline.gr and www.sch.gr

[2]   www.eetaa.gr/cgi-bin/msql/foreis/01

Interior). To obtain information about the infrastructure and Internet penetration in Greece from the user's perspective, the Head of the Market and Competition Department of the National Telecommunications and Post Commission was interviewed.

An online survey of local government employees was undertaken, accompanied by email inviting respondents to participate. This method had the advantages of response speed and low cost. Also, because of the distances involved, it was impractical and financially unfeasible to access the sample in Greece by other means. The sampling strategy used was 'probability sampling' (Blaxter *et al.*, 2001) with a combination of random and systematic sampling. Respondents were chosen at random from the alphabetical lists of local authorities in Greece who had a web presence. Other respondents were added from the list of the Regional Authorities which the Central Union of Municipalities and Communities of Greece maintains on its website. In addition, a small percentage of respondents were added either for information only or out of courtesy for their help or contribution to this research. In total, 248 emails were administered.

An email was sent to the respondents explaining the purpose of the survey, how the sample was chosen and containing contact details as well as a statement that the questionnaire was confidential, anonymous and there was no obligation arising upon its completion. Attached to the email was a downloadable questionnaire. Thus, three choices of completing and returning the questionnaire were given: online, by email and by post.

A ten-item questionnaire was used, based on the Haart/Teeter national public opinion survey of government workers on e-Government conducted on behalf of the US Council for Excellence in Government (Hart/Teeter, 2003). Data collected included:

- service or agency the respondent worked for
- position held (administrative, technical or elected)
- whether their agency/department had a public website
- which services their agency/department provided over the Internet (if any)
- what other services the respondent thought should be provided over the Internet
- whether their agency/department was participating in any pilot projects, actions or measures of the 3rd Community Support Fund

- whether their agency/department was planning to increase their web presence
- a rating on the importance government agencies communicating clearly to users the privacy and security policies that apply to their websites
- opinion on what should be the government's top priority for government websites
- Identification of obstacles to e-Government.

3. Results obtained

According to the Central Union of Municipalities and Communities of Greece (KEΔKE, 2004), there are two tiers of local government and regional administration in Greece, as a result of the recently reform under the *Kapodistrias* Municipal Code (1995) which came into force in 1999:

- 13 regions (peripheries)
- 51 prefectural authorities, including 3 extended prefectural authorities and
- 1,031 municipalities (130 urban municipalities – *dimi* and 901 rural communities – *kinotites*)

Under the *Kapodistrias* reform, the number of local authorities was reduced from 5,775 to 1,031 in order to create a strong first-tier local government.

Out of the 1,031 local authorities, 641 were listed on the EETAA database along with 42 out of the 51 prefectural authorities, as well as 49 Local Unions of Communities and Municipalities (TEΔK) and 133 Municipality Development Agencies (Δημοτικές Επιχειρήσεις). None of the regional authorities was listed. (With regard to the first tier of government authorities, 63% in total were listed.) Overall, out of the 865 authorities and agencies listed, 460 had websites (53%) whilst 754 (87%) provided an email contact address on the EETAA list. Nevertheless, it was discovered subsequently that not all were operative, as 16% out of 248 emails bounced back whilst trying to administer the survey questionnaire.

The operational state of the 460 websites visited was: 364 of the websites (77%) were working, 96 (20%) returned an error page response and 12 (3%) were under construction. With regard to interactive features, 93 had a second and sometimes a third language option. A few stated that the language option was under construction, but only on the tourist page. Whilst the majority of municipalities' websites had available contact information via email or the facility to submit a form request by email using mailer Active Server

Pages (Mailer ASP), only a few provided an email directory of their departments or employees. The contact information provided most frequently was telephone numbers or extensions. Eleven percent of the municipality and rural community websites had other interactive features such as instant polls about current issues (e.g. Olympic Games), weather reports and a live webcam link. In general, the most commonly found online interactive services included requesting information or services and filing complaints by completing a form.

The response rate of the survey was 18%. An examination of the responses shows that, along with the lack of or limited responses from regional and prefectural authorities, there is a different perception of e-Government in different levels of local government. Furthermore, although the majority of the respondents were working for municipalities and rural communities, there were a number of responses from Ministries as well the National School of Public Administration & Local Government and the Hellenic Agency for Local Development and Local Government. These respondents had a stake in promoting e-Government, being responsible for the proliferation of ICT in public administration. The majority of the respondents were administrative personnel in elected councils, although there were some technical personnel and an elected respondent. Moon (2002) argues that managers in council-manager municipal governments tend to be more proactive in introducing technological innovations such as web technology to the public sphere than mayors who are elected officials and tend to hold political views. The fact that replies were made up to the end of November 2004 (way beyond the deadline given to the respondents) could be attributed to the authorities and local authorities' employees' reluctance to act without prior authorisation from above.

There was a variety of services provided online by the websites of the respondent authorities but none of them provided web-based services for any online transactions. The most popular services concerned provision of tourist information, maps, cultural information and downloadable documents and forms. However, when asked "What other services do you think should be provided online?" several respondents indicated that they would like to have on their websites more interactive services for both citizens and businesses, as well as real-time updates about executive decisions, local authority

legislation, and other issues. The latter response shows a desire for democratic responsiveness. Although only 67% of the respondents surveyed confirmed participation in a pilot programme, action or measure of the 3rd CSF, they were all aware of it, as the 3rd CSF, which includes OPIS and other regional development projects, is the main financing tool. This could corroborate the response to the next question which asked if they were planning to increase their web presence, where 81% answered affirmatively. Of the remainder, 5% responded No, and 14% did not know. Online security and privacy were rated highly on the agenda by the respondents, both in terms of informing and reassuring the citizen, and as a top priority for their authorities' websites. Other priorities included the need for a wider participation and openness and providing more user friendly interfaces.

4. Discussion: Implications for research and practice

e-Government develops in stages. However, the relationships and stages of e-Government are more complex than in electronic commerce in general. In recent years, conceptual frameworks for the evolution of e-Government have been developed.

Hiller & Belanger (2001) suggested that "e-Government can be considered through two lenses: the type of relationship and the stages of integration" and offered five stages of development for e-Government. Layne & Lee (2001) regarded e-Government as an evolutionary phenomenon and suggested a four-stage growth model: (1) cataloguing, (2) transaction, (3) vertical integration, and (4) horizontal integration. For the purposes of this discussion the framework devised by Reddick (2004), who examined both of the above models and concentrated on two of the four stages proposed by Layne & Lee – cataloguing and transactions – will be used. Like Hiller & Belanger, he conceded that stages of growth are combined with major types of e-Government relationships: "E-Government can involve electronic relationships between government and different levels of constituents." The first relationship identified is government delivering services to individuals or rather citizens (G2C); the second is government to government (G2G)/ and the third, government to business (G2B) – see Table 1:

Table 1: Stages of e-Government growth and type of government relationship

Type of government relationship	Stages of e-Government growth	
	Stage I: Cataloguing	Stage II: Transactions
G2C	Online presence of information about government and its activities for citizens. Example: council meeting minutes online.	Services and forms online and databases to support online transactions for citizens. Example: online payment of taxes.
G2G	Online presence of information for other levels of government and its employees. Example: intranet with benefits information.	Services and forms online and databases to support online transaction for other levels and government and employees. Example: provide online training.
G2B	Online presence of information for businesses about government. Example: online product review of office supplies.	Services and forms online and databases to support businesses transactions with government Example: make purchases of office supplies online.

Source: (Reddick, 2004).

The application of Reddick's model of e-Government development to the survey findings illustrates that:

- The Government to Citizen relationship (G2C) provision by the local authorities is largely in the first stage of cataloguing information. There is also a correlation between the size of the municipality or rural community with its online presence (if any).
- The Government to Government relationship (G2G) is virtually non-existent at a local government level despite the optimism of the *Syzefxis* pilot network implementation at the central government layer.
- The same could be said for the Government to Business relationship (G2B), as local government authorities either do not participate or are not included in the e-procurement project which is yet to be implemented by the General Secretariat of Commerce.

e-Government growth at a local government level in Greece is not aligned with the progress that has been made in the central public administration layer. The results of the content study indicated that different municipalities had different types of websites. There was no correlation however between the size of cities or municipalities and communities and their sites.

The content study also found that there was no common framework for the design of the websites; in fact it was found that their designs varied significantly. Certain prefectures however, such as Fokida and Dodekanisa, had a universal design template for their municipalities' and communities' websites, although the former was fretted with (encoding) problems.

The progress of the OPIS shows that the take-up rate of contracts is slow, as there is a certain procedure that has to be followed, and thus it becomes a long project that does not necessarily fit with the short life cycle of ICT implementation.

The survey results also suggest that there are serious institutional obstacles to e-Government evolution such as the lack of familiarisation of employees with new technologies and lack of management support. The lack of financial resources and issues of security/privacy are considered to be major obstacles too – see Figure 1 below:

These barriers, in combination with the inability to recruit qualified personnel and the entrenched operating procedures, highlight the need for institutional change and re-engineering of the business processes.

5. Conclusions

Evidence has been presented that shows the implementation of websites by municipal and rural community authorities in Greece is a recent phenomenon. There is however an indication of enthusiasm and optimism as evidenced by both the survey findings and the interviews conducted. Moreover, there is a yearning for democratic responsiveness and outreach which is both positive and encouraging as e-Government will enhance service delivery for local government authorities in the most effective way.
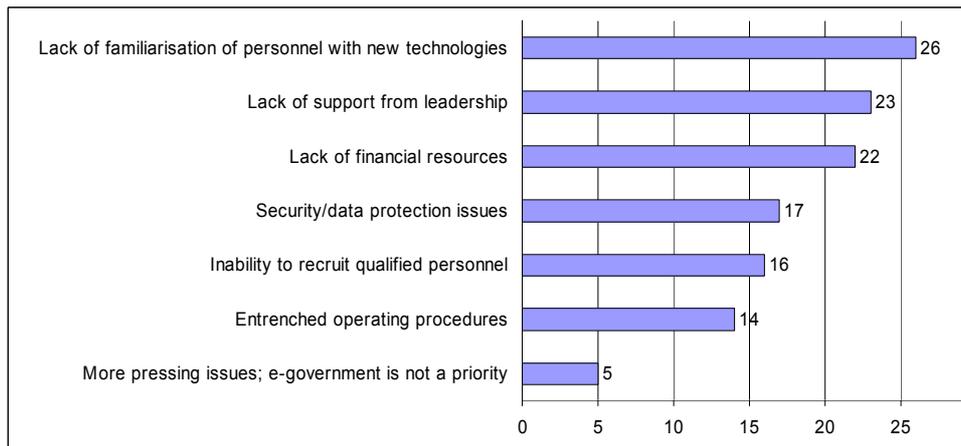
Figure 1: Possible obstacles to e-Government implementation

Funding the e-Government infrastructure and development is quite a challenge for local authorities in Greece, especially after the reform for local authorities and regional administration brought by the *Kapodistrias* Municipal Code involving some decentralisation of power and financial autonomy.

A well-defined national framework that will identify necessary funding and resources, similar to that in the UK, is essential. Also recommended is the establishment of an e-Government Unit that would be responsible for implementation, co-ordination between ministerial agencies already involved, and monitoring of national projects.

Institutional and organisational change is imperative, as well as education and training on the new technologies for local government employees. Furthermore, local government business processes re-engineering should be considered prior to a catholic adoption and implementation of e-Government.

In bridging the digital divide, the swift development of broadband infrastructure and propagation of Internet penetration should be undertaken by the Greek administration, not only for the public sector and business but also for citizens. These targets are already laid out in the European Initiative eEurope 2005 of which Greece is a participant. So far, a working group has been set up and they have decided on nine points for the 'Broad Band Strategy of Greece'. It remains to be seen what the outcomes will be.

Finally, more interactivity in transactions with the citizen, building trust and creating portals by integrating many services together are some of the measures needed, since the potential for a full democratic outreach and increase of responsiveness is there.

Further useful research would be a comparative study of EU countries that have achieved the best, the worst and in-between levels of e-Government to try and identify which factors are associated with progress and lack of progress in e-Government. The findings of such research could enable the most effective targeting of resources in countries like Greece. In Greece itself, further research needs to be conducted including an evaluation of local and central e-Government in order to assess integration and public participation.

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Stages of Growth in e-Government: An Architectural Approach

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Abstract: Governmental agencies from all over the world are in various stages of development to migrate their traditional systems architectures to more horizontally and vertically integrated architectures. In this paper a stages of growth model for the development of information architectures for local governmental agencies is presented. By analyzing discontinuities in the architectures coordinating back and front office applications five stages are derived. The five-stage model consists of 1) no integration, 2) one-to-one messaging, 3) warehouse, 4) broker and 5) orchestrated broker architecture. Public decision-makers can use these stages as a guidance and direction in architecture development, to reduce the complexity of the progression of e-government initiatives, to communicate changes to the rest of the organization and to provide milestones to evaluate and control cost of architecture development.

Keywords: Information architecture, local government, stage models, coordination, information broker, web service orchestration

1. Introduction

Citizens in all countries are calling for better services at lower costs and for more responsiveness in a dynamic and continuously changing environment. The information architectures need to be in pace with these development. Initiatives are confronted with a highly fragmented information architecture that has often been vertically organized around departments. In general, in the current situation each department has developed its own information systems in relative isolation, and for each product or service a separate information system exists (Janssen, Wagenaar and Beerens, 2003). As such there is a need for more horizontally and vertically integrated architectures addressing the communication between systems within and between departments and organizations. Most public agencies have felt the need for more integrated architectures, and in one way or another, often questions concerning the management and development of these architectures have arisen.

The development of information architecture can evolve through a number of phases or stages of growth. Stages of growth or evolution models are popular in organizational research and information systems and have been applied in various domains (e.g. Greiner 1972, Nolan 1979, Layne and Lee 2001, Grover and Segars 2005). Nolan (1979) made the stages of growth model popular due to the intuitive appeal of his model. Stage models aims at deconstructing information systems development into a series of stages and development goes from one stage to another stage. Although of importance, stage models do no not focus on change management and organizational development strategies. This implies that stage models need always be accompanied by a careful chosen change management strategy. Change management strategies requires the addressing of all kind of process management issues, including the creation of shared vision, motivation of stakeholders, dealing with resistance to changes, obtaining political support, intervention strategies, and so on (e.g. Bruijn, Heuvelhof and Veld, 2002).

The evolution of government efforts to provide electronic services in this stage-by-stage manner has already been described by a number of authors (e.g. Layne and Lee 2001, Moon 2002, Rao, Metts and Monge 2003, Ghasemzadeh and Sahafi, 2003). A model that is widely referred to is that of Layne and Lee (2001), which focuses mainly on the service provision by municipalities to citizens and business. They distinguish four stages: 1) cataloguing, 2) transaction, 3) vertical integration and 4) horizontal integration. The stages are explained in terms of different levels of integration and involved complexity. Reddick (2004) describes the e-government development of municipalities in the United States in a two-stage model, which is similar to the first two stages of cataloguing and transaction. He distinguishes between G2C (government to citizen), G2G (intra-governmental) and G2B (government to business). He concludes that in the field of G2C, the services are largely in the cataloguing category, in G2G, they are in the transactional stage and for G2B they are most advanced. Moon (2002) proposed a five-stage model, with stages named 1) information dissemination/ cataloguing, 2) two-way communication, 3) service and financial transactions, 4) vertical and horizontal integration, and 5) political participation. The fifth stage thus adds the political dimension of e-government. Rao, Mets and Monge (2003) have developed a

model to assess the nature of the provided service through the development of e-commerce in SME's. They distinguish four stages 1) presence, 2) portals, 3) transactions integration and 4) enterprises integration and identify the organizational characteristics that facilitate their development and the external characteristics that function as barriers. All of these models can be criticised for offering no guidance to actually addressing technology aspects.

A basic premise underlying stage models is that descriptive stages can potentially be used in a prescriptive manner. Nolan (1979) suggests that the model can be viewed as a learning model where stage adoption is influenced by the environment and the adaptation to the environment. The applicability of stage models in general is described by Prenanto, McKay and Marshall (2002, 2003). They have identified four useful applications of stage models for e-business: 1) guidance and direction in architecture development, 2) reduce complexity of the progression of e-government initiatives, 3) communicate changes to the rest of the organization and 4) provide milestones to evaluate and control cost of architecture development. Descriptively, stage models may help to describe and evaluate the organization's maturity and sophistication in its use and management of the IT resource, for the purposes of enhanced and shared understanding. Prescriptively, it may assist the management in formulating an appropriate strategy to pursue their organization's e-business objectives (Prenanto, McKay and Marshall 2002).

Stage models are premised on the idea that organizations pass through the notional stages of maturity or sophistication. The existing growth models are primarily focused on service provision to citizens and business, and not on helping to structure the information architecture's maturity process, i.e. how the architecture should be arranged and evolve over time. As such, public decision-makers and managers are in need for support concerning the evolution of their information architecture. Hence, in this paper we address this need by deriving a stage model for the development of the architecture for e-government activities.

2. Architectural stage model development

The term information architecture, or architecture for short, lacks a universally accepted definition (Ross, 2003). Architecture is often referred to as a kind of city plan, containing detailing policies and standards for the design of architecture layers.

The idea of breaking up the system into subsystems, layers and connections that is central to architecture, makes it therefore possible to design, construct and maintain a system by more than one person separately and to re-use useful parts of the architecture. This city plan concept has therefore given birth to a breed of IT architects who develop detailed drawings of the interaction between systems. A definition of architecture proposed by IEEE is: "the fundamental organization of a system embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution" (Hillard, 2000). The purpose of architecture is to effectively align the organizational strategies with their business processes, information systems and the coordination of their resources. Appropriate architectures can facilitate the changes required to progress to a modern service-led organization.

Architectures are typically classified into stages to distinguish various phases of development (Prenanto, Marshall and McKay 2002, Layne and Lee, 2001). *Classification* is the separation of things into groups and is often considered useful because it improves the ability to communicate or, in other words, to process data (Cook, 1996). A fundamental concept for classification is *discontinuity* (Cook 1996). Discontinuity helps to find the boundaries for groups of things that are alike. Criteria for classification depend on what you are classifying. We wanted to classify various architectures found in local governments that are primarily shaped by the coordination of the interactions between information systems residing in the back and front office. The front office (FO) comprises business processes of an organization that interact with outside entities, i.e. citizens and businesses. The back office (BO) comprises all business processes that do not directly involve customer-interactions, often settlement and related processes. We found discontinuities in the governmental architectures by locating various forms of coordination between back and front office systems, i.e. by analyzing how the interdependencies between information systems in front office and back office are managed. We found that the architecture necessary for service delivery to citizens and business evolves in five stages.

3. Architecture stage model

3.1 Stage 1: No integration

Before the advent of the Internet the information systems of most governmental agencies were hardly integrated. The first step that organizations take in order to develop online services to

citizens, is the development of a website. In the beginning this site is usually set up by and the responsibility of the communications department. Layne and Lee (2001) describe the services delivered in this step in their stage model as the 'cataloguing' services, where this website comprises an overview of useful information.

From a quantitative perspective, a lot of the services towards citizens concern the delivery of information. The 'business case' of electronic business here is the replacement of personal contact at the desk or telephone by information delivery through the Internet. Practically, this means that an electronic coupling between information systems is not relevant yet. The web applications and data are 'stand-alone' applications and there is no need for exchange of data.

Bovens (2003) and Layne and Lee (2001) recall the governmental duty for *universal access*, which means that the public services should also be available through more 'old-fashioned' channels for citizens that are not yet online. A first step in delivering services online in addition to other channels is through copying the data one-by-one from one system to the other manually, thus without integration of systems. This should not be a problem for small quantities of data, but when the services are expanded, this practice cannot be scaled to accommodate larger quantities.

