PERSPECTIVE ON A DECADE OF E-GOVERNMENT IN AFRICA

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EXPLANANTION OF COVER IMAGE

The e-governance tree. This signifies growth and linkage of services between government and citizens, using the icons of the Internet and social media networks. It is electronic in its applications, but organic and rooted within the African context in its execution.

The strong outer lines on either side position the entire tree as a live wi-fi beacon and complement the symbiotic relationship of all the elements.

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The African Journal of Information and Communication (AJIC), an academic journal accredited by the South African Department of Higher Education and Training, is published by the Learning Information Networking Knowledge (LINK) Centre, Faculty of Humanities, University of the Witwatersrand. The AJIC is an annual interdisciplinary journal concerned with Africa's participation in the information society and network economy. It focuses on information and communication technology (ICT) issues at global, regional and national levels, which have implications for developing countries in general, and for Africa and the Southern African region in particular. It encourages debate on various aspects of ICT policy, regulation, governance, strategy and implementation, with interest in the multiple relationships between technology, the economy and society. It is intended to be both a rigorous academic journal and a practical medium to inform the continent's actors and decisionmakers in government, industry and civil society, across the many diverse areas where information, communications and new media play a role.

Editors
Tawana Kupe (Managing Editor), Dean, Faculty of Humanities, University of the Witwatersrand, P O Box 601, Wits, 2050, Johannesburg, South Africa;
Lucienne Abrahams (Corresponding Editor), LINK Centre, Faculty of Humanities, University of the Witwatersrand, P O Box 601, Wits, 2050, Johannesburg, South Africa; and
Dorothy Okello (Guest Editor) , Lecturer, CEDAT, Makerere University, Uganda.

Reviews Editor
Charley Lewis, LINK Centre, University of the Witwatersrand, Johannesburg, South Africa.

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Tawana Kupe
Managing Editor AJIC, Dean, Faculty of Humanities, University of the Witwatersrand

Dorothy Okello
Guest Editor, Lecturer, CEDAT, Makerere University, Uganda and Co-ordinator, WOUGNET

This issue of The African Journal of Information and Communication (AJIC) raises, in interesting ways, a number of issues that have become core to the debate about the role of new ICTs in the African context. These are both theoretical and practical. In simple terms, it is the perennial, but not unimportant, issue of how theoretical assumptions measure up to not only practical considerations, but practical applications in a particular context. In turn, what we learn about and from what is happening, may enable us to develop theories in practice.

The critical issue in relation to ICT is the potential of these technologies to advance democratic practices that enable wider participation in decision making, through interactive channels. At a practical level, how spaces are opened through interactive technologies can lead to reform of, and improved delivery and access to, government services in ways that not only meet practical needs, but enhance democratic citizenship. Multiple issues are critical to realisation of the potential of ICTs for e-government and e-governance, including reform of political systems and cultures; trends in economic factors, including development of, and access to, infrastructure and e-services; as well socio-cultural factors that enable or hinder the uptake of technologies.

The aim of this issue was therefore not just a tracking of the development and state of e-government in Africa ie delivery of government services to citizens through ICT, but an exploration of e-governance, which involves multiple dialogues and seeks to empower citizens to be actors, not mere recipients, of information or services. Regrettably, there is little evidence that points to real e-governance, with countries and economic systems requiring a greater evolution of governance systems and institutions, and advances in democratisation.

This issue is also therefore about engaging in theoretical and methodological debates, as well as developing theories and methods through studying the development of e-governance and e-government in Africa.

Governments have often been keen participants in countries that have successfully transitioned to higher-yielding, industrial or services economies, supporting technological innovation through policy, financing and innovation adoption. It is therefore opportune for a review of a decade of e-government in Africa.

Burke sets the stage by reviewing the state of research in e-government in Africa. A key finding is that the impact of e-government on citizens and the economy remains little-researched.

Given the limited ICT infrastructure and generally low ICT skills levels, particularly in rural areas where the majority of the population lives, it is important to assess such impact nationwide. This is so as to ensure equity of access in terms of infrastructure, price of services, and benefits to vulnerable persons, whether from a disability, gender or other perspective. Indeed Ochara discusses this need for strategies focusing on the citizen and grassroots communities, so as to avoid further increasing the divide between the haves and have-nots. In addition, Godem and Hallberg promote a user-centric approach to the design of ICT access through their review of the telecentre models in Cameroon and Kenya.

Not only can ICTs be used by governments to improve service delivery, but they can also be used by both government and citizen alike to monitor service delivery, as well as enhance transparency and accountability. In this regard, Wray and van Olst's review of the convergence of geographical information systems and the Internet to create more effective government interaction with citizens is timely. This also calls for open access to government data to spur the development of even more e-government applications and services.

In addition, we do need the tools to gauge the quality of e-government service so as to continually improve upon it. Twinomurinzi addresses this need by adapting a retail, customer, quality-of-service model to an e-government setting. Such quality-measurement tools may serve as guides to further innovation in the use of ICTs to enhance public service delivery.

As highlighted by the case studies from Zambia, South Africa and Egypt, e-government is not only about infrastructure, legal/institutional environments, and computerising government administration, but also very much about citizen engagement. In this too, it is always important to ensure gender equity in design and access to e-government, as well as promote opportunities for widespread e-participation.

SECTION I

THEMES AND APPROACHES TO INFORM e-STRATEGIES

ONE: A DECADE OF e