3.2 Stage 2: One-to-one integration architecture

A second discontinuity concerns the creation of a one-to-one messaging architecture as schematically depicted in figure 1. Data stored in back office systems are automatically published on the website and e-mail or web forms are used for communication. Although the technical demands in this stage are not yet high, this architecture does have important implications for the business practice and the responsibility for the information. Technical issues that surface are the location of resources, maintenance and how to assure privacy; organizational issues that should be addressed in this stage are also the coordination and planning of resources, and the answering of e-mails (Layne and Lee 2001). Thus, already at this stage, a deliberate policy for electronic service delivery needs to be developed.

On the technical level, message adapters are necessary for getting the data out of the applications and routing it to another application. *Adapters* are layers between the message broker, the middleware and the application, hiding the complexities of the interface (Linthicum, 2004).

When software systems are becoming increasingly complex, more than one developer will develop the systems and different programming languages, applicatons, protocols and other standards might be used. Furthermore, when two systems need to 'talk' to each other, a common language is necessary, a protocol for communication and a means of delivery of the message. To enable communication between information systems middleware is used. *Middleware* is aimed at encapsulating the implementation details and supporting the smooth integration of systems (Linthicum, 2004). For this purpose middleware provides generic services such as naming and directory service, message transmission and transaction processing monitoring (e.g. Fan, Stallaert and Whinston 2000).

One-to-one messaging usually starts on a small scale. First one or a couple of services require the integration of information systems using middleware technology. A direct link to one or more BO applications is created to enable online transactional services. Newly added online services are added to the system as a direct link between FO and BO systems. Step by step, more applications are added to the online one-to-one service provision. After a while the increasing number of connections creates a complex system of applications and middleware solutions. Especially when transactions need to be facilitated by the systems implemented, the organizational and technical complexity increase at an accelerating rate (Rao, Metts and Monge, 2003). Also, in this step, the question of who owns the systems and the information in the system becomes more important and, the question of who is responsible for the information and the information quality becomes crucial.

The maintenance of this 'spaghetti' of systems is expensive, as too many solutions become into existance and often systems' knowledge gets lost over time. As a result, the information architecture becomes less and less transparent. It is no longer clear what the impact of a modification in one system will be on the other systems, as all applications are linked. One bug might even disrupt the whole system. The middleware solutions have become the legacy systems of the future. When the amount of data that needs to be exchanged increases and integration of the many existing systems becomes too complicated, a new stage of growth enabling the decrease of the number of links is called for.
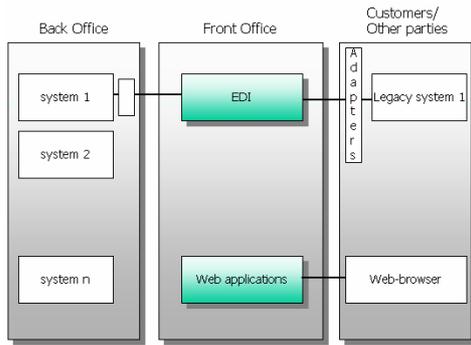
Figure 1: One-to-one integration architecture

3.3 Stage 3: Warehouse architecture

The number of connections between systems has increased and cannot be easily maintained anymore. Therefore, organizations are looking for new types of coordination. The Internet is an additional channel and creates the need for multi-channel approaches. These approaches create the need for collecting and storing integral customer information that can be used in various channels to ensure coherent customer responses (Diepen, 2000; Simons & Bouwman, 2005). The discontinuity we found is that information is decoupled using a data warehouse. Data coming from various sytems is imported into a data warehouse that provides an overview of and single point-of-access for all data, as schematically shown in figure 2.
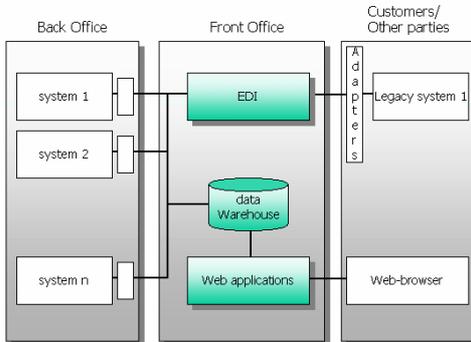

Figure 2: Warehouse architecture

The concept of using a *data warehouse* for electronic service delivery concerns the design of a dedicated database that is installed in the FO, which is filled with copies of relevant data from other databases. This database is thus maintained separately from the organization's operational databases and it stores data only for a specific duration. These data are often only used to support tasks performed in the FO. The BO applications retain ownership of the data that cannot be mutated directly from the FO. This makes the system very robust and viruses cannot attack the BO in this way. Moreover, vulnerability is reduced, as data is stored redundantly. It is stored in at least two different places. To ensure that the data are accurate and correct, changes to

the data should be made in all places, preferably at the same time.

One important advantage of a data warehouse is that it facilitates the processing of large queries, because the system is not used by other applications at the same time and long response times will not block user queries. The copying of data from the BO is usually done outside working hours in order to relieve the system from large queries that need to be performed during daytime. In this way, more contact with clients can be processed directly by the FO, which performs its tasks more demand-driven than before when one-to-one messaging was in place.

Another advantage is that the exchange of data takes place on the level of databases. Many databases have standard support for making connections with other databases. This ensures that only specific fields of the databases need to be connected and that data is exchanged automatically. Finally, internal employees often welcome the installation of a central database, as it can be used as the one-stop source of information.

Data warehouses are often criticized for containing incorrect data. Organizational decisions have to be made: who will be responsible for collecting and maintaining chunks of data. For example, multiple systems contain name and address information that might not correspond. It should now be made clear which system holds the correct information, i.e. is appointed a vital record registration and will be used as the source for the data warehouse, and who will be responsible for the information and information quality and maintaining the systems.

Customer requests are processed using the data stored in the data warehouse. There are two different ways to deal with changes in data. First, customer interactions are stored within a separate transaction database and transported to the BO on a periodically basis. When other organizations request information, the information might not be up-to-date, e.g. a customer address change is only updated the next morning. As a result, this type of architecture solution is often an in-between solution as it can be created quickly and the drawbacks result in the next discontinuity.

3.4 Stage 4: Broker architecture

The more information is exchanged between agencies, the more real-time information exchange becomes necessary. The 24-hours-7-days-a-week economy requires also the continuous updating and availability of systems. The need for real-time information exchange

results in a *broker architecture* were all nodes are directly linked to the *message broker* that takes care of the translation of messages, routing them to their destination and so on. This is schematically depicted in figure 3. All applications are thus connected to one central broker. The broker is used as a *one-stop shop* for all connections with information systems inside and outside the organization.
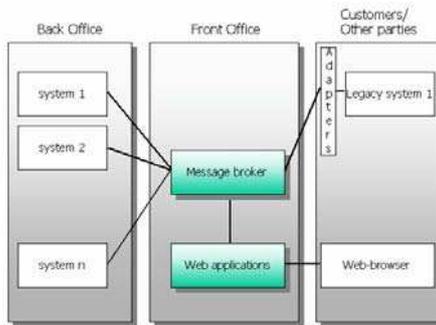

Figure 3: Broker architecture

Broker architectures fulfill the business process re-engineeering (BPR) principle of entering data only once at the source, as proposed by Hammer (1990). The most efficient way to connect information systems is through a central point, the broker. In this way, each information system needs only one connection to that central point. Thus, when a network consists of n participants in total, only n relationships have to be managed. Without a central broker, each system has to manage (n-1) relationships and n*(n-1) relationships have to be managed in the entire network, thus increasing the complexity (e.g. Janssen, 2004). When looking at the management of the number of relationships, it is clear that the use of a central broker is preferable.

A central point has advantages for the speed and costs of implementation of an information system, for the easiness and flexibility of modifying connections and for the costs of maintaining it, as only one connection needs to be implemented. When more connections with information systems are made, a central point can profit from the economics of scale principle and the experience to ensure secure, reliable and fast transmission of data. A major disadvantage is the creation of a single point-of-failure in the information architecture. This can be overcome by having redundant versions of the broker, preferably on physically separated locations in order to use different network connections.

A message broker supports different integration methods and consists of a combination of several integration technologies. Adapters can be part of the broker or part of the application connected to the broker and is therefore not depicted in figure

3. For a lot of programs, like SAP or Oracle, standard adapters are readily available.

More and more broker functionality and information can be packaged up and accessed using web services protocols (Janssen & Wagenaar, 2003). Web services enable a Service-Oriented Architecture (SOA), an architectural paradigm according to which application functionality is not provided by large monolithic information systems, but by means of web services (Linthicum, 2004). The services-oriented paradigm offers many benefits to enterprises, and the creation of a class of enterprise services allows us to create services that are modular, accessible, well-described, implementation-independent and interoperable (Fremantle et al., 2002). The combination of the broker architecture enabling a real-time exchange of information and the use of service-oriented architecture results in the next growth stage.

3.5 Stage 5: Orchestrated broker architecture

Currently, pleas have been made for more open, flexible and adaptive architectures constructed of relatively small components, which can be configured to support a limited number of functions (e.g. Fan, Stallaert and Whinston 2000; Fremantle et al., 2002). Over time, more and more functionality has been added to message broker architectures, including component and web service invocations and routing of messages; even complicated workflow rules are added. This results in a discontinuity where not only information exchange between systems, but also the invocation of information system functionality and management of the sequence of invocations become part of the broker architecture. As such, the paradigms of enterprise application integration (EAI) and workflow management (WfM) merge slowly (e.g. Linthicum, 2004; Gortmaker, Janssen & Wagenaar, 2005). This depicts a trend to include business logic as part of the architecture. This is a natural extension of the broker architecture enabled by developments in service-oriented architectures and services technology. The broker architecture becomes gradually an orchestrated system of both technical and business functions. This architecture, called orchestrated broker architecture, is schematically visualized in figure 4. Business or workflow rules are depicted in a repository, as this enables easy maintenance and re-use

Web service orchestration is enabled by developments in the web services technology stack (http://www.w3c.org). The de facto standard for web service orchestration is the Business

Process Execution Language for Web Services (BPEL4WS), or BPEL for short. Orchestration using BPEL aims at coordinating the time-dependent sequence of single web service invocations. In this way a series of complex business processes can be created. Web service orchestration contains the business logic for managing the sequence of service invocations and requests. The orchestrator can also guides the business process or workflow of users, i.e. which screen will appear in the web browser of a user and which functional components and information sources need to be accessed.

Service-oriented architectures enable the on-demand composition of new business processes using already existing web services. Internal departments or external service providers can provide web services. This enables the connection to outside systems, to access information or invoke functionality. This the architecture has gradually expanded from coordinating back and front office applications to coordinating business processes and interactions with external systems.
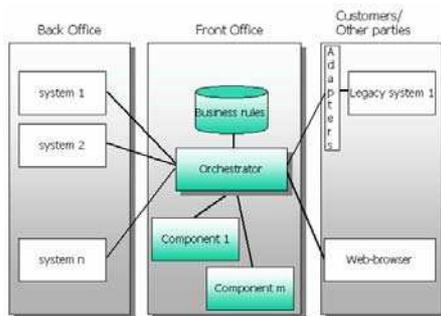

Figure 4: Orchestrated broker architecture

This architecture is based on high-levels of standardization of interfaces, business rules and protocols. It provides many benefits, including the re-use of components as services, the easy construction of new processes and might even enable the re-use of complete processes by other public organizations. In the higher stages the emphasis gradually shifts from technology to organizational processes, structures, and the socio-political issues. The higher stages need business process engineering and structural transformation.

4. Conclusions

In this paper we have presented an information systems management model based on stages of growth. We derived a five-stage growth model based on the fundamental concept of classification; discontinuity. We looked at the discontinuities in the information architectures connecting the information systems in the back and front offices of local governmental organizations. Our stage model consists of the following five stages: 1) no integration, 2) one-to-one messaging, 3) warehouse, 4) broker and 5) orchestrated broker architecture. In the first stage no integration exists and information is copied manually. When the number of services increases, the process of copying manually becomes too time-consuming and electronic links are set up. In the second stage an electronic connection or coupling is set up for each service to be delivered separately. Automating many services results in 'spaghetti' of links, which become difficult to maintain when the number of connections between systems increases. When the spaghetti of systems becomes too intransparent, the third stage can be found; the data warehouse architecture. A data warehouse is a database containing information that is copied from various systems. The information in the warehouse is sometimes incorrect and not up-to-date as information is periodically imported. Therefore, the need for real-time data exchange appears, resulting in the fourth stage: the broker architecture. A broker is a central point for information exchange that passes on information between the different information systems in real-time. Over time, the information broker not only handles information, but also starts invoking other types of technical services. In that case, the last growth stage, the orchestrated broker architecture, is entered. Business logic is included in the information broker to create workflows and even complete business processes. Our growth stage model enables the gradual expansion from no integration architecture, via an architecture coordinating back and front office applications, to an architecture coordinating complete business processes and interactions with external systems. In the higher stages the emphasis gradually shifts from technology to organizational processes and structures. The number of stages is limited by the current practices we have found at local governments. Moreover, we found that some organization have concatenated two stages into one stage. The investigation of other practices might result in other stages; moreover, in the future the number of stages might be expanded based on technology developments. New developments might result in discontinuities, which in turn result in new growth stages. Current trends that might be included are the use of ontologies, semantic web services, software agents and peer-to-peer architectures.

Stage models are built on the assumption that developments of IT systems evolve through a number of stages of growth. As an organization becomes more familiar with the use of technologies it advances to a higher stage. Technologies in themselves will not likely cause

changes to happen. This implies the need for a certain amount of organizational change strategies addressing issues like creation of shared vision, motivation of stakeholders, dealing with resistance to changes, obtaining political support, planning intervention strategies, reallocation of responsibilities and so on. Our stage model does no address these issues but can be used to plan for change to establish goals and determine progress towards accomplishing these goals. The model can be used descriptively to assess the maturity and sophistication of current architectures. Prescriptively, it may assist public managers in formulating an appropriate strategy to pursue their organization's objectives. Moreover, the stages can be used by public decision-makers as a guidance and direction for architecture development, to reduce the complexity of the progression of e-government initiatives, to communicate changes to the rest of the organization and to provide milestones to evaluate and control cost of architecture development.

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A Comparative Analysis of Product Classification in Public vs. Private e-Procurement

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Abstract: Product classification is an important tool for automating e-Procurement processes in the private sector, whereas public e-Procurement does not emphasize this function. This paper reports on the methodology and results of a comparative analysis of product classification in public vs. private e-Procurement. We define criteria for assessing the current state of respective standards, such as CPV, eCl@ss, and UNSPSC. The in-depth analysis of two representative standards reveals fundamental differences and shortcomings, which can partly be attributed to different objectives and priorities of public and private sector organizations.

1. Introduction

There is a growing consensus that e-Procurement is the single most important area of development in the B2B e-commerce arena (Neef 2001). Within a public sector context e-Procurement has been widely embraced by governments seeking the administrative and cost reductions experienced in the private sector. As a result a number of 'proven' private sector e-Procurement solutions such as e-marketplaces, desktop purchasing systems, and tendering platforms have been employed by various public sector organizations. However, public e-Procurement differs from the private sector in various aspects mainly because of its economic and social considerations (Maniatopoulos 2004; Tonkin 2003; Zulfiqar et al. 2001). These differences result in a number of specific regulations and standards that have been developed for public e-Procurement. One group of these standards addresses how to classify and describe products and services being the object of all procurement activities. While standards for product classification play an important role for establishing a shared and common understanding of a product domain, there is still no over-arching standard for both public and private e-Procurement nor do competitive standards in these two sectors agree on common concepts, exchange formats, data models, standardization processes, and intellectual property rights that could all contribute to semantic interoperability.

A key instrument for achieving a common product understanding in business-to-business e-Commerce is classification by standard product classification schemes (standard PCS), such as UNSPSC, eCl@ss, and GPC. This major trend, though, is yet not fully reflected in public e-Procurement and its respective European

standard, the Common Procurement Vocabulary (CPV). Looking at recent developments in private e-Procurement, we see considerable efforts to automating processes based on aligned, thus standardized descriptions of products and services. These efforts aim also at enhancing the coverage of domains, semantic richness, and formal precision of these schemes. In face of these developments, this paper reports on the methodology and results of a comparative analysis of product classification and respective standards in public vs. private e-Procurement. Based on a literature review, we define criteria for assessing the current state of product classification standards. The in-depth analysis of two representative standards may reveal fundamental differences and shortcomings with private sector standards being more advanced.

Drawing conclusions from the results should bear in mind different objectives and priorities between private and public sector organizations. Product classification in the public sector is primarily an instrument for tendering processes and inter-organizational spend analysis whereas classification in private e-Procurement refers to e-Ordering processes and intra-organizational procurement optimization. The work presented here aims at improving the understanding of product classification with regard to both sectors, and may help standards makers in developing extended, closer integrated, or at least harmonized standards, especially for public e-Procurement.

The remainder of our paper is structured as follows. In Section 2, we discuss related work. Section 3 briefly describes the specific notion of public e-Procurement and its differences to private sector e-Procurement. Section 4 introduces

product classification, and relates it to the expected benefits of e-Procurement by identifying specific contributions. Based on this, the components of product classification schemes can be reconstructed. In Section 5, we emphasize the importance of standards for product classification, both in public and private e-Procurement. Section 6 incorporates the previously discussed aspects by applying a comprehensive set of criteria for evaluating the status quo of existing standard PCS. Finally, in Section 7 we draw conclusions from our findings and point to future avenues of research and standardization work.

2. Related work

Related work to product classification can be found in several fields such as e-Procurement, product data management, and ontology engineering. Next we provide an overview of closely related work and outline their relevance to the matter of public vs. private e-Procurement.

Early work on basic concepts of product classification evaluates standard PCS from a business perspective. For instance, Fairchild and de Vuyst (2002) examined the role of UNSPSC towards benefits of spend analysis.

Recently, the importance of properties as a cornerstone of product classification has been underlined. For instance, Ondracek and Sander (2003) proposed a "property based product classification" from that several, still different classification hierarchies for specific purposes can be built, though they are based on common, thus standardized properties. Kim et al. (2004) developed a "semantic classification model" based on properties in order to enable an in-depth understanding of product classification. All this work is in support of semantically rich PCS that incorporate well-defined properties. However, it is several steps ahead of the current state of PCS for public e-Procurement.

Assessing the content quality of standard PCS is another important subject. Hepp et al. (2005) proposed a comprehensive set of content metrics that reveal characteristics and shortcomings in existing schemes. Their coverage of relevant standard PCS is limited to those for private e-Procurement (eCl@ss, eOTD, RNTD, and UNSPSC). However, the metrics itself are domain-independent, and we use them for our evaluation in Section 6.2.

Schulten et al. (2001) introduced product classification as a reference domain for ontology engineering and the Semantic Web, and called for concentrated efforts to "design a generic model"

for automated mapping between two different PCS. Concerning public e-Procurement, this call and its extensive response in the research community (e.g., Beneventano et al. 2004), is also relevant to CPV, because it may help integrating existing industry schemes into CPV, or provide mappings to it. A wealth of research addresses the ontological modeling of these schemes by employing formal languages, especially ontology languages for representing knowledge about products, (e.g., Lee et al. 2005; Hepp 2005). These models are relevant for both sectors, thus provide important foundations for specifying and integrating schemes. An earlier approach based on XML Schema, thus not focused on formals semantics can be found in Leukel et al. (2002).

While a lot of current approaches, concepts and models are technically oriented, and therefore to some degree independent from domains, we have to state that the field of product classification in public e-Procurement and its specific settings are widely neglected in IS literature.

3. Public vs. Private e-Procurement

3.1 Public e-Procurement

In a public sector context, e-Procurement is a collective term for a range of different technologies that can be used to automate the internal and external processes associated with the sourcing and ordering process of goods and services. Across the EU e-Procurement is very much at an evolutionary stage. However, despite the variations in the adoption of e-Procurement across member states, the trend towards its acceptance is strong, with the majority of national governments developing strategies to expedite the implementation of e-Procurement projects. This diversity of government implementations reflects the variety of commercially available *technologies*, *business models*, and *product coding (classification) schemes* (NECCC 2001).

It has been suggested that the public sector is likely to benefit from the use of e-Procurement solutions (Neef 2001). Those benefits are both tangible and measurable with direct or indirect effect on cash flow such as price savings, and intangible such as cultural change and enabling e-Business into public sector. Heywood et al. (2001) proposes that there are three potentially levels of benefit achievable from e-Procurement: *Transactions*, focusing on e-enabling the purchasing process, *strategic sourcing*, using the newly aggregated control information to enable better and cheaper sources of supply, and *market transparency*, facilitating innovation and collaboration across the supply chain.

However, public sector institutions have different objectives towards the implementation of e-Procurement and those cannot be seen simply as extensions of commercial e-Procurement applications because government institutions pursue a wide variety of goals due to their different nature. Within this context the political and legislative environment that public sector institutions operate requires conformity to a range of requirements that have little or nothing to do with economic output (Maniatopoulos 2004).

3.2 Differences between private and public e-Procurement

Unlike procurement in the private sector, public sector procurement requires a bureaucratic procedure to be followed due to the nature of the institutions (Henriksen et al. 2004). A major characteristic of the public sector is the regulation of the procurement process by local, regional, national and international authorities. Regulation embraces "audit, accountability and compliance with national and international rules ensuring competition for supply and transparency in the award of contracts" (NAO 1999). For example, public procurement in the UK must be consistent with EU procurement directives, which provide a framework of rules for the procurement activities. These rules prevent EU member states from distorting competition in public procurement and discriminating on a geographic or nationality basis. Moreover, they facilitate the achievement of value for money for the taxpayer as well as promoting the single European market. In addition, public procurers in the UK must also adhere to the government's Value for Money (VfM) policy. This requires that procurement decisions must be based on an assessment of whole life cost and quality rather than lowest price alone (OGC 2005).

The second priority of the public e-Procurement adoption refers to that of the social responsibility of government through *sustainable* procurement. Sustainable procurement relates all "policy-through-procurement" issues – where public procurement is seen as a lever to achieve wider policy objectives (OGC 2005). These include environmental or "green" issues; the creation of job places and wealth in regeneration areas; opportunities for Small and Medium Enterprises (SMEs) and Ethnic Minority Businesses (EMBs); fair trade and the inclusion of developing countries; adult basic skills; disability, race and gender equality; innovation; and the promotion of ongoing and contestable supplier markets. Policies aimed at meeting social objectives should

be legal, transparent and effective within government (NAO 1999).

Undoubtedly government agendas are typically more extensive and complex than those of private organizations where efficiency, cost reduction and time savings are sufficient justifications for e-Procurement adoption (Coulthard and Castleman 2001). The significance of this reality means that one of the first challenges for an e-Procurement policy and standards framework is to recognize that within a public sector context e-Procurement is more complicated than in the private sector. Public e-Procurement represents an on-line environment involving the complex interactivity of public-private, private-private and public-public sectors rather than just a simple interface between government buyers and private sellers. These considerations have the potential to substantially influence the development of government e-Procurement systems as well as its policies, legislation and standards roles. Within this context a main objective of government policy in relation to its interactions with the business and community sectors should be to seek to promote and enhance efficient and affordable connectivity and interoperability.

4. The role of product classification

4.1 Product-related information

Information on the products (and services) to be procured is essential both in e-Sourcing and e-Ordering. This information is critical to making the right procurement decision that incorporates selecting the right supplier and product as well as determining the conditions for the intended contract and order respectively. Therefore, e-Procurement requires information systems that support these decisions. The term product classification and description refers to two basic concepts of product-related information (CEN 2005): First, classification is an instrument to subdivide markets, industry segments, and its belonging products in classes of products. All products belonging to the same class fulfill similar functions and/or share a set of same attributes, thus they are similar or equivalent to each other. Second, product description underlines the importance of more detailed information that represents specific characteristics or functions of the respective product. Moreover, these two concepts complement each other, since the product class determines many parts of the product description. The latter is implemented by defining class-specific *property lists*. Such a property list contains all properties that should be used to describe a product belonging to the respective class.

Taking in mind that product-related information has to be delivered by suppliers, product classification and description must not be seen from the buyer's perspective only. Often suppliers need to meet buy-side requirements concerning product classification and description; this is especially true for buyer-dominated markets. However, e-Procurement has to consider limitations of suppliers' capabilities in fulfilling these requirements as well as supplier-specific interests in classifying and describing products. Based on the consideration that both buyers and suppliers are stakeholders in the same problem, we extend the focus of the following discussion to e-Sales processes being the supplier's view on e-Procurement processes.

The key responsibility for product-related information belongs to suppliers by nature. This information is created, stored, and maintained in enterprise resource planning (ERP) and product data management (PDM) systems. In addition, the product assortment, its structure and the way of describing products depend heavily on strategic goals, competitive advantages, and addressed markets. In the context of e-Procurement, however, the need for *standardization* becomes evident. Only if suppliers and buyers commit to the same way of classifying and describing products, heterogeneities can be aligned and semantic interoperability achieved (Fensel et al. 2001). In that sense, standard PCS aim at fulfilling this role.

4.2 Contributions to e-Procurement

Standardized product classification supports multiple functions that benefit both e-Procurement and e-Sales processes. These functions can be derived from (i) benefits of e-Procurement, mainly related to buyers, (ii) publications by vendors of standard product classification schemes, and (iii) existing literature. Next, we compile the results of a review of these sources (i.e., CEN 2005; eCl@ss e.V. 2004; Fairchild and de Vuyst 2002) by identifying nine contributions:

Hierarchical search: Searching for products often follows a top-down approach by browsing through a hierarchy that leads to the most specific level and finally to instances, thus actual products which are assigned to leaves of the class tree. Hierarchical search can be implemented due to the definition of product classes forming a class hierarchy.

Direct search: This search strategy works directly on class names in order to find associated products. Since the scope of a product class can often hardly be expressed by a single class name,

additional keywords aim at improving the direct search (i.e., synonyms, industry-specific terms, colloquial language).

Property-based search: If similar products are associated to the same class and this class comes with a property list, the search for relevant products can be detailed by specifying requirements on the property values. This search strategy is also called parametric search (e.g., find all screwdrivers with handle insulation corresponding to IEC 900, length between 180 and 200 mm, and blade size of 8 mm).

Product specification: Property lists are templates for the description of products. Therefore, it is predefined how to describe a product. Buyers can rely on this information, when it is expected that suppliers stick to the given template, which ensures a standardized product specification.

Product comparison: Based on the preceding contribution, standardized specifications open the ability to compare multiple offerings by the same supplier, and even more important, products of competitive suppliers (multi-supplier catalogs).

Spend analysis: Due to the subdivision of markets, industry segments and its products, all procurement activities are also segmented into these classes. Statistical analysis of procurement spending can be based on the given class hierarchy, if it reflects markets appropriately. Performing spend analysis is often regarded as the most important benefit of a standard PCS, since it is a critical instrument of strategic procurement and already part of conventional reporting in ERP systems. Due to its standardized structure, benchmarking different procurement organizations is enabled as well (e.g., divisions of a global, diversified enterprise).

Process management: Since procurement and sales processes often depend on the product being subject of these processes, product classes can be used to map products to specific ways of executing the respective process. For instance, the responsibility of each purchaser in an organization can be expressed by referring to the class hierarchy. Another example is adding special process steps required when purchasing hazardous materials. The contributions to process management are of high importance for achieving the benefits of desktop (direct) purchasing systems, which are part of e-Ordering; these systems delegate the order process to the individual employee rather the purchasing department, and at the same time automate these processes by reducing the number of process

steps and determining the process type based on the product classification scheme.

Description of contracts: Instead of referring to actual products in a procurement contract, the scope of this contract can be described by naming respective product classes, especially those on higher levels of the class hierarchy. Skeleton agreements can make use of this simplified procedure.

Description of assortments: Analogous to describing contracts, suppliers can provide information on their assortment by referring to

standardized classes, especially those on higher levels of the class hierarchy. This information can be forwarded to marketplaces that implement PCS-based tools for searching for suppliers.

The described contributions address various needs of e-Sourcing and e-Ordering. For instance, property-based search is only relevant to e-Ordering systems, because the strategic perspective of e-Sourcing does not include decisions of selecting single products. Table 1 determines the relevance of each contribution to e-Sourcing and e-Ordering.

Table 1: Contributions to e-Sourcing and e-Ordering

Contribution	e-Sourcing	e-Ordering
Hierarchical search	No	Yes, implemented in e-Catalogs.
Direct search	No	Yes, implemented in e-Catalogs.
Property-based search	No	Yes, implemented in e-Catalogs.
Product specification	Yes, properties can be used for describing requirements on items of tenders, and for supplier bids.	Yes, implemented in e-Catalogs.
Product comparison	Yes, properties can be used for comparing supplier bids.	Yes, implemented in e-Catalogs, especially multi-supplier e-Catalogs.
Spend analysis	No	Yes, analysis of all orders.
Process management	No	Yes, management of all catalog-based procurement process.
Description of contracts	Yes, supports searching for tenders.	No
Description of assortments	Yes, supports searching for suppliers.	No

4.3 Basic components

The previous discussion revealed significant differences between the contributions of standard PCS to e-Sourcing and e-Ordering. These differences, however, do not imply that two specific PCS (e-Sourcing and e-Ordering) should be used. Contrary, most standard schemes aim at supporting both types of procurement processes. An important question, however, is what are the requirements on schemes that are truly suitable for these applications? From a practical point of view, this question can only be answered by evaluating the content quality, thus the suitability of classes and properties for the respective purpose. Here, we abstract from these domain-specific criteria by limiting our view to the structure, not the content.

We derive the basic, structural components of standard PCS from the previously determined contributions. For instance, hierarchical search requires the existence of a class hierarchy, while property-based search calls for property lists. This procedure can be seen as a reconstruction of the structure of PCS, and results in four components: class hierarchy, keywords to class names, property lists, and uniqueness (real classification).

The latter is also a requirement on the classification process; each product has to be assigned to one product class only. Table 2 contains the results by describing the relation between contributions and components

5. Standards for product classification

As stated before, the benefits of product classification and description can only be achieved when suppliers, buyers and all other market participants commit to the same way of classifying and describing products by adhering to a standard PCS. Here the attribute "standard" does not only cover "real" standards created and maintained by standards development organizations, such as ISO, IEC, ANSI, and DIN. Contrary, countless industry-driven, less formal initiatives and consortia have proposed standard schemes for their respective purpose.

In private e-Procurement, the number of standard PCS is still increasing, and the multiplicity of schemes has lead to confusions among suppliers and buyers, since the competition between standards prevents the diffusion of a single standard, and limits expected network externalities (Dhai and Kauffman 2001). This is

especially true for horizontal, international standards on which we focus here. In addition, the organizations behind these standards have seen significant changes in their strategic settings,

business models, and services for supporting adopters. For instance, several organizations left the market, or were subject of mergers and acquisitions.

Table 2: Relations between basic components and contributions

Contribution	Class Hierarchy	Keywords	Property Lists	Uniqueness
Hierarchical search	X			
Direct search		X		
Property-based search			X	
Product specification			X	
Product comparison			X	
Spend analysis				X
Process management				X
Description of contracts				X
Description of assortments				X

The two most relevant standards as identified in (CEN 2005) are as follows:

- eCl@ss is being developed by a consortium of mainly German companies since the late 1990s (eCl@ss e.V. 2004). It has gained a significant relevance for e-Procurement in Germany and many European countries. A key characteristic are its property library of about 5,525 properties and class-specific property lists for 10,930 product classes.

- UNPSPC, the United Nations Standard for Product and Service Classification, is the most known standard PCS due to its early start under the UN Development Program (UNDP 2005). Its coverage is very broad with 21% of its classes concerning services. Over the past four years, there were multiple changes in the organization that manages the standard. Due to this uncertainty, and partly because of the missing property lists, UNSPSC has lost some of its market share, especially in Europe.

Looking at recent developments in activities by standards makers, the importance of harmonizing existing schemes, committing to basic components and reference data models as well as integrating horizontal with vertical schemes has been emphasized. Another pathway is marked by adding property lists for product description in order to tap the full potential of standard PCS. This way requires even more resources for creating practical, commonly accepted solutions and maintaining these extended schemes. On the other hand, decision makers face on-going changes in standardization processes, organizations, data models, exchange formats, and content; all these changes may cause uncertainty about the future directions in global standard PCS. For instance, the current adoption of the eCl@ss property lists in e-Catalogs is very low compared to the initial goals; therefore, the

contributions that require standardized properties can not be fully realized.

In public e-Procurement, the number of standard PCS is much smaller; actually, there is often one standard for each region only. The reason is that the standard is set by the legislative institution in charge of the respective region. The limitation to a single standard can be attributed to the primary purpose of product classification in public procurement, therefore the subdivision of procurement activities for statistical purposes, especially economic statistics. In the EU, the Common Procurement Vocabulary (CPV) has become mandatory for public e-Procurement by Regulation No 2151/2003 (European Commission 2003). CPV is being managed by DG Internal Market of the European Commission, and consists of about 8,000 entries in the vocabulary.

The NATO Codification System (NCS) is another relevant standard (NATO 2005). It is one of the oldest and largest standard PCS in the world, being used in all NATO organizations, and many other countries. In addition, the NCS forms the basis for a database of more than 31 million parts supplied by 1 million suppliers. NCS is interested in offering its standard for purposes outside the military environment, though it remains to be seen if this can be achieved. Due to its restricted adoption for a specific type of organizations, NCS may be seen as a vertical standard, though its coverage is very broad.

The brief comparison reveals some significant differences in the standard setting process for private and public sector standards. In the private sector, it can be described by *competition*, since those standards will prevail that gain the highest acceptance. Contrary to that, public sector standards are the result of *regulation* that necessarily excludes competition.

6. Evaluation of selected standards

6.1 Criteria

Next, we select two standard PCS for a detailed evaluation. All our criteria will address organizational, structural and technical issues only, since we are not able to evaluate the actual content quality and suitability of these standards. Due to their representative status for private and public e-Procurement in Europe, we select eCl@ss and CPV.

The criteria of our evaluation can be subdivided into the following groups:

- Basic components (analogous to Section 4.3): We check which components are implemented in the standards.
- Contributions to e-Procurement and e-Sales (analogous to Section 4.2): We check which contributions are addressed explicitly, and which can be realized due to existing components.
- Supported languages: We check which European languages are supported.
- Content metrics describing the class hierarchy: We perform a comprehensive set of statistical analysis as introduced by Hepp et al. (2005) concerning the class hierarchy. Specifically, we apply the following metrics: (i) size, (ii) speed of growth, (iii) services ratio, (iv) size of segments, (v) variability of segments size, and (vi) segments domination.
- Data model and exchange format: We check the data models and exchange formats for type and quality of documentation based on criteria described by Leukel (2004).
- Standardization Process: We check the transparency of the standardization process and offered services.

6.2 Findings

6.2.1 Basic components and characterization

The main difference between the two schemes is the absence of property lists in CPV (see table 3).

The reason behind this lies in the main purpose of CPV, which is to describe the subject of procurement contracts; hence it is not intended to be used for e-Catalogs (in which products are described on a detailed level). In the CPV, the degree of abstraction is much greater, since its product classes are used for describing item within a contract, whereas eCl@ss aims at describing the characteristics of single products. CPV supports buyers and suppliers in the tendering process only, and buyers in performing spend analysis. From a European point of view, the CPV classification code enables participants to bypass existing language barriers. While CPV is available in all 20 official languages of the EU, eCl@ss is restricted to five European languages plus Chinese.

6.2.2 Content metrics

Size: The mere number of classes is often used for standards marketing, but it obscures the true coverage in the various sections; hence counting the number of classes contributes marginally to assessing the content coverage and quality. Here we use this quantitative approach for identifying the hierarchical structure and its underlying rationale. Both class hierarchies are built upon different principles. eCl@ss defines a hierarchy of 4 levels, with 25 top-level classes (segments). The tree is balanced, since all segments and their sub-trees lead down to the lowest, fourth level; leaves on higher levels are not allowed. If a segment requires a higher degree of specialization, thus a fifth level, then the segment has to be divided into two or more segments (the respective sub-tree on the second or third level has to be promoted to a new segment).

Contrary to eCl@ss, CPV builds a non-balanced hierarchy of 2 to 7 levels. For instance, there are four top-level classes with only 1 sub level (e.g., recovered secondary raw materials); hence the degree of specialization in these segments is very low compared to the other 24 segments with 6 sub levels (e.g., construction work with 796 classes). In addition, the class hierarchy is broader (61 vs. 25 segments) covering more markets and industries.

Table 3: Evaluation – Basic components and characterization

Criteria		eCl@ss 5.1	CPV 2003
Basic components	Class hierarchy	Yes	Yes
	Keywords	Yes	No
	Property lists	Yes	No
	Uniqueness	Yes	Yes
Contributions to e-Procurement and e-Sales	Hierarchical search	Yes	Not intended for e-Catalogs
	Direct search	Yes	Not intended for e-Catalogs
	Property-based search	Yes	No

Criteria		eCl@ss 5.1	CPV 2003
	Product specification	Yes	No
	Product comparison	Yes	No
	Spend analysis	Yes	Yes
	Process management	Yes	No
	Description of contracts	Yes	Yes
	Description of assortments	Yes	Yes
Supported languages	Number	6	20
	Languages	chi, deu, eng, fra, ita, spa	All 20 official languages of the EU

Speed of growth: We determine the amount of new classes in the current version compared to previous versions. For a good coverage, any standard requires timely feedback about missing classes from the user community, and a standardization process that makes new elements available in a timely manner. The major difference here is that CPV is almost static with only 1% growth in 6 years. There are different explanations for that, as for example very good coverage already in CPV 1998, missing resources for maintenance, and lack of comments from standards adopters. However, the most important factor is the standards setting process which requires a legislative initiative up to the Commission. Contrary, eCl@ss shows a tremendous growth in number of classes. A steady growth, however, and significant modifications of the class hierarchy may also harm standards adopters, because re-classification of products becomes necessary.

Table 4: Evaluation – Size and speed of growth

Criteria		eCl@ss 5.1	CPV 2003
Size	Number of levels	4	2 to 7
	Number of classes	25,658	8,323
	Balanced tree	Yes	No
	Number of segments (top-level classes)	25	61
	Number of services segments	1	28
	% of services classes	4.1%	30%
	Segments with 1 sub level	-	4
	Segments with 2 sub levels	-	4
	Segments with 3 sub levels	25	7
	Segments with 4 sub levels	-	11
	Segments with 5 sub levels	-	10
	Segments with 6 sub levels	-	24
Speed of growth	Class growth	93% in 2 years 503 % in 5 years	1% in 6 years

Services ratio: The broad coverage of CPV is being reflected in the high number of segments that represent services. Its 28 segments – ranging from diverse domains such as repair, retail, education, transportation, publishing and cultural services – contain 30% of all CPV classes. Comparing CPV and eCl@ss by applying further metrics should bear in the mind this fact, since eCl@ss provides a single segment for services only. Therefore, we restrict the next steps of our statistical analysis to those segments that contain classes for physical goods; hence we remove all services classes from the raw data. Otherwise, the high percentage of services in CPV and the missing equivalents in eCl@ss could distort the results.

Moreover, service classification differs fundamentally from the classification of tangible goods, although existing service classifications from marketing literature fail to demonstrate the configurable nature of services, which is a key characteristic of services (Baida et al. 2005). With regard to product classification schemes, the one-dimensional hierarchical segmentation of services must be seen as insufficient to reflect the complexity of services classification and services configuration.

Table 5: Evaluation – Services ratio

Criteria	eCl@ss 5.1	CPV 2003
Number of segments (top-level classes)	25	61
Number of services segments	1	28
% of services classes	4.1%	30%

Size of segments: Comparing the sheer number of classes in the entire PCS does not necessarily contribute to assessing the coverage of relevant domains. For instance, representing markets

based on classes depends on the degree of abstraction, the principles of the class hierarchy, and the use of properties (i.e. specific classes can be replaced by a generic class that describes characteristics by properties). A first indicator of domain coverage and its representation in the class hierarchy is the size of each segment. Here,

we determine the number of classes per segment and summarize the results in a bar chart listing all segments ordered by descending number of classes. The resulting chart for CPV illustrates clearly the uneven population of the segments (figure 1). Very similar are the results for eCl@ss (see Hepp et al. 2005).
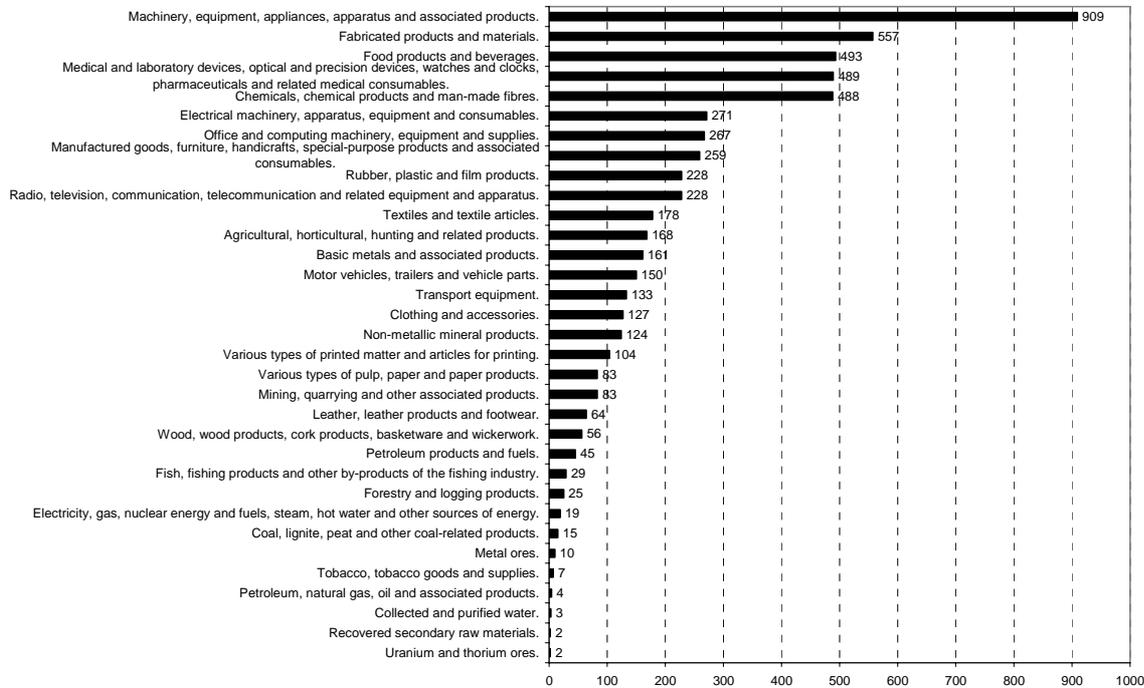

Figure 1: Size of segments in CPV 2003 (without services)

Variability of segments size: The previous metric has revealed that both standard PCS are dominated by a few large segments, whereas other segments are very small. This observation leads to the question whether these schemes are actually balanced standards. We determine the distribution parameters for the data gained in section "size of segments", i.e. the minimal value, maximal value, mean, median, first quartile, third quartile, interquartile range, standard deviation, and the coefficient of variation. The results are shown in table 6.

The schemes show a high variability of segments size with some tiny segments in CPV and huge segments of several thousands of sub-classes in

eCl@ss. Therefore, both schemes are actually unbalanced. Comparing the respective metrics for eCl@ss and CPV reveals that the segments in eCl@ss are approximately five times bigger (as indicated primarily by the mean and median as well as by the interquartile range and standard derivation). eCl@ss avoids having very small segments by defining 4 levels with at least two branches for each segment; this would prevent segments of less than 15 classes. Although all absolute metrics show significant differences, the coefficient of variation, which allows comparing distributions that have a different mean, is nearly equal, thus it reveals that the relative variability is quite similar.

Table 6: Evaluation – Variability of segments size

Criteria	eCl@ss 5.1 without services	CPV 2003 without services
Minimal value	203	2
Maximal value	5,312	909
Mean	1,025	175
Median	673	124
First quartile	412	25
Third quartile	1,244	228
Interquartile range	832	203
Standard derivation	1087	203
Coefficient of variation	106%	116%

<u>Domination of segments:</u> The role of the large segments can be further examined by identifying and quantifying their contribution to the entire scheme. For instance, the percentage of classes in the largest segments indicates whether the standard is a true horizontal one or horizontal just with regard to the existence of top-level classes, but focused quite vertically at the more detailed level. Surprisingly, both schemes are quite unbalanced with regard to the number of classes in the 5 largest segments (eCl@ss: 53.8%, CPV 50.8% of all entries). Looking at these figures (table 7) and the domains of the respective segments, we have to state that eCl@ss is rather focused on the chemical industry. Its five segments covering organic, inorganic chemical products, laboratory supplies, polymers, and additives comprise 40.9% of all classes (CPV: only 9.3%).

In addition, interesting is the order of magnitude between the largest segment and the median. The bigger this ratio, the more the content of the standard is dominated by one single segment; in eCl@ss the largest segment contains nearly eight times more classes than the 'median segment'.

Table 7: Evaluation – Domination of segments

Criteria	eCl@ss 5.1 without services	CPV 2003 without services
% of classes in the largest segment	21.6%	15.7%
% of classes in the 3 largest segments	40.5%	33.9%
% of classes in the 5 largest segments	53.8%	50.8%
% of classes in segments of the chemical industry	40.9%	9.3%
Largest segment / median of segment size	789%	733%

6.2.3 Data model and exchange format

Both standards do not provide an explicit conceptual data model (table 8), and their underlying data models are not compliant with the ISO 13584 standard for product classification schemes (ISO 2001). The data definitions are supplied in proprietary exchange formats, which are easily processible due to their syntax (comma separated values, Excel spreadsheets). eCl@ss provides a syntax description for its 7 files (needed for property definitions and properties lists). Update information describing modifications in the recent version is available for CPV, while eCl@ss has added this information only recently for the latest release of September 2005 (Service Pack 5.1.1).

Table 8: Evaluation – Data model and exchange format

Criteria		eCl@ss 5.1	CPV 2003
Data model	Explicit model	(No)	No
	ISO 13584 compliance	No	No
Exchange format	Syntax description	Yes	No
	Format	CSV	XLS
	Number of files	7	1
	Update information	No	Yes

6.2.4 Standardization process

User participation in the standardization process is quite different (table 9). Companies may join the eCl@ss organization formally, a number of industry associations are involved in the definition of consensual classes and properties, and any individual or company is asked to submit change requests. On the other hand, CPV's transparency regarding the standardization process is very low.

Table 9: Evaluation – Standardization process

Criteria	eCl@ss 5.1	CPV 2003
Transparency: Organization	Yes	No
User participation	Membership, Industry Associations	No
Change requests	Yes	No

7. Conclusions

A driving force for e-Government in general has been the idea of bringing successful private sector ICT solutions and respective business practice to the public sector in order to reduce costs and improve services. This approach was also taken in public e-Procurement by employing e-marketplaces, desktop purchasing systems, and tendering platforms for conducting procurement

processes. However, public e-Procurement differs from the private sector in various aspects mainly because of its economic and social responsibilities. These differences result in a number of specific policy and standards frameworks that have been developed for public e-Procurement. This paper provides arguments for the existing gap between private and public e-Procurement concerning product classification. In particular this study reported on the methodology and results of a comparative analysis of product classification in public vs. private e-Procurement. In doing so we developed criteria for comparing the contributions of product classification and description between private and public e-Procurement. For this comparison we choose eCl@ss and CPV as the two most representative schemes. The in-depth analysis of both schemes revealed fundamental differences with regard to basic components, content metrics, and standardization process. Those differences can partly be attributed to the heterogeneity of objectives between private and public e-Procurement. Within a public sector context CPV is still an instrument for spend analysis and tendering processes whereas classification in private e-Procurement is directed at e-Ordering based on e-Catalogs.

Moreover the comparison between eCl@ss and CPV revealed some shortcomings of CPV. Concerning the structural components, eCl@ss must be regarded as a forerunner. Its property library is often regarded as a competitive advantage. However, the current adoption of the eCl@ss property lists in e-Catalogs is rather low, since describing product by standardized properties requires additional efforts, especially for suppliers. Recently, eCl@ss has received a funding by the Federal Ministry of Economy and Labor of Germany towards its wider adoption. The Government has acknowledged the importance of eCl@ss, because it is critical to the success of German companies in conducting e-Business on an international level. In addition, eCl@ss has

announced to strengthen its efforts in becoming one of the highly visible standards.

The results of our analysis show that standards for private e-Procurement are moving ahead. The respective industry consortia invest significant resources for creating and maintaining these schemes. Product innovation appears in almost all industries, thus continuous monitoring of markets and adjusting current standards is necessary. Due to these challenges, the need for harmonizing existing standards has become evident. Therefore, several initiatives towards integrated classification standards have been started over the past two years. For instance, a number of consortia and standardization bodies have joined forces in a respective CEN/ISSS project (CEN 2005).

In private e-Procurement, the vision to arrive at a universal PCS, as it is still assumed by CPV, does not exist anymore. Rather standards adopters often participate in private and public e-procurement, thus suppliers, intermediaries and ICT solution providers that act in both markets face another important problem: They need to know public e-Procurement practice and rules for classification in addition to those in private environments. In this context one of the first challenges for an e-procurement policy and standards framework is that of harmonizing the processes for public and private e-Procurement. Government bodies could learn lessons from recent developments in private e-Procurement, and aim at cooperating closer with standards makers in private sector. This collaboration could help standards adopters (government bodies, private organizations) to enhance efficient and affordable connectivity and interoperability, lowering barriers to market entry. The work presented in this paper aims at encouraging this partnership, helping standards makers in developing extended, closer integrated, harmonized standards, between private and public e-procurement.

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e-Administration, e-Government, e-Governance and the Learning City: A typology of Citizenship management using ICTs.

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Abstract: Citizenship implies a certain model of relationship between citizens and their government. This type of relationship can be conceived in several ways. Citizenship can be presented in the form of an object to be governed in various ways. Using a two year research-action study in the town of Vandoeuvre (France), we elaborated a typology of citizenship management using Information and Computer Technologies composed of four modes: E-administration, E-government, E-governance and "The Learning City". In the "e-administration" mode, the citizen is considered as a « consumer of rights » claiming personalized and efficient public services. It corresponds to a government « for the people » with a strategy of citizen satisfaction improvement. The second mode, that we call "e-government" reflects a vision of a relatively passive citizen-agent, who responds to his duties. Based on the need of quantifying and comparing solutions, this government of the people relies on regular consultations in order to improve the policy's acceptance. In this perspective, electronic voting is the most appropriate tool, because it facilitates the communication of citizens' opinions to government, while conserving a consultative characteristic. In the "e-governance" mode, the citizen is considered an active agent of local democracy. The citizen is now considered as a source of ideas and initiatives that provides a mutual enrichment. The e-governance model can launch a reflection on the local government's knowledge management capacity. This could then result in a fourth type of the citizen relationship management, which would not be a government of the people, for the people or by the people, but according to the people. We called this mode "the Learning City". The logic underlying this approach would be: "learn how to learn", defining a range of possible actions, choosing the decision corresponding to the criteria considered to be essential to the success. The citizens would at the same time be actors and determinants of the rules. The role of the local officials and the corresponding ICT tools remain to be imagined.

Keywords: e-Administration, e-Government, e-Governance, learning organization, Citizen Relationship Management, local government, ICT.

1. Introduction

Currently, we can note three tendencies:

- Increased involvement of the public in the decision-making process: Public decision makers try to involve citizens in decision-making process without excessive costs and loss of efficiency, but do not know how to do it (Farmer, 1995; Saul, 1992 ; Aydelotte and al, 2000 ; Callon, Barthe, Lascoumes, 2000 ; Reich 1998 ; Thomas, 1995).

- Development of Citizen Relationship Management: Public organizations seek to improve the services rendered to the citizen, by reducing the cost and time, and are looking for tools (Kotler, 1993 ; Berman, 1997 ; Cohen and Henry, 1997).

- Emergence of e-management: The emergence of e-management shows that the integration of ICTs in organizations makes it possible to generate new practices and services and to reduce the cost and the time of the services rendered (Kalika and al., 2002).

Public managers could then seek in ICT possibilities to generate new practices of citizenship or to make the existing practices more effective, in order to increase the involvement of citizens in the decision-making process and to improve the services rendered by public organization. Telecommunication offers new perspectives for electronic citizenship through polls and e-voting. These tools seem particularly suitable for "citizen-consumers" who have gradually become accustomed to the quality of service offered by ICTs and more demanding and more critical of public organizations (Berman, 1997). Thus, we could then regard the citizens as "customers" of public services. The work then consists of studying a relationship to the citizen, and considering the impact of e-management on this relationship. The question is: How can a local government integrate the potential benefits of the ICTs in its interactions with the citizens? The aim is to give public organizations a model for positioning their strategies and choosing adequate tools. Citizenship defines the political design of organization (Chevallier, 1999). Citizenship implies a certain model of relationship between citizens and their government. This type of relationship can be conceived in several ways. Citizenship would then be presented in the form of an object to be governed in various ways. We will

limit the field of research to citizen-relationship management. We will analyze the literature, highlighting the contributions and limits. We will then propose a method and elaborate a new model.

2. The field of research: Interactions between citizens and local government

2.1 Definition of citizenship in management

Given that the notion of citizenship is ever-changing and constantly being debated, the definition that Leca gave in 1986 presents us with a kind of universal structure in the sense that it considers citizenship as a whole, composed of rights and duties, of a role and moral values. We will use this structure as the ground definition of our work. However, the notion of moral values will be first kept aside, as it would be difficult to integrate it into a public management approach at this stage of the study. The basis for our work will then be : Citizenship is composed of rights, duties and participation. Any definition of citizenship seems to make use of those three components even if one takes preference over the others. Each conception gives us a different vision of the citizen's role. The citizen can be considered as a consumer, a passive agent or an actor in local democracy. Thus, when the "Rights" component is given more weight in a definition, the citizen is considered as a consumer, whether it may be of rights or of public services. Whereas in a definition where the"Duties" component is given more importance, the citizen is considered as relatively passive, being subject to a number of restraints. Finally, in a definition where the word "Participation" is given ascendancy over the other words, it is taken for granted that the citizen is an actor who is totally engaged in local political life.

2.2 Citizen relationship management

The 1958 French Constitution states that the very principle of the Republic consists of a "government of the people, by the people and for the people". Out of this founding principle, two ideas appear: first of all, that the citizens are manageable, which allows us to consider citizenship as "something to be governed". Secondly, there are different visions or modes for the management of citizenship. Thus when referring to a government "for the people", we refer to the first vision of citizenship, i.e. the citizen is a consumer of rights and public services. In this case, the underlying logic for the "government for the people" would be to improve services. "Government of the people" would refer to a

citizen as a passive agent. The representatives would then have to improve the chances of success for a policy by making the citizens' adherence easier. Finally, the "government by the people" emphasises the participation facet and considers the citizen as part and parcel of the processes of politics. The goal is then to encourage debate and their participation.

2.3 The local territory as a relevant scale

Some authors have taken interest in a national vision, even a supra-national one, of citizenship (Chadwick and May, 2003; Laudon, 1977). As Assens and Phanuel (2001) or Vedel (2001) did, we want to underline the advantages of taking the local level as the reference. There are two main reasons for this: First of all, initiatives begin locally, where all pilot schemes are conducted and evaluated before being taken to larger scales. Secondly, the local level is the key level for the legitimation of any public action. One of the current political goals, when some perceive a crisis in the democratic system, is to rebuild the legitimacy of representatives' roles by means of equivalences: presence in the community=implication= participation=efficiency=legitimacy (Lefevre, 2001). The local level approach reinforces the representatives' legitimacy. The local level is thus represented as "the most relevant scale for recovering citizens' trust" (Lefevre, Nonjon, 2003). The local scale makes many strategies possible: "The easiest way to reach government of the people by the people is the city" (Voilin, 1929, cited by Paillart, 2003). Depending on the chosen strategy, the mayor's role will be different. In a "government for the people" perspective, the mayor would have to regulate and meet the requirements of the "new economy", provide quicker and more effective services to the citizens-consumers. When the chosen strategy is "the government of the people", the local representatives have to make citizens -considered as passive in this case- more confident. Finally, in a "government by the people" perspective, the mayor has to protect freedom of speech and regulate the structures in order to ensure good conditions for debate and participation of the citizens, who are then actors in the system.

2.4 The new tools

We distinguish three types of tools. Each one corresponds to a local citizenship's management's mode. The first kind of tool aims to favour transparency, facilitate procedures and personalize services. For example: e-procedure, personalized account, on-line payment, file checking, etc. These tools are appreciated by the customer-citizen, who seeks outstanding services.

The second type of tool aims to consult with the "passive" agent-citizen, in order to improve the acceptation rate of a policy. E-votin is thus the most representative tool. The last kind of tool aims to favour the participation of the active citizen. It allows citizens to generate new ideas, to debate them and to develop constructive propositions.

We analyzed the models suggested by Laudon (1977), Assens and Phanuel (2001), Vedel (2003) and Chadwick and May (2003). We thus notice that there is no study fulfiling all the following criteria:
- a study modelling the interactions between government and citizen,
- a study completely taking into account the impact of the ICTs,
- a current study,
- a study that can be used in public management,
- a study which is applicable to the French context,
- a study applicable to the local level.

We thus propose to elaborate a new model fulfilling these criteria.

2.5 The empirical approach

The city of Vandoeuvre is composed of 32,000 inhabitants. Participation in the local democracy is encouraged. Vandoeuvre also follows a daring policy of development of the ICTs in the life of its citizens, but also in its relations with the citizens. For several years, the city has been seen as innovative in its use of the ICTs within the community, testing e-voting and consultation systems. We ran a two-year study in the town of Vandoeuvre-les-Nancy (France). The city launched two projects at the same time:
- The Daily Life Card : In 2003, the government wished to develop a card to simplify the life of citizens. The project of the "Democratics" card of the town of Vandoeuvre is based on the utilisation of the safe smart card, and offers two types of applications : ·Electronic consultation with citizens and a range of e-Administration services.
- The citizen website : With the help of associations, Vandoeuvre has developed a citizen website, offering new possibilities for participation. On the site, citizens can find : information (an online newspaper, reports updated by the local actors and in particular the inhabitants, etc.), description of local actions, a toolbox to create and support projects, etc.

To extract information from this two-year study,

we used an action-research approach. According to David (2000), the research-intervention aims to help the actors to define their strategies and to install adequate tools.

3. Results: A model of three types of citizen relationship management

We have defined three modes of local citizenship management using ICTs: e-Administration, e-Government and e-governance. Each of the three modes we describe presents distinctive characteristics. All three may intersect and overlap.

3.1 e-Administration

The city works with sector representatives. Each representative is in charge of collecting information and claims from the sector's inhabitants. This is generally done through a specific document to be filled in. This document is transmitted to the town hall where the administration processes it. In Vandoeuvre, the representatives will be given a card which enables them to identify themselves and to complete the online document. They can follow the evolution of each claim throughout the process. Employees will have all information at their disposal and can focus on the analysis phase and on the response to the claim. The elected officials will use this information as current indicators of local life, and use it to elaborate more appropriate decisions. In this model, that we call "e-Administration", the citizen is considered as a « consumer of rights » claiming personalized and efficient public services. It corresponds to a government « for the people » with a strategy of citizen satisfaction improvement. For Tapscott (cited by Chadwick and May), ICTs allow a renewal of public organizations: Administrative renewal with faster and more efficient bureaucracies, digital access to government information, fostered information initiatives (to establish databanks of social information), tax filing, payment processing, etc. Tools offered by ICTs are mainly e-procedures and databanks. With the development of Customer Relationship Management in the private sector, we can foresee the necessity of developing Citizen Relationship Management in the public sector.

3.2 e-Government

The town would like to consult a panel of citizens regularly on different subjects dealing with local community life. This would increase the awareness of inhabitants' needs and wishes and would enable local officials to develop appropriate policies. Members of the panel would be given a

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card with which they can be consulted anonymously via the Internet. If the experimentat works, the project could be extended to the whole population of the town. The town foresees a system of general and regular consultation (such as the Swiss voting system). This management mode, that we call "e-Government" reflects a vision of a relatively passive citizen-agent, who responds to his duties. Based on the need of quantifying and comparing solutions, this government of the people relies on regular consultations in order to improve the policy's acceptance. In this perspective, electronic voting is the most appropriate tool, because it facilitates the communication of citizens' opinions to government, while conserving a consultative characteristic. In the same way as Chadwick and May, we consider this approach as a « pull » system where government seeks predefined information. This limits citizens' capacity to propose solutions and initiatives in a « technical democracy » (Barthe, Callon, Lascoumes, 2001).

3.3 e-Governance

The town works in collaboration with the association « Place Publique » which has developed a website dedicated to citizens. This website is a place of discussion and debate for all the city's inhabitants. It is independent from the official city website. The editorial committee is composed of local representatives, associations and citizens. This website could be used to help citizens' propositions and initiatives to emerge. If a subject or a project generates a lot of interest in the community, it can be submitted for public consultation. The town could enter a dynamic movement where e-governance would feed into e-Government, where policies would be evaluated thanks to the key indicators developed by the e-Administration. In this mode that we call "e-governance", the citizen is considered an active agent of local democracy. « Participation (…) integrates a more active dimension. The citizens take part in a decision-making process. The aim is to enable inhabitants to express their opinions, then to collect these opinions (…) and to integrate them into the final decision» (Pailliart, 2003). The distinction between government and governance is important: « Governance stresses the way in which decisions are made, while government stresses the way in which these decisions are carried out » (Marche, Mc Niven, 2003). The « pull » system changes to a « push » system where information emerges from the ground. In the model of e-governance, interactions between citizens and government are necessary. "The participatory model contains a recognition that knowledge is discursive, contingent and changeable – that it emerges through interaction" (Chadwick and May, 2003). The citizen is no

longer perceived as a "layman" (unfamiliar) of public policy by the local elected. The citizen is now considered as a source of ideas and initiatives that provides a mutual enrichment. The e-governance model can launch a reflection on the local government's knowledge management capacity. To conclude this step, it seems that a town which enables the interactions of these three modes of local citizenship management is a town which takes into consideration the citizen in his diversity and complexity. The citizen can at the same time be a customer of public services, a « passive » agent obeying a policy he was consulted on, and an active actor taking part in the decision-making process.

4. The fourth type: The Learning City

We consider that these modes of management are not isolated from each other. They can co-exist and interact together. However, in fact, there could be different steps in the city's strategies. It seems that a town starts by developing elements of E-Administration, then implements the E-government and finally only considers the e-governance. The question is: what is the following stage that no city has reached, or even considered, for the moment ? This new form of city, which does not exist yet, remains to be imagined. If we use the concept of learning organization to analyse this, we notice that e-governance seems to function on the principle of a single loop learning process. The next stage, the fourth mode of management could be based on a double loop learning process.

5. e-Governance or a single loop learning process

In the e-governance model, citizens can make proposals and contribute to the decision-making process according to the rules defined by the local government. But, Argyris and Schön (1978) specify, when the rules don't allow the adaptation to the environment, the system breaks down because it tried to preserve a model of behavior which is no longer appropriate. For Morgan, the more complex cybernetic systems, such as the human brain or the computer, have the capacity to learn how to learn. They are often able to detect and correct errors in the standards of operation and thus influence the rules which guide their own operation. The ICTs would offer the city the opportunity to have a double loop learning process.

6. The integration of the « moral values » component of citizenship in the double loop learning process

The double loop learning process relies on the capacity of the organization to remain open to the changes which occur in the environment and on the capacity to redefine the standards of its projects. Here we have a radically new process of planning: whereas the traditional vision consisted of the production of a project with clear targets, cybernetics shows that it might be wiser, from the systemic point of view, to concentrate on the definition of the constraints. Knowing the values of the group and their limits allows us to define a range of possible actions. An action chosen accordingly will not be necessarily the best, but it will fulfill the criteria considered to be essential to its success. The double loop learning process then consists of being able to consider the situation and to question the rules or standards of operation (Figure 1).
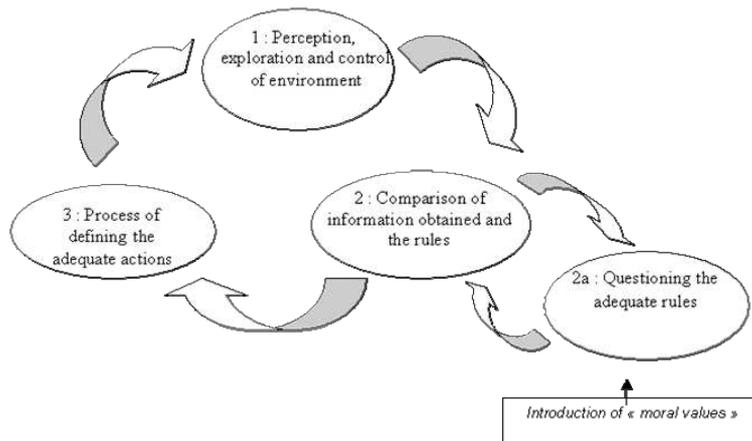

Figure 1: Double loop learning process (from Schön and Argyris, 1978)

Our model is based on the components of citizenship (right-duty-participation). The double loop learning process allows us to integrate the "moral values "component of citizenship: This could then result in a fourth type of the citizen relationship management (Table 1), which would not be a government of the people, for the people or by the people, but according to the people. Logic underlying this approach would be: "learn how to learn", defining a range of possible actions, choosing the decision corresponding to the criteria considered to be essential to the success. The citizens would at the same time be actors and determinants of the rules. The role of the local officials and the corresponding ICT tools remain to be imagined.

Table 1: Four types Citizen Relationship Management using ICTs

	E-Administration	E-government	E-governance	The Learning City
French Republican principle	Government for the people	Government of the people	Government by the people	Government according to the people
Citizenship's component	Rights	Duties	Participation	Moral values
Role given to the citizen	Consumer	"Passive" agent	Actor "Active" agent	Defining the rules to follow
Underlying logic	Delivering services, improving satisfaction of citizens, presenting local government policy	Improving the chance of a policy's succes	Encouraging deliberation, participation and development of local democracy	Learn how to learn. Deciding according to mutually determined criteria
Role of local elected	Regulating, improving administration performance	Understand the opinion of the citizens using consultation. Improving acceptance of a policy by citizens.	Protecting free expression, regulating infrastructures	To be created

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Corresponding ICTs tools	Online administrative services, E-Procedures …	Electronic consultation, using e-voting methods and tools	Collaborative tools. Online Construction of collective propositions	To be created

7. Conclusion

To conclude, this study offers a four types model of citizen relationship management: e-Administration, e-Government, e-governance and "The Learning City". Each mode is linked to strategies and tools, except "The Learning City" which remains to be imagined. It is however much more difficult to control the double loop learning process. Argyris (1995) specifies that this failure is found especially in the bureaucratic organizations since their essential principles of organization make the learning process impossible. Our study has limits linked to the methodological and epistemological choices. The first limit concerns the difficulty of analysing the emergence of a collective creation, which offers a poor and uncomplete vision. The second limit is the lack of external validity of the model. In a constructivist approach, this model is a representation of reality, influenced by our own perceppion. To gain external validity, the model should be tested on other towns.

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e-Government and Financial Transactions: Potential Versus Reality

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Abstract: Some of the most challenging e-government applications involve allowing citizens and other customers such as businesses to conduct financially related transactions electronically with governments on a 24-hour, 7-day a week basis. There has been little empirical research on the utilization rates of on-line financial applications. This paper reviews existing data concerning usage rates and presents new data from governments at the state and local levels concerning the usage rates of these online systems. Generally, usage rates are low, demonstrating that there is a gap between the potential and reality of this form of e-government. Statistical tests showed that convenience fees have a negative effect on usage rates. There were also statistically significant differences among applications. Population size was not significantly related to usage rates. Our qualitative data suggest that governments can affect usage rates by providing incentives to employ online transactions and/or penalties for making payment by manual methods. Governments may also improve their usage rates by making their websites and applications accessible and easy-to-use as well as by extensively marketing these applications. Finally, the intrinsic advantages of the applications themselves compared to traditional payment methods affect usage rates.

Keywords: e-Government, usage rates, e-Payment, convenience fees, marketing (of e-Government and e-Payment services)

1. Introduction

In this paper, we study the use of e-government (Holden, Norris, & Fletcher, 2005, p. 64) to provide financially related transaction services to citizens 24 hours, seven days per week such as paying of bills and filing of taxes. There are at least two major positive expectations associated with these types of transactions: (1) It is expected that they will make it easier and quicker for citizens and others to conduct transactions with government by providing a 24/7 method of access; (2) It is expected that by moving these transactions from mail, phone or in-person contacts to electronic exchanges that government may save money such as by less need for personnel in "front office" duties involving the general public as well as other savings including avoidance of costs associated with physical mailings and dealing with bad checks. In addition, many governments suspect that citizens will eventually expect and demand online services because they have become used to this mode of conducting businesses such as with Amazon.com or E-bay. This viewpoint is supported by a recent Federal Reserve (2004) study of payment trends for the period of 2000-2003 showed rapid changes towards electronic payments. In 2000, most non-cash payments were by check but by 2003, most were by "electronic instruments" and the number of checks paid actually declined during these years (Federal Reserve, 2004, p. 10).

2. Literature review

Data show the potential for growth in the use of electronic financial transactions by governments. For example, a 2004 survey by the Pew Center (Horrigan 2004) found that 30 percent of all contacts with government concerned transactions of some sort. A Pew study (Horrigan 2004) asked how many people would prefer to perform personal transactions to the Internet and between 20 and 26 percent each said they prefer to do transactions for auto licenses, personal projects, recreational licenses, and professional licenses using electronic means. As one might expect, the study showed that citizens with broadband access were more likely to want to use the internet for transactions..

Coursey (2005) reports that an average of 44 percent of citizens requested online financial transactions according to citizen surveys. However, Norris & Moon (2005) based on the 2002 survey by the International City/County Management Association (ICMA) found that only about 5 to 7 percent of governments currently allow for online processing of financial transactions. But change should be occurring soon. According to Moulder (2005), more than 50 percent of local governments (including 50 percent of those with populations from 5000 to 9000) plan to offer online payment of utility bills, fees and fines. However, Norris & Moon (2005) cite data to show that there is a wide gap between

stated intentions and actual behaviour with respect to the implementation of financial transactions. Norris & Moon (2005, p. 70) point out that, based on stated intentions, the percent of governments adopting financial transactions should have jumped by 32 per cent between 2000 and 2002 but the actual increase was only 6.5 percent.

There are significant obstacles to offering online services. Norris & Moon (2005) found that lack of IT staff and financial resources were the top two barriers to e-government in 2002. Norris & Moon's data also show that the percent of governments citing the issues of security and convenience fees grew faster than other barriers between 2000 and 2002—this finding could reflect their interest in developing online transaction systems. Coursey (2005) points out that the funding of these systems often requires convenience fees that are resisted by political leadership and these fees also may violate local ordinances. However, there are now third party vendors who will provide e-commerce sites for governments. Arrangements vary but one approach that is cost free to government is to allow the vendor to charge convenience fees to recoup their costs and assist in making a profit on these ventures. In some cases such as in the Illinois Epay Program (http://www.illinoisepay.com/epay/index.jsp), the state may arrange a contract and make online payment systems available to a wide variety of governmental organizations including many municipalities and county governments that have few IT resources of their own and, in some cases, even lack their own website. In the state of Washington, several governments have cooperated on developing a successful system (MyBuildingPermit.com) for doing simple (i.e., they don't require plan review) permits online and some of these local governments are relatively small in population. This system has been highly successful. For example, during 2004, their overall percentage usage rate for all of the cities taken together in 2004 was about 29 percent of all subject permits issued and the rate has been increasing in 2005 (Michaud, 2005). Perlman (2001) discusses how the use of third party vendors has allowed counties without large IT resources such as Cobb County (Georgia) to implement an online ticket-paying system. Cobb County obtained a 17 percent usage rate and helped to shorten lines at the courthouse. These cases show that small and moderately-sized cities can experience success through use of vendors and cooperative efforts of pooling resources.

One of the most important aspects of planning for online transaction systems is the extent and speed with which the intended customers of these systems use online functions. This usage rate is sometimes referred to as a "penetration" or "take-up" rate. This rate is important to vendors and the nature of the deal that they are willing to strike with governments—the higher the rate expected, the more favourable the deal they would be willing to make. If the government conducts its own online transaction system, then the usage rate will be important because government will want to recoup its investment of personnel, hardware, and software with benefits such as less time required to conduct traditional mail or in person transactions, though some governments told us that the major goal of such programs is to reduce costs for customers as an official associated with the MyPermit.com (Michaud, 2005) observes:

Standard ROI methods do not work with on-line applications. Too many of the benefits are "soft"—either they are on the side of your customer or they are in the improved image of the city. In our case, the cost savings are almost all on the customer side.

Still, planning for governmental e-commerce requires assumptions about these usage rates. For example, a plan for e-government for the State of Massachusetts (2001) assumed that the "take-up rate" for individual citizens would begin at 10 percent and increase 5% per year so that by the fifth year of implementation, it would reach 35 percent. The same plan assumed that business usage rate would begin at 15 percent and would increase rapidly to 50 percent by the fifth year of implementation.

Are these assumptions realistic? What are the usage rates obtained by governments for their online financial transactions? Although only a small percentage of local governments offer such transactions according to the most recent ICMA survey cited above, the absolute numbers are large enough now for us to take advantage of the experience of these early implementers and provide a data base for governments planning e-commerce activities to draw upon. These data will also help initiate research into the factors that affect usage rates of governmental online transaction systems.

Despite its importance, there have been few studies of actual e-commerce usage rates. One exception is Rudolphy & Cullison's (2002) study of the State of Arizona's Motor Vehicle Department (MVD) adoption of an online registration system. The original plan was for a "self-funding model" in which IBM would construct and implement the system at no cost to the State. IBM's plan was to recoup their costs and make a profit from a convenience fee that would be charged to

customers using the online system (Rudolphy & Cullison, 2002). The system began in 1997 and worked smoothly in technological terms but the usage rate was low, only about 2 percent in the first year, due largely to the $6.95 convenience fee according to Rudolphy & Cullison (2002). The state passed new legislation in 1998 to allow IBM to recoup money from the registration fee itself and also to be reimbursed for the credit card fee and this policy change led IBM to rescind the convenience fee (Rudolphy & Cullison). The result was an increase in usage rate to about 20 percent by 2002. Rudolphy & Cullison (2002) report that an internal study found that online transactions cost about 65 percent less than traditional "over-the-counter" service.

Strover's (2002) Texas survey and found the highest percentage of citizens willing to pay high fees (over 10 dollars) for renewing driver's license (10.1%) and filing and paying taxes (7.5%) which makes sense because these are two of the most essential services for citizens. It is instructive to compare survey results with actual reports of online usage from governments. The State of Texas Online Authority (2002, 2000) found a wide range in the degree of usage depending on the particular target group involved. The highest usage rates obtained were for the following transactions: (1) Department of Public Safety Driver records (71.9%); (2) Savings & Loan license renewals (44%); (3) Department of Public Safety concealed handgun license (27%); (4) Real Estate Commission License renewal (23%); and (5) Department of Public Safety Driver's License Renewal (12.7%). The lowest rates of usage were for local government transactions that the Texas Online Authority supported including: City of Mesquite Ticket pay (.2%), City of Dallas Water Bill pay (.2%); City of Houston Ticket pay (.6%); Department of Transportation Vehicle Renewal (1.0%); and Travis County Property tax (1.2%).

The Texas OnLine Authority (2002, p. 18) concluded that the extent of marketing done for the online transaction system helped to explain why some target groups had high rates. For example, the departments with the highest usage rates (Department of Public Safety and Department of Savings and Loan) marketed the new applications on TV, radio, through press conferences, and other media. A survey (Texas OnLine Authority, 2002) studied end users of the systems and found that the most common way that end users found out about the system was from renewal notices but other significant sources were websites, search engines, and libraries.

3. Study purposes and methods

This is an exploratory study of an important but largely neglected topic of usage rates. Our goals are to synthesize existing knowledge, present new information on rates, and develop a preliminary framework to explain variation in usage rates. During the course of the study, we also found it important to analyze other forms of electronic financial transactions that governments employ such as automated debit or credit payment systems. Drawing on qualitative data gathered in the study, we also will also identify certain strategies to improve usage rates as well as some preliminary insights on some of the impacts of these systems.

Since Moulder (2005) found that only about 10 percent of governments have systems now, we deliberately sought out organizations that already have implemented online payment systems. In particular, we contacted local governments that were rated highly by West (2004) and another rating of e-government excellence, the Campbell Public Affairs Institute of the Syracuse University's Governmental Performance Project ratings of counties. In addition, we contacted certain state agencies that were reputed to have high usage rates in order to gather additional information. We also employed major governmental listservs (those of Governmental Management Information Science, the Innovation Groups, and CityWebmaster listservs) to solicit data. We asked each government to provide us with the following information: (1) data on the number and percent of transactions that are conducted electronically through their governmental website with credit cards; (2) data on the number and percent of transactions that were conducted by other electronic transaction methods such as "ACH" or direct debit payments. We also requested information about whether they used convenience fees. We obtained responses from 45 governments for 58 different applications. This is an exploratory study and, given the methods we used to obtain data from organizations, we can not claim that these data are representative of other governments. We do know that our governments contain certain organizations have been offering online transaction services for a relatively long period of time as well as others that are very new to online transactions. Despite the fact that we guaranteed anonymity to governments reporting usage data, it is still likely that governments that view their online systems as being successful are more likely to share their data so this and other unknown response biases may affect our findings. Our reporting of these measures, despite the non-random sample, helps to build some benchmark usage data and prepare

the basis for more refined analyses in the future. Moreover, we have a good representation of local governments in terms of size—the governments in our list range from less than five thousand to more than one million in population. In addition to seeking data on their usage rates, the authors also solicited qualitative comments both through e-mail and phone conversations with the respondents to obtain their insights concerning usage rates.

4. Forms of "Electronic" Payments and state-level data

When we began this research, we were primarily focused on one specific form of electronic transaction: transactions by individual citizens with governments through websites with credit cards since this has been the focus of research by most e-government researchers such as West (2005). As we explored further, we realized that web-based credit card payments were only one of several different electronic transaction methods offered by governments and these other forms often dominate in terms of numbers. For example, projects such as New York City's NYCSERV and Indiana's ePay programs, named winners of a contest for online systems by the NECCC (National Electronic Commerce Coordinating Council 2004), employ a variety of forms of transactions including web-based credit card payments, Interactive Voice Response (IVR), Kiosk, ACH-credit, ACH-debit, and other forms of electronic payments from customers. For state agencies, there are several approaches to filing state taxes (Federation of Tax Administrators 2004) that are electronic. There are ELF, Telefile, On-Line, and Direct I-file returns that are at least partially electronic in nature: (1) ELF: returns are submitted by practitioners; (2) Telefile: citizens use touchtone phone to submit their forms; (3) Direct I-File in which citizens submit their forms directly to the state through a state website; (4) Online Returns in which citizens submit their forms via personal computers and software through "electronic return originators;" (5) Bar-Coded paper returns in which the paper returns are captured and converted into electronic form. Of course, many would not consider the bar-coded approach to be "electronic." Moreover, new forms of electronic conversion and payments are continually evolving. For example, one of the municipalities we contacted employs "Distributed Payment Capture" in which payments left in an outdoors payment box are scanned and converted to enable an electronic ACH deposit. In short, we have now reached the stage where most payments will quickly be converted into electronic format even if it is initially made via manual methods but there remain differences among

these methods in the extent to which they have eliminated the need for manual processing and human intervention on the part of the government.

The different forms of transaction methods have their advantages and disadvantages. Direct debit or the "ACH" method has the advantage of usually not involving any fees for the government or the citizen. This method, however, may not be practical if the bill is due in a short period of time and the person is not already signed up for this form of payment, although one of the governments in our sample did offer a "one time ACH" payment option. Thus direct debiting forms of payment make best sense for recurring types of charges like utility bills while occasional payments that often have short-time frames for payment (e.g., for traffic violations) mesh better with online credit card payments. From the governmental point of view, the credit card approach has an advantage of immediately obtaining the funds and problems of payment become a matter for the individual and his/her credit card company to work out. By way of contrast, an electronic debit approach will not obtain any money if there is nothing left in that person's account and thus presents a difficulty similar to bad checks.

There are wide ranges in the degree to which states employ these particular forms of electronic submissions. The majority of all states' electronic income tax filing appears to occur through electronic arrangements with "practitioners" (the "ELF" electronic submission form). For example, in 2004 (Federation of Tax Administrators, 2004), about 81 and 71 percent of the electronic taxes filed to Iowa and Illinois occurred through ELF. Iowa overall had the highest rate of electronic submission, about 60 percent (including telefile) but less than 3 percent of Iowa returns were filed by the I-filing method through direct electronic submission by citizens from a website. By way of contrast, Illinois had less than 40 percent filed electronically but had more than 9 percent filed through the I-filing method. If one includes bar-coded returns as electronic, then Massachusetts had the highest overall electronic filing rate with more than 80 percent. (Federation of Tax Administrator, 2004). The percentage of taxes filed electronically by states varies greatly from 19% (Rhode Island) to 60% (Iowa) (see Table 1 below). The relatively high rates of state taxes being filed by electronic methods is explained by at least two factors: (1) Residents who file electronically expect to quickly receive a refund so they are actually expecting a benefit rather than paying a bill; (2) A large proportion of these payments are made by tax processing "practitioners" for whom electronic submission makes economic sense and the fact that states

can require or more easily target efforts to increase electronic submission on a narrow set of businesses. Another factor affecting usage rates is a state mandate. Duncan & Burruss (2005)

point out that certain states mandate electronic payments for practitioners and these mandates have had a significant effect on usage rates

Table 1: Shows the electronic payment rate

Type of Organization	Bills-Application	Time period	Overall Electronic Rate	Types of Electronic Payments Included
States	State tax filings	2004	19-60%	Telefile, I-file, Online, Web, & IVR
State of Arizona	Vehicle Registrations	July-December 2004	32.18%	Web & IVR
State University	Tuition Payments	2004	3.54%	Web

Also impressive is the State of Arizona's 32.18% rate of electronic submission (IVR and Web combined) for their automobile registration (see Table 1). Moreover, there has been a steady rate of increase in Arizona's percent of registrations done via the Internet or Interactive Voice Response System from 1.2 percent in FY1998 to nearly 28 percent for FY2004 for an average increase of nearly 4 percent per year. Arizona's success began with the repeal of the convenience fee thus the percent Internet/IVR jumped from 1.3 to 7.35% in the 1998-1999 period but the upward trend has continued steadily since then indicating that there is an underlying secular trend to greater use of online transactions. In Table 1, we combine Internet and IVR—disaggregating these two categories shows that the percent done by the Internet rose steadily from about 12 percent in 2002 to 25.5 percent in 2005 (year to date) while the percent done by IVR has actually declined from 7.1% to 6.6% during the same time period. (Note: We are indebted to James Cullison, Arizona Department of Transportation for providing this updated analysis of the Arizona data). By way of contrast, the percent of tuition payments at one state university done through the Internet was 3.54%. (Note: we keep this university temporarily anonymous to preserve the anonymity of the authors).

Several of the state and local governments provided us data concerning usage rates for several years and the data show a consistent secular trend to higher rates through time, though the improvement generally is gradual. For example, data provided to us recently by the State of Texas OnLine Authority allow us to compare FY2005 data for selected Texas applications (see Table 2 below) and there are (with one exception) systematic improvements in usage rates, often sizeable, between the 2002 and the projected 2005 usage figures. The Texas results and the high rate of success with tax practitioners illustrate one principle of online transaction systems: success is easier when the target group is relatively small in number so that marketing efforts

can be concentrated. Likewise, success is likely to be greater when the target group can perform a large number of transactions that are important to the success of their jobs or businesses as opposed to the occasional transaction that characterizes many of the online transaction systems aimed at general citizenry

5. Local government results

For local governments, Table 3 below shows the percent of web payments with credit cards range from zero percent for two local governments to a high of 45 percent for simple building permits but the latter figure is an exception. Many of the governments provided us with several months and, in a few cases, years of data. In these cases, we calculated averages for the most recent year or fiscal year or for the several months of data provided. In Table 3, we report averages and ranges for those categories of applications that had several responses: parking violations, utilities, property taxes, and water-related payments. The percent usage for parking tickets was highest with an average of more than 10 percent compared to 3 percent for utility, two percent for water, and only about 1 percent for property taxes. We conducted simple t-tests and the differences in usage rates between parking and water-related were significant ($p < .001$, 2 tail) but those between parking and utility were not quite significant ($p=.051$, 2 tail). Most utility and water-related web payment usage rates are in the low single digit range. We received few reports for business taxes but the few we did obtain were generally low. So, generally, the penetration rate for web payments of most local government applications appears to be low. The percentages of payments by electronic debit (also often referred to as "ACH" or "bank draft" by our respondents) were generally more substantial than the percent of web payments. In 18 out of 23 cases where we received percent usage figures for both web and direct debit (ACH) payment methods, the direct debit percent surpassed the web payment, often by a substantial degrees—a

paired samples t-test found the difference   .
significant at p<.001.

Table 2: State of Texas OnLine Authority: Selected 2002 & Projected 2005 Adoption Rates Compared

Agency	FY 2002*	Projected FY2005**	# Transactions (2005)
Nurses License Board	50%	135.82%	8,321
Texas Dept. Licensing & Regulation Air	4%	12.27%	196
Licensed Chemical Dependency Counselor Renewal	4.10%	23.82%	41
Railroad Commission License Renewal	4.40%	42.39%	401
Department of Insurance Agents License Renewal	9.33%	22.73%	2,034
Real Estate Commission License Renewal	23.20%	59.81%	2,108
Department of Public Safety Drive License Renewal	12.70%	38.33%	23,300
Department of Public Safety Concealed Handgun License	27.30%	8.56%	1,894
Department of Public Safety Driver Records	71.90%	93.96%	759,646
Department of Transportation Vehicle Registration Renewal	1.00%	2.79%	33,850
Texas Engineering Extension Course Registration	0.70%	3.53%	335
Comptroller of Public Accounts Sales Tax	2.60%	6.27%	12,913

*Based on State of Texas OnLine Authority (2002).
**Based on Interim FY 2005 report provided March 24, 2005 by Kevin Tanner, Senior Project Manager, Texas OnLine Authority.
***These are projected figures based on early 2005 results and thus the figures are estimates and can be in excess of 100%.

We explored the hypothesis that governments that do not impose a convenience fee would have higher usage rates by testing for differences in usage rates for local governments with similar applications (water-related & utility) and the usage rates were higher (.047 vs. .012) with the no-fee governments (p<.05). The impact of convenience fees is also suggested by the fact that in 3 out of the 4 cases (in which we know about the status of convenience fees) where web payment percentages exceeded the direct debit (ACH) percentages, the governments had no convenience fee. As noted above, one of the reasons for the relative popularity of the direct debit method is that it generally has no convenience fee attached to its use.

We also explored the hypothesis that the size of the government as indicated by its population would have a positive impact on the percent of online transactions. Population size has been found to be important by Ho & Ni (2004) to the expansion of e-government features. Although the correlations were in the expected direction, there were no statistically significant correlations between size and usage rates overall or within the utility and water-related categories. Of course, due to the non-random nature of our sample and its limited size, these tests need to be replicated on larger, random samples before drawing any firm conclusions. However, the lack of a strong relationship between size and usage rates could reflect the fact that the increasing availability of third party vendors reduces the importance of size as a factor affecting usage rates
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Table 3: Usage rates for local Government

Government	Population Range	Application	Time	%Web	Conv. Fee?	Other Electronic
G27	Over 1,000,000	Business taxes	2004	0.01%	Yes	
G42	250,000-499,999	Business taxes	2004	0.60%	Yes	
G13	2500-4999	Licenses	2005	1.00%	Yes	
G36	Over 1,000,000	Municipal Courts	2004	6.95%	Yes	
G3	100,000-249,999	Parking Violations	2005	17.00%	Yes	
G14	100,000-249,999	Parking Violations	2004	1.25%	Yes	Other: 7.49%
G21	500,000-1,000,000	Parking Violations	2005	4.00%		
G24	500,000-1,000,000	Parking Violations	FY2005	13.70%		
G27	Over	Parking Violations	2004	11.53%	Yes	IVR 2.95%;

Government	Population Range 1,000,000	Application	Time	%Web	Conv. Fee?	Other Electronic Kiosk .26%
G42	250,000-499,999	Parking Violations	2004	18.30%	Yes	
G44	250,000-499,999	Parking Violations	2004	10.89%	Yes	
Average for Parking Violations: 10.95%; Range: 1.25% to 18.30%						
G2	100,000-249,999	Parks &Recreation	2004-2005	6.30%	No	
G42	250,000-499,999	Police Reports	2004	18.10%	Yes	
G22	100,000-249,999	Property tax	FY2005	2.04%	Yes	
G23	500,000-1,000,000	Property tax	2004	0.41%	No	
G24	500,000-1,000,000	Property tax	FY2005	0.01%		
G27	Over 1,000,000	Property tax	2004	2.08%	Yes	
Average for Property taxes: 1.13%; Range .01% to 2.08%						
G27	Over 1,000,000	Red light violations	2004	3.26%	Yes	
G21	500,000-1,000,000	Sewer bill	2005	3.00%		ACH: 2%
G2	100,000-249,999	Simple building permit	Mar-05	45%	No	
G18	Over 1 Million	Ticket payments	2005	2.8%		
G22	100,000-249,999	Ticket payments	FY2005	2.17%	Yes	
G1	25,000-49,999	Utility payments	2005	2.14%	Yes	ACH 8.11%
G4	Under 2500	Utility payments	2005	0.00%	Yes	
G5	100,000-249,999	Utility payments	2005	1.00%	Yes	Direct debit 9%
G6	50,000-99,999	Utility payments	2004-2005	15.85%	No	Bank draft 8.05%
G7	50,000-99,999	Utility payments	2005	1.64%		
G10	25,000-49,999	Utility payments	2004	1.45%	No	Direct debit: 15.34%
G15	2500-4999	Utility payments	2004	0.24%	Yes	
G20	200,000-249,999	Utility payments	Jan-05	2.73%	Yes	IVR: 9.15%
G26	100,000-249,999	Utility payments	2004	4.96%	No	Direct debit 13.40%
G30	5000-9,999	Utility payments	2005	0.50%	Yes	Direct debit: 9.5%
G31	100,000-249,999	Utility payments	2005	11.50%	No	ACH 9.1%; Electronic lock box 14%
G32	100,000-249,999	Utility payments	2005	1.06%	No	ACH 1.19%;Direct Debit 2.14%
G33	10,000-24,999	Utility payments	2005	0.17%		Direct debit 2.14%
G35	100,000-249,999	Utility payments	2004	4.14%	No	
G37	100,000-249,999	Utility payments	2004	2.88%	No	
G38	500,000-1,000,000	Utility payments	2004	0.92%	No	
G42	250,000-499,999	Utility payments	2004	1.80%	Yes	
Utility-Related Payments. Average 3.18%; Range 0 to 15.85%						
G17	250,000-499,999	Vehicle registrations	2004	3.56%	No	
G40	2500-4999	Wastewater bills	2005	0.00%	Yes	
G41	50,000-99,999	Water & Wastewater	2005	4.17%	No	Automatic bank draft: 16.5%

Government	Population Range	Application	Time	%Web	Conv. Fee?	Other Electronic
G8	Over 1,000,000	Water bill	FY2005	5.36%	Yes	IVR 1.2%
G9	500,000-1,000,000	Water bill	2004-2005	0.55%	Yes	IVR 1.2%
G16	50,000-99,999	Water bill	2003	0.01%	Yes	
G19	50,000-99,999	Water bill	2005	5%	Yes	Direct Debit: 25%
G22	100,000-249,999	Water bill	FY2005	4.20%	Yes	
G25	100,000-249,999	Water bill	2004-2005	1.28%	No	IVR 1.73%; ACH-recurring 12%; ACH-one time 1.01%
G28	10,000-24,999	Water bill	2005	0.39%	Yes	ACH 2.56%
G29	25,000-49,999	Water bill	2005	0.39%	Yes	ACH 2.56%
G34	5000-9999	Water bill	2005	0.82%	Yes	ACH 4.65%
G39	50,000-99,999	Water bill	2003	0.01%	Yes	
G43	250,000-499,999	Water bill	2005	.60%	Yes	Automated payment: 15.3%
G45	5000-9,999	Water bill	2005	1.01%	Yes	Direct debit 5.11%
G11	2500-4999	Water-sewer	2005	0.68%	Yes	ACH: 4.69%
G12	50,000-99,999	Water, sewer, & recycling	2005	5.63%	No	ACH 3.62%;DPC: 2.95%
G44	250,000-499,999	Water-Stormwater	2005	2.43%	No	ACH 9.57%

Water-Related Applications. Average: 1.98%; Range 0 to 5.63%
ACH, Bank draft, & direct debit all refer to essentially same idea of electronic transfer arrangements with bank or other financial institutions that results in electronic transfer of funds.
IVR: Interactive Voice Response System that also results in electronic payments.
DPC: Distributed Payment Capture that involves scanning of check to result in an ACH transaction.

The City of Tampa (Florida) provides a test for the impact of convenience fees. (Note: we are indebted to Steve Cantler, Tampa's Information Technology Project Services Leader, for these data). They dropped convenience fees in March of 2005 (see Table 4) and both the percentage of the count of online payments and the percent of the amount paid online increased the months following the change despite the fact that the government did little or no promotion. The percentage usage rates in Table 4 represent an average for all of Tampa's applications but their individual application rates vary greatly—from more than 18 percent for parking tickets to less than 1 percent for business taxes, demonstrating that the nature of the particular application affects usage rates. The Tampa data also illustrate that online percentages are generally fairly stable even though the absolute amounts may be affected by seasonal factors. Table 4 also illustrates the fact that there are two different figures that can be used to calculate usage rates: percentages of counts and percentage of amounts—the count percent is almost double the amount figure in this case. These two different percentages can differ significantly if the size of the typical online payment differs from the typical traditional payment—note that the figures reported in Table 3 employ the count figure. For example, one local government noted that their numbers of "wire transactions" were small but often involved large amounts being transferred from banks.

One of the attractions of web payments is the ability to earn "miles" or other rewards from credit card companies. This would be especially attractive for a large payment such as annual property taxes but most if not all of the property taxes online systems have fairly heavy convenience fees so that the percent paying online is small. Still some do pay by this method even though it does not appear to make economic sense. Indeed, an official in one government reported that in some cases, online credit cards were used for payments that resulted in hundreds or thousands of dollars in fees and the benefits from credit card companies did not appear to justify the costs. Upon inspection, in some of these cases, it turned out it was a third party (e.g., representative of a homeowner association) paying the fee and thus the payment of the penalty made sense from that individual's perspective.

Table 4: City of Tampa Effect of Eliminating Convenience Fees Beginning March 2005

Month-Year	Online Transaction Account	Online Revenue Collected	Percent of Transactions Online	Percent of Revenue Collected Online
Jan-04	4,388	280,886	3.55%	1.70%
Feb-04	4,396	268,067	3.66%	1.59%

Mar-04	4,574	278,481	3.28%	1.50%
Apr-04	4,048	231,278	3.32%	1.52%
May-04	4,034	256,940	3.32%	1.60%
Jun-04	4,208	272,940	3.30%	1.58%
Jul-04	4,209	294,904	3.40%	1.67%
Aug-04	4,280	296,358	2.98%	1.44%
Sep-04	3,578	234,976	2.90%	1.28%
Oct-04	4,510	303,981	3.46%	1.63%
Nov-04	4,378	315,701	3.30%	1.89%
Dec-04	4,441	296,684	3.62%	1.73%
Jan-05	4,375	307,392	3.72%	1.84%
Feb-05	4,381	311,956	3.72%	1.87%
Mar-05	5,894	361,359	4.49%	1.97%
Apr-05	5,784	367,897	4.66%	2.35%
May-05	6,685	437,002	4.90%	2.52%

Source: Steve Cantler, Information Technology Project Services Leader, City of Tampa, Florida

6. Discussion

Web payments can save governments money on postage and are also a quicker and easier method than traditional methods (postal mail or in person payments). The speed of the website credit card payment can make a difference when people are late. For example, one local government has a policy that parking tickets double in cost if not paid within 10 business days. According to an official with this local government, people often don't pay immediately and then panic as they realize the date is approaching so they use the web online system to pay the parking tickets despite its convenience fee and this is one of the reasons why their usage rate for parking tickets is higher (close to 20 percent) compared with less than 2 percent for utility bills. In short, people may resort to online payment to ensure that they make the deadline to avoid penalty fees and be willing to pay the convenience fee if they are less than the penalty.

Online payments with credit cards may also be useful to those who are short on cash and this fact is associated with other important benefits. According to one of the municipal officials, many of the users of online utility payments are late payers whose service is about ready to be cutoff. It used to be that people could write a check and use "float" due to the fact that it took several days for the check to clear. However, the Check Truncation Act (often referred to as "Check 21") has sped up the time that it takes to clear checks and thus cut back on the "float." Consequently, online payment with credit cards is one way to pay when cash funds are not available in their checking accounts. From the point of view of the government, the processing of checks can be costly in terms of time and personnel as well as the fact that a certain percentage of the checks are bad. Thus credit card payment can alleviate the problem of the bad check—the problem of payment then becomes between the credit card

company and the customer, not between the customer and the local government. Likewise, the cutting off of utility services is a very serious step (e.g., losing heat during cold weather) so the use of credit cards can help to avoid this dilemma for both customer and government. Our communications with several local governments revealed that they very much dislike initiating these service cutoffs so that if online services reduce the necessity to cutoff services, the online systems could be viewed as successful even if the overall rate of usage is low. One local government reported a drop in "collection shutoffs" of water declined for the city from about 2500 to 1700 during a 3-month period—more than a 30 percent drop. In short, to summarize, the smallness of the percentage figures for web use can mask some important positive impacts.

Web usage rates are likely affected by many factors over which governments have no control such as the socioeconomic status of their populations and the area's degree of "connectedness" to Internet. Areas with wealthy populations with high education levels and prevalent broadband usage are likely to obtain relatively higher rates of usage and these are factors over which governments have little or no control. There are some factors that governments can control. One is the nature of the website— how visible and easy to access and use is the online payment system? The authors searched through more than 200 websites for their online payment applications during the course of this study. In many cases, online services are highlighted on the home page (or portal) so that the online transaction system is both prominent and accessible in one or two clicks of a mouse. In many cases, we had extreme difficulty in finding the online payment system and only were able to locate it by sending a query to the webmaster or some other official of the government. Some of

the variation in usage rates is likely to be due to these aspects of the governmental website.

We were not able to actually conduct transactions to test the user friendliness and effectiveness of the applications. The award-winning NYCServ ePayment Project's (NECC, 2004, p.13) concluded that it is important to have a live help desk that citizens can call and that many hacking attempts were made so that "robust security" is a necessity. However, an official of the NYCServ (Desiderio, 2005) stated that the biggest fraud issues concerned pay by phone—not by Internet. The development of an online transaction system is complex and the NYCServ (2004, p. 14) project concluded that there is no substitute for a field test because acceptance testing could not accurately "simulate actual portal usage." They noted that a focus group would have been useful because it would have turned up insights such as the importance of supporting AOL and Apple that were not included in the original design requirements developed by internal managers. Another agency found similar issues needed to be dealt with: (1) Customer support issues such as lost or forgotten information, credit card validation problems, missing or inaccurate customer information, & user error in navigating the application; (2) Operational issues such as fraudulent credit card use, need to train customer support representatives, and dealing with changes that the system forces to the closing of business operations. If this agency had to start over, some of the steps they would do differently include a more detailed online help system. In short, although we were not able to investigate the actual characteristics of the applications, it is clear that the accessibility and quality of the system will affect usage rates.

A second major factor is marketing. One of the officials running a state-supported online system said that he noticed big differences in usage rates depending on the extent to which the local government marketed their system. We asked governments to provide us information on the nature their marketing and some of high usage rates indicated that they had put substantial effort into it as the following comments indicate. Here are some comments. The high usage rate for MyBuildingPermit.com communities reflects their commitment to marketing the applications:

(Local Government Business Systems Manager) We hired a marketing company to help us come up with a logo and to give us advice. Each of the jurisdictions had posters and business cards and every jurisdiction's Permit Techs told clients about it. We had press releases. During the design stage we had focus groups of contractors who tested the system and gave us feedback. We

have contractors that pull a lot of these types of permits so we knew if we targeted some of the big ones we would pick off a large percentage of the applications. We went to the Master Builders Association. We all have public computers in our Permit Centers so we can show clients how to use it. We all have links on our websites to this website….

The nature of the customer pool affects success rate. MyBuilding.Com was able to be quickly successful because they were able to target a few large contractors and thus achieve substantial success by converting them to users. Other communities relied on a variety of marketing strategies:

(Local Government Manager) "We used whatever marketing tools we had at hand. We included a few sentences in our residential newsletter, sent a separate letter to all utility customers and promoted it on our website.

(Local Government Manager): "The marketing strategy was straightforward. The first billing cycle that eBilling was available…the message section of the bill had an announcement with information inviting people to go to our website and view and/or pay their bill. In addition, a buck slip bill stuffer on bright yellow paper was placed in the envelope with more detailed information. (The City does not use bill stuffers very often and limited them to one subject per cycle so there is more effect). In addition, we made the system the "featured" story with a hot link on the home page of the website. We repeated the message on the bill with the next two cycles but did not use a buck slip. In addition, residents who called and paid their bill historically via phone were given the information and invited to look at the system….

In both of these above cases, the governments were relatively successful and their success appeared to be associated with a reasonably extensive marketing campaign. So marketing can make a difference. Still, as we show in Table 4, increases in usage rates can be achieved without additional marketing simply by eliminating convenience fees. According to Cullison (2005), Arizona's auto-registration program did not employ much advertising beyond sticking a flyer in renewal notices but that their application sold itself through word-of-mouth advertising.

In Figure 1 below, we have outlined a model of the factors that, based on our analysis, appear to influence usage rates. Our model is undoubtedly a simplified version of reality, positing that the usage rates are constrained by certain variables that are beyond the control of the government

including the nature of the area served, the pool of customers/citizens and their particular characteristics and financial situations, and the nature of the applications themselves. Within these constraints, organizations can influence usage rates through their convenience rate policies, and the quality of their website and applications. The nature and perceived advantages of the application itself can have effects on customers' propensity to use the systems independent of these factors. For example, according to Megan Michaud (2005), Business Systems Manager for the City of Bellevue (Washington), the MyBuilding.com "system sells" itself because it allows contractors to sit in their office and "pull permits across jurisdictions." We saw in the state level data that fairly high usage rates can be obtained when the

targeted group expects a significant benefit such as an income tax refund or if the targeted users are business people whose job will be significantly facilitated by the online system. Our model draws on the Technology Acceptance Model (TAM) that posits that perceived ease of use and utility affect end user's usage of technology (Davis, 1989). Wang (2002) employed a revised TAM model that included perceived privacy of information and the citizen's sense of self-efficacy and found these variables were significant in explaining usage rates of electronic filing systems in Taiwan. Of course, we did not directly study end users of the systems in this research--our model is based upon the qualitative observations of some of the managers of the government systems.
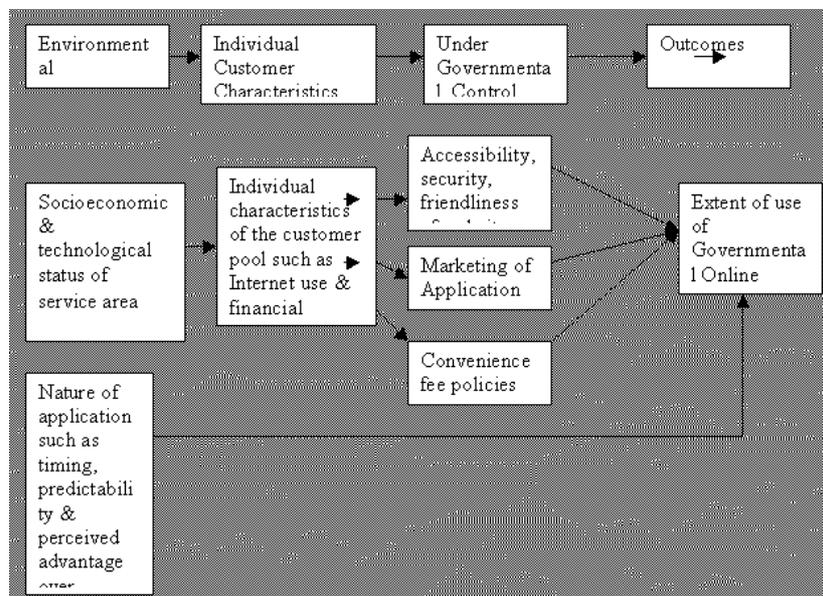

Figure 1: Model of factors influencing use of Governmental online financial

The establishment of online payment systems can be complex for a variety of factors including negotiations with credit card companies. Governments can adopt certain tactics to lower rates for their customers. For example, the NECCC (2004) study reports that the State of Indiana issued an RFP to obtain the best credit card rate. Reportedly, some of the credit card companies have policies that restrict, for example, the use of sliding fees and require that all credit cards offered by online systems charge the same fee. These policies can force government to make choices as to which credit cards they will accept.

All governments providing online systems currently maintain traditional payment systems too so it is important to increase the usage of electronic payment options because the marginal cost of them is less once the system is in place. The trend among the advanced governments is to

provide several different options for payment including web payment, interactive voice response, direct debit, and others. An alternative approach to encourage greater electronic payment usage is to charge a fee for traditional methods of payment. This is what Conyers Georgia (Perlman, 2001) did—they charged three dollars for an accident report picked up at City Hall while providing it for free over the Internet. However, such an approach is likely to be controversial since previous work shows that usage rates are correlated with age and ethnicity (Strover & Straubhaar, 2000). Indeed, one local government official explicitly argued against the exclusion of convenience fees for online payments:

We read with interest the experience of other municipalities and "villages" with high median incomes who absorb the costs of "e-payment"

programs…. …this approach doesn't make business sense. "E-government" may be sexy, but it comes at a cost. We made the decision not to subsidize those customers who (and we have heard this quite often) wish to accumulate frequent flyer miles by using their credit card to pay their utility bills.

Our results along with the few other studies done of usage rates provide some tentative conclusions that need testing with a scientific sample. First of all, the percent of payments done through websites with credit cards is generally small for most local governments. Thus governments planning to implement online systems should begin with expectations of low usage rates for

applications aimed at general citizenry. High usage rates appear to occur in special situations such as when customers expect benefits (e.g., tax refunds) as opposed to paying a bill, their numbers are small so marketing can be targeted, or the group of intended users are businesses or professionals whose jobs will be significantly easier due to the online system. Still, we found a steady if gradual increase so that usage rates should be substantially higher in the future. In short, online financial transactions continue to offer a great deal of promise for the future but success is not quick or easy but requires a sustained effort.

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Information- and Communication Technology (ICT) and Local Power Relationships: An Impact Assessment

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Abstract: This paper is grounded in the empirical reality of a growing use of information- and communication technologies (ICTs) in public administrations. Generally, ICTs are being introduced in an organization in order to increase operational efficiency, quality, and transparency. But, besides these intended effects, the introduction of ICTs also leads to substantial changes in the power relationships among all involved actors. As a result of ICT-enhanced operations, some of the actors will increase their power, while others will loose some of their power. This paper therefore studies the implications of ICTs on the power relations in local administration settings.

Keywords: Information- and communication technology (ICT); local administration; power relationships; stakeholder theory; state transformation; electronic governance

1. Introduction

Generally, information- and communication technologies (ICTs) are being introduced in an organization in order to increase operational efficiency, quality, and transparency. Thus, most research focuses on such issues. However, besides these undisputable gains, the introduction of ICTs also leads to substantial changes in the power relationships among all involved actors. Consequently, and as a result of ICT-enhanced or modified operations, some of the actors will increase their power, while others will loose some of their power. So far, little research has been done on the impact of ICT on the power relationships between organizations. The existing literature does not properly conceptualize the issues of power between the public sector and its stakeholders in the context of ICTs. This, however, has to be done if one does not want the public sector to loose some of its power when making use of the ICTs.

In this paper we will therefore study this question by focusing on the local level. We work with a stakeholder approach and have identified the relevant stakeholders of a local administration. On the basis of our stakeholder model, we will systematically analyze the change (increase/decrease) of power in the relationships between the administration and the identified relevant stakeholders. We will finally try to assess who wins and who looses power as a result of the introduction of ICTs in the relationship between the local administration and its stakeholders. As such, our paper is a contribution to further theorizing the way the public administration adapts thanks to the ICTs.

We will, in a first section, define the three main conceptualizations of power. In a second section we will describe the different stakeholders of the local administration and outline our stakeholder model. In a third section we will describe the characteristics of ICTs and their general impact on organizations, particularly on public administrations and on power relationships. In a fourth section, we will then systematically analyze the different situations in which the ICTs play a role in power relationships between the local administration and the identified relevant stakeholders in our model. In a final step we will translate these observations in terms of gain or loss (increase/decrease) of power for each actor in the stakeholder model and show the shift in the balance of power.

2. The categories of power

Our starting point in this section is that power and power relationships are part of organizational life. It is obvious that power does play a key role in organizational change in general and in transformation of the public sector in particular, even though the theories about organizational change do not give due credit to such power considerations at all. Indeed, the administration cannot afford to ignore its stakeholders while making use of the ICTs when accomplishing public tasks.

We refer here to the classification of power in organizations proposed by Finger, Mercier and Brand (Finger, Mercier et al. 2000: 2). There are indeed basically three ways of looking at power in general, and at power in organizations in particular. Power can be either seen as an attribute of an actor, which is the original political

science approach, as a structural phenomenon, which is the sociological approach, or as being located in the interface between actors and structures, which is the so-called structuration-theory approach. We will now briefly present each of these three approaches of power. Power as an attribute: according to this approach, actors have different degrees of *power depending upon* their *resources* (e.g., financial power), their reputation (reputational power), or their ideas (epistemic power). In all three cases, power resides with the individual actor and stems from his or her attributions. Today literature mostly refers to stakeholder theory, whereby multiple actors and multiple goals coexist. In this context the interaction of the various actors with power is becoming increasingly complex. This means that, though the actors still have the attributes of power, their leeway is diminishing parallel to the growing amount of relevant actors.

Power as domination: this approach is grounded in the idea that the organization is basically a "mini-society", i.e., a complex social structure composed of multiple interests and groups representing them. Among these interests some are incompatible, thus inevitably resulting in conflicts. Given this, different actors seek to impose their will upon other actors by using both formal or informal norms and means. However, the means used are less related to the actors and their attributes, than they are to the organizational structures and institutional arrangements. This sociological approach sees *organizational rules and structures* as a means to exert domination of the actors inside an organization.

Power as relation: a third way of looking at power is to locate it in the interface between actors and structure, an approach also called "structuration" theory. Michel Crozier (Crozier 1963) says, that actors struggle for power, more precisely, they struggle for the ability to define the norms and the rules, which structure the environment they operate in. In doing so, their rationality is quite limited, i.e., significantly surrounded by uncertainty: the *control over* a certain span of *uncertainty* thus equals power. Oppressed actors strive for certainty, which allows them to better strategize, while actors in power try to preserve as much uncertainty as they possibly can. There are two sources of uncertainty, i.e., expertise and hierarchy. For Crozier, power always results from a dialectical process of negotiation among actors on the one hand and between actors and institutional rules and norms on the other. As such, power depends upon the mastery of spans of uncertainty, more precisely upon the depth of uncertainty one can master, upon the pertinence of this uncertainty, as well as upon the degree to

which one can manipulate previsibility. Consequently, according to this approach, every actor in an organization or in a network will try to increase its ability to control uncertainty in order to better strategize. This approach corresponds to the behaviorist's view, which defines power as the ability of an actor A to get another actor B to do something, either by influence, by coercion, by authority, by force or by manipulation (Lukes 1974).

In this research we will focus on the third approach of power, the structuration theory. This approach includes the arguments of both previous approaches, since attributes (resources, reputation, ideas) and organizational rules and structures are elements, which determine the ability of an actor to control uncertainty and thus the ability to better strategize. Besides, it might be more correct to describe this approach as a conceptualization of control over uncertainty than as a conceptualization of power, but as we have stated above, there are several reasons why an increased ability to control uncertainty also means increased power. Consequently, if we want to measure the influence of ICT on the relative power position of an actor, we have to look at the elements, which determine its ability to control uncertainty, to strategize and to negotiate with other actors.

In order to discuss the influence of ICTs on the relative power position of a local administration, we have developed a stakeholder model, which we are going to discuss in the next section.

3. The stakeholders of the local administration

Stakeholder theory is primarily a theory of the private-sector firm. But despite this fact, the insights from this theory can be applied to public sector settings, and in particular to the context of managerial decisions regarding major e-Government initiatives. Such application is facilitated by the fact that public management responsibilities begin to resemble private-sector management tasks not only formally but also regarding the emerging network-nature of organizations in both spheres (Scholl 2001: 18). Even though most public-sector managers perform their tasks for different ends (e.g., public interest) as opposed to their private-sector counterparts (e.g., survival of the firm, or profit), their decisions have the same capacity to affect individuals or groups when pursuing their organization's objective. Therefore, in order to measure the change in the power relationship between the local administration and the stakeholders, the first objective is to identify all

involved actors. On the basis of an in-depth analysis of literature (e.g. (Bovaird 2005); (Frey 2003); (Riedl 2004)) we have identified the following nine stakeholders of a local administration:

- Citizen: by citizen we mean all functions of a private person, i.e., a user of services, a taxpayer, a voter, etc.. This first stakeholder group influences the local administration through elections and votes, but also in their daily interaction with the administration and indirectly through their interaction with politicians. The growing use of Internet in society will, most likely, lead to an increased pressure on administrations to deliver their services online.

- Business: as a basis of economic welfare, businesses greatly influence the political-administrative system and are in constant interaction with it. In the context of e-government, the particular pressure of businesses on administrations arises from the fact that, generally, private sector organizations are technologically more advanced than the public sector and demonstrate the existing technological opportunities. In addition, private operators sell products and services to public sector organizations.

- Other public administrations: administrations of national (federal) and regional (cantonal) level as well as other local administrations are – in particular in the federalist system of Switzerland – in daily interaction with the local administration and thus represent one of the most important stakeholder group.

- Politicians: political actors and the executive body, as for instance the president or the municipal council, influence administrative activities through their decisional and instructional authority. In addition, the question of the (optimal) size of an administration is a political decision and a consequence of the priorities, which politicians assign to a public task. Furthermore, civil servants are mostly nominated by politicians, sometimes on the basis of their political orientation and favoritism. Simultaneously we can observe a large politization of civil servants, certainly due to the relatedness of the tasks. In return, the current technological evolution causes some changes in this situation: according to Finger and Genoud "…*it is the administration which most of the time defines the terms of the contractual relationship it engages with the executive body. In other words, in this new strategic*

relationship with politics, there is a strong information asymmetry in favor of the administration. If the executive body signs the contract, and thus to a certain extent remains in control, the legislative body is totally left out of the picture." (Finger and Genoud 2000: 243).

- Parliament and Justice: both the parliament in its legislative function, and the justice, whose decisions are precedent-setting, define the rules and the framework for administrative activities and interactions with third parties. In return, the administration owns the „institutional memory", the knowledge of the dossiers, the know-how and the experience. Thus, to the extent that the administration elaborates law propositions, it also has power (Blankart 2000: 159).

- NGO's / IO's / Associations: Non-governmental organizations and international organizations as well as political parties and other interest groups influence – through their lobbying – the political-administrative system and its decisions. In addition, they participate in the elaboration of laws and regulations and thus co-define the framework for administrative activities.

- Media: administrative employees use media as a source of information. In addition, media in their role as public opinion maker, determine the choice of news and topics. By choosing specific topics and by specifying their importance, a phenomenon commonly called agenda-setting, media deeply influence the public opinion. Finally, media also expose dysfunctions in the public sector, especially in the administrations.

- Foreign countries: the more a state interconnects with the rest of the world, the more its institutions – especially the administrations – have to match the rules and regulations of the foreign countries. This constraint, however, varies according to the size, the economic and the military power of the country in question. In the actual European context, foreign countries significantly influence the political-administrative system of Switzerland and the pressure for Euro-compatibility increases.

- Employees: the power of an administration largely depends on the characteristics of its employees and on the relationship between them. Finger describes this fact as follows: The success of an organization is largely dependent upon its ability to maintain control of its participants (Finger 2004: 18).

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Consequently, employees also have power over the administration. Besides, this category also includes trade unions of civil servants. These associations exercise considerable influence on the relative power position of an administration as a whole.

In summary, all of the stakeholders described above influence and are themselves influenced by the actions of the local administration. After having identified the involved actors of the local power relationship, we can now draw our "stakeholder model of the local administration":
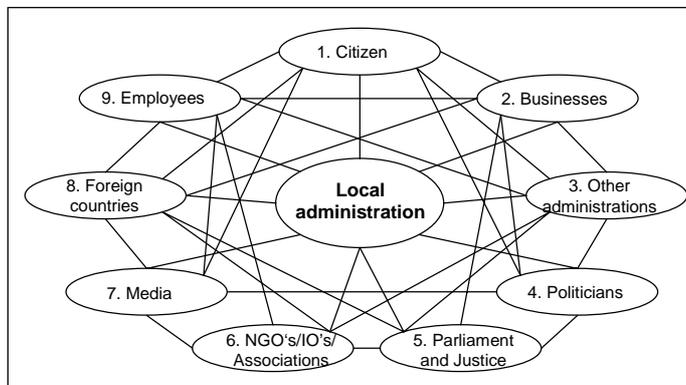

Figure 1: The stakeholder model of the local administration

In this model we have numerous interrelations between the involved actors. According to our definition, the relative power position of each actor in this situation varies depending upon his ability to negotiate, to strategize and to control uncertainty.

4. The characteristics and impact of ICT

In this section we will first describe the general impact of ICT on *organizations*. In a second step we will analyze the specific impact of ICT on *public administrations*. In a third step we will then give an insight in the literature on the impact of ICT on *power relationships* in organizations, particularly in public administrations.

4.1 The general impact of ICTs on organizations

The introduction of ICTs, by which we understand hardware, software, storage technology, Internet and other digital communication technologies, generally contributes in both private and public sector organizations to an improvement in three critical domains, which are efficiency, quality, and transparency (Brücher, Scherngell et al. 2003: 11):

4.1.1 Efficiency

Efficiency consists of two elements, namely *time* and *cost*.

Time efficiency: as a result of work process acceleration through standardization, digitization, and automation, but also as a result of faster information processing and accelerated information procurement, ICTs tend to increase time efficiency.

Costs efficiency: The introduction of ICTs in an organization generates both costs and benefits that can be summarized as follows (Fichman 2004: 720_04_11, 22): On the one hand, we have tangible costs for hardware, software and telecom services as well as costs for development, implementation and training professionals. On the other hand, there are also intangible costs such as lower morale of the employees (as a consequence of automation and less responsibility) and costs for the disruption of operations. On the other hand there are also benefits resulting from the use of ICTs: both tangible benefits such as increased cash flows, increased productivity, lower operational costs, reduced workforce, lower expenses and lower facility costs and intangible benefits such as organizational flexibility, more timely information, better decisions, organizational learning, employee good-will, job satisfaction, client satisfaction and improved corporate image.

4.1.2 Quality

The use of ICTs – in comparison to manual work – reduces mistakes and leads to an optimization of the stakeholder (client) benefit through proximity and online-services, as well as to administration-internal knowledge optimization (knowledge management / knowledge sharing). Generally, ICTs do not only digitize existing processes (e.g. from paper based to web based transactions), but also transform processes or even lead to the creation of new processes. According to this, we can distinguish 3 categories

of impact of ICTs on processes: reproductive, transformative, and disruptive.

4.1.3 Transparency:

ICTs enhance the overall transparency: This consists of transparency of suppliers, prices and availability, as well as organization internal transparency (tracking & tracing). ICTs also enable optimization of organizational structures that is less hierarchy, less bureaucracy, and more flexibility, which, again, improves the overall transparency.

4.2 The impact of ICTs on public administrations

In the previous section we described the general impact that ICTs have on organizations. In this section we will now describe the specific impact of ICTs on *public administrations*. The impact of ICTs on public administrations resembles in various domains the impact of ICTs on businesses: Previously ICTs only had a function of support. Today, ICTs are of strategic importance on which depend the competitivity and survival of any private company. With every innovation in the private sector technological possibilities get evident and the pressure grows to introduce these technologies also in the public sector. But, simultaneously, there are substantial differences between the private and the public sector: *"…the development of government reform is not likely to resemble the growth of private sector reform. In the economy efficiency gains and cost savings are rewarded through profits, promotions etc. whereas gains in public sector are rewarded with budget cuts, staff reductions, loss of resources and consolidation of programs."* (Fountain 2001: 13). Hence, governmental institutions cannot simply copy the concepts applied in commercial domains. The most significant difference between the public and the private sector is that governments do not sell products to customers in a competitive environment. Rather, they provide well-defined services where, in most cases, the client-citizen is forced by laws and regulations to demand a service from a monopolistic provider (Wimmer, Traunmüller et al. 2001).

In summary, the upcoming use of ICTs in government and society impacts the public administration in several domains, which can be categorized as follows:

4.2.1 Legal domain

The use of ICTs in administrations contains legal implications, since security, privacy and confidentiality issues are concerned. E-

Government reforms represent new challenges for lawyers and jurisdiction, since governmental activities are highly regulated and driven by legal framework such as constitutions, laws and regulations. Technology modifies these rules and therefore the use of ICTs for public action requires adaptation of laws in order to make e-Government solutions legally binding, especially in regard to issues such as electronic signatures, electronic documentation, electronic communication among governmental agencies and citizens, networking of authorities and common databases, data protection and data security and access to public information.

4.2.2 Structural/Organizational domain

ICTs are enabler for new forms of coordination, control and communication and thus enabler for organizational change. Generally hierarchy in the administration is gradually replaced by network, from bureaucratic to network and circular organization. In fact, the reality proves that administrations are increasingly organized in terms of virtual agencies, cross-agency and Public-Private-Partnership-networks. In return, administrations neither deal with the habitual stable and localizable stakeholders anymore, but with volatile and permanently changing networks, e.g. business networks, third-sector networks or citizen networks, which are organized in the Internet. In a networked administration, civil servants will also have to change their habits regarding their production and storage of documents by structuring and adapting them according to standards, often defined on upper administrational levels.

4.2.3 Financial domain

The introduction of ICTs in the public sector is related to high acquisition and maintenance expenditures. In return, these investments will generate economies by rendering front-office and back-office work processes more efficient. Thus, various statistical and mathematical models have already been developed to evaluate the financial impact of ICTs on organizations and of e-Government initiatives on administrations.

4.2.4 Relational domain

The introduction of new ICT work tools leads to a redistribution of skills and competencies among the internal (employees) and external (stakeholders) actors of an administration. ICTs lead to a redefinition of the operating modes by creating new opportunities and making obsolete old practices. The contact between the different actors becomes timeless and placeless and geographical boundaries loose their importance.

The new possibilities of communication lead to a direct and informal contact between the stakeholders and the administration. With this, the distance, which currently characterizes the relationship between civil servants and citizen, will be partly broken down. Furthermore, ICTs improve the ability of civil servants to respond to specific duties such as the duty of information and the principle of publicity of administrative activities. But, at the same time, the new technological possibilities also lead to growing requirements of the stakeholders of the administration, namely regarding availability, quality, timeness and transparency of public services and the growing use of ICT tends to increase the digital divide among the stakeholders, since an increasingly digital administration favors those with access to computers.

In short, today everybody agrees on the fact that ICTs have important implications for the administrations on legal, structural, financial and relational level. These implications have been widely discussed in literature. However, literature on the *relational* implications of ICTs does not properly conceptualize the impact of ICTs on *power relationships*. Although some scientists mentioned this issue, it has been widely ignored in literature so far. Thus, we are going to address this topic in the next section.

4.3 The theoretical impact of ICTs on power relationships

Today organizations strongly depend on the expertise of internal and/or external technological professionals. The dependence of administrations on such professionals provides these actors with critical power, since they control an essential resource of the organization. In fact, besides the intended cost, time and quality impact the growing use of ICTs also leads to unintended impacts, such as a redistribution of power among the involved actors. As described above, administrations are increasingly organized in networks. But networks vary greatly in structure and in how power and other resources are distributed. One can expect that powerful actors in the network will try to use ICTs to retain or even gain power. In contrast, less powerful actors might use the new technological opportunities to try to restructure the network to be more equitable. These types of power struggles and negotiations characterize the enactment of information technology in public administrations. (Fountain 2001: 82). In this sense ICTs can both contribute to a reinforcement of existing power structures and, at the same time, represent an opportunity for the evolution of existing power structures.

Internet may be considered either as a force to increase the responsiveness of government to its citizens or as a means to further empower the state. Internet threatens domination by the state over information and communication and information systems are vulnerable to white-collar criminals, hackers, "bugs" or errors in computer programs. Networked connections further increase this vulnerability. But, at the same time, paradoxically, ICTs serve as an instrument of surveillance and control over society (Fountain 2001: 3). Possessing information equals possessing power. Consequently, sharing power also means sharing influence and capacity of action.

The introduction of a new work tool (such as the ICT) in an organization represents an important change which inevitably leads to a redistribution of power (Finger 2001): Every transformation in an administration changes the power relationships and causes « political » reactions among the involved actors. In clear, every change in an organization, and the introduction of a new work tool is an important one, generates informally but inevitably a redistribution of the resources within the organization according to the competencies of each actor, thus a redistribution of power which threatens the status of some actors. Change is likely to change both the formal rules (structures and processes) and informal rules (culture), thus defining the (power) relationships among the actors (Finger 2004: 48). Finally, reforming and modernizing an administration, as every other organization, is a generator of tension which threatens the individual status and qualifications of every actor (Brousseau 2002: 8). This evolution in the state also affects the stability of the economy and civil society. Max Weber focused on the state as an institution whose structure has a significant effect on civil society. As fundamental modifications in these organizations accumulate, so proceeds change not only in the relationships between governing bodies and civil society, but also in the relationships within the economy and society. Hence, structural change in the state modifies the power relationships between public and private organizations, between government and civil society.

5. The impact of ICT on power relationships in our stakeholder model

In the previous chapter we outlined the impact of ICT on public administrations on the on hand and on power relationships on the other hand. In this section we will now analyze the different situations in which ICTs play a role in power relationships between the local administration and the identified

stakeholders and try to evaluate the impact on the actors in our stakeholder model. Therefore we are going to analyze the impact of ICTs on the critical elements, which determine the ability of an actor to control uncertainty, to strategize and to negotiate with other actors, thus the impact on the critical elements that determine the relative power position of the actors in our stakeholder model.

The main elements in this context are:

- Cost and time efficiency (e.g. communication- and search costs, work volume handled)
- Quality of decision-making (e.g. quality and quantity of sources of information, decision-support tools)
- Dependence on third parties (e.g. outsourcing, co-sourcing)
- Vulnerability (e.g. external influence, number and nature of errors and/or security regulations)
- Ability of surveillance (e.g. number and nature of control tools)
- Organizational transparency (e.g. hierarchy, centralization/decentralization)

In order to evaluate the impact of ICT on these critical elements we are going to analyze each stakeholder separately:

5.1 Citizen

5.1.1 Strengthening of the citizen:

The ICTs match the deeper process of societal and cultural transformation, a process that they tend to reinforce. Thus, the introduction of ICT is part, or even supports this transformation of the relationship «citizen-state» to a relationship «consumer-state». The consumer is characterized by a less engaged behavior and more strategic than a citizen (Finger 2001: 353).

Nearly all forms, laws and rules can be downloaded on an administration's website. This leads to a decreased information asymmetry between the administration and the citizen.

5.1.2 Strengthening of the local administration:

Information is power: The ability to locate information from anywhere thanks to centralized databases as well as the fact that communication and search costs are virtually zero, increase the power of the administration. In addition, the fact that civil servants can locate all necessary information for each transaction eliminates the previous risk of falsification of documents, when citizen had to collect papers from different administrations and bring them to the local

administration. The integration of laws, rules and regulations into information systems further increases the power of the administration, since less errors will be made with the evaluation of citizen demands.

5.2 Businesses

5.2.1 Strengthening of the businesses:

Since most information technology experts are under contract with private companies there will be a growing dominance and influence of private consultants and operators within information-based administration. Public-private-partnerships as means of improving production processes and gaining market efficiencies are frequent today and especially ICT-partner have considerable influence, since the designer of an ICT-system influences how the system is used (Guyaz 2001). Yet, information architecture is more than a technical instrument, it is a powerful form of governance.

In addition, with the outsourcing of ICT-tasks administrations become more and more dependent on private consultants and operators: they loose control, lack technological innovation, loose their strategic advantage and have to take into account high „switching-costs" in the case of a change of operator. In addition to this, security and confidentiality problems emerge when third parties get able to access administrative information. A related problematic is the "brain drain" of ICT professionals from government to the private sector, ironically to companies that specialize in selling digital government solutions to public agencies (vgl. Fountain 2001: 203). Private sector vendors of digital government and professional service firms have aggressively targeted the construction and operation of the virtual state as an enormous and lucrative market. This situation is unhealthy with a risk of derives and the launching of projects which can be far away from the real needs of the administrations and the users, but corresponding to the vision of the external experts. The reorganization of the private sector in networks and decentralized units also hides some major fiscal problems, since administrations are generally bound on territories. For instance, electronic commerce profits from the delocalization effect of taxable services and from the absence of an accounting system that controls cross-border transactions over the Internet. Most of today's taxes can't bypass physical borders and fiscal sovereignty can only take place within a territory (Ossipow 2000: 276, 277).

5.2.2 Strengthening of the local administration:

However, outsourcing of ICT-tasks also has positive impacts on administrations. There are cost savings through efficiency gains, easer transition to new technologies and the administration can better focus on the core business. Finally, private companies can better handle demand peaks and better provide ICT-management staff.

5.3 Other administrations

5.3.1 Strengthening of the other administrations:

As described above, the state becomes increasingly networked through information systems, not only by public-private partnerships, but also by interagency arrangements and intergovernmental agreements that join federal, regional and local administrations. Shared databases are not possible without standardized data. However, standardization, catalyzed by the Internet, represents a significant rationalization of agency processes

> *"First, standardization renders redundancies across agencies transparent. Second, standardization weakens the rationale for different agencies collect identical data. Third, data standardization suggests new forms of analysis. Fourth, structural changes are inevitable as redundant data collection by different agencies is eliminated. The political battles revolve around which agencies will win and which will lose ownership of the data."* (Fountain 2001: 27).

A centralized database is likely to be under the ownership and control of a central, federal administration, which implies loss of control for the local administration. Furthermore, to ensure cooperation between the different administrative levels, ICT solutions have to be compatible and the central (federal) administration is likely to impose its standards to the lower administrative levels.The tendency of this evolution is clearly visible: In future, administrations will be organized in (intergovernmental) networks, in which different nodes will have different degrees of power. Especially federal administrations, which control the centralized databases, will significantly increase their power.

5.3.2 Strengthening of the local administration:

Networked cooperation and shared databases among local administrations open wide access to new knowledge and offer opportunities for benchmark with other local administrations, while such opportunities are more limited for the central administration.

5.4 Politicians

5.4.1 Status quo:

Administrative reforms, such as e-Government initiatives, largely depend on political decisions. In return, administrative reforms also influence and push for political reforms. Therefore, we can observe a situation of status quo between politicians and the local administration and the power balance remains stable. Finger describes this fact as follows: „*…one can anticipate that either administrative reform will be pushing for political reform, thus significantly increasing the power of the administration over politics, or administrative reform will be slowed down, if not stopped, by political foot-dragging."* (Finger and Genoud 2000: 233)

5.5 Parliament and Justice

5.5.1 Strengthening of the local administration:

There is a fundamental conflict between the rapid evolving technology on one side and the rigid laws on the other side. The legislative body cannot catch up with the rapid technological evolution when formulating new laws and rules in order to regulate the newly gained managerial autonomy of the administrations.

> *"The legislative body, therefore and so far, is the main loser of current administrative reforms. Indeed, while the administration and the executive body, often supporting each other against the parliament, acquire substantial decision-making power as a result of the newly gained managerial autonomy, the traditional instruments of legislative control remain the same."*(Finger and Genoud 2000: 243)

5.6 NGO's / IO's / Associations

5.6.1 Strengthening of the associations:

As described above, administrations become increasingly networked through information systems, not only by intergovernmental agreements and inter-agency cooperation, but also by public-private partnerships or cooperation with third parties, such as Non-Government-Organizations and associations. Consequently, these third party actors access, to a certain extent, administrative information, which threatens domination of the administration over information.

5.7 Media

5.7.1 Strengthening of the local administration:

Previously, media were an important source of information for administrations. With the rise of the Internet, the traditional way of communication "one-to-many" is counterbalanced by the new structure "many-to-many".In other words: Previously, every administration had the same information and the press diffused a kind of common sense and shared values. Today, administrations do not depend on the information of traditional media anymore, but can obtain individualized information over the Internet. In addition, even for job-advertisements administrations can increasingly bypass traditional media by putting such announcements directly on the administrations' website.

5.8 Foreign countries

5.8.1 Strengthening of the foreign countries:

As outlined in the introduction, foreign countries significantly influence and determine administrative processes of a specific nation state. So does, for instance, the European Union currently with Switzerland. With the rise of the ICT-based administration this already existing pressure for data standardization and compatibility that match international standards further increases.

5.9 Employees

5.9.1 Strengthening of the employees:

Computerization has made it possible to combine many excessively specialized positions into enlarged jobs. The aggregation of tasks, in which operators are given more responsibilities using computer-based information processing and "decision support tools", is often described as "empowerment" or "job enlargement". Decision support systems give employees low in hierarchy the ability to make decisions because the rules they are to follow are embedded in software rather than in the decisionmaker. With the Internet, information has been largely individualized and the flow of information becomes largely incontrollable. Before, mail was distributed through a hierarchy, now information flows horizontally and is hardly controllable by superiors. The use of mobile phones reinforces this tendency. Conversations bypass hierarchical control and traces increasingly disappear (Guyaz 2001).

5.9.2 Strengthening of the local administration:

The employees' liberties are limited by the software and visible to the superiors thanks to the ability of ICT to monitor, capture and display the employees' activities and to produce detailed periodically reports. Consequently, the bureaucratic state moves from direct supervisory control to information based control. Employees operate under tighter control, since the rules, routines, procedures, knowledge, expertise and problem-solving are formalized and embedded in computer code. If any data is missing or a rule not respected, the process cannot be continued, thus limiting the power of the employees.

By the same time, some of the employees are being replaced by computers. Much of the routinized information processing that was previously performed manually, is now handled by computers. In other words, ICT formalizes the knowledge and know-how of skilled workers and thereby makes it independent of those. However, a forecast of the effects of ICT on job *quantity* is difficult to perform. On the one hand human labor will be replaced by automation; on the other hand additional professionals will be needed for implementation, exploitation and support of ICT-systems. However, the new jobs will probably not counterbalance the lost ones. But one thing is sure: There will be a *qualitative* shift in the job profiles of administrative employees, driven by the ICTs.

6. Conclusion and final remarks

It appears clearly that the introduction of ICT in local administrations and their relationships is not a neutral thing. It comes to a redistribution of power among the various involved actors. But there is no general rule that describes the overall impact of ICT on local power relationships. In addition, ICTs as such do not diminish or increase power, but they do change the contours of the playing field and some of the rules of the game. We want to show now the shift in the balance of power in our stakeholder model. Previous to the introduction of ICTs we had a power balance between the administration and the stakeholders, as represented in figure 2:

Citizen				Local administration
Businesses				Local administration
Other administrations				Local administration
Politicians				Local administration
Parliament and justice				Local administration
NGO's / Associations				Local administration
Media				Local administration
Foreign countries				Local administration
Employees				Local administration

Figure 2: Local power balance before

The black parts in this figure are the power shares of the local administration, the white parts are the power shares of the stakeholder in question. With the upcoming use of ICT the power balance in our model experiences a shift according to the arguments described in chapter 5 and the relative power position of the actors increases or decreases as represented in figure 3:

Citizen						Local administration
Businesses						Local administration
Other administrations						Local administration
Politicians						Local administration
Parliament and justice						Local administration
NGO's / Associations						Local administration
Media						Local administration
Foreign countries						Local administration
Employees						Local administration

Figure 3: Local power balance after

Thus, our resulting stakeholder model contains an underlying tension in terms of power imbalance.

The most evident conclusion is that the introduction of ICT in our stakeholder model, if not counter-balanced by any control mechanisms, heavily decreases the power of the local administration against businesses and other administrations.

A next step in this research will be the attempt to answer the question, whether the administration, in totally, wins or looses power thanks to the introduction of ICT. Therefore all stakeholders can be classified by importance by using categories, for example primary, secondary and tertiary stakeholders. According to this classification the stakeholders will be weighted and the individual results added in order to obtain a total.

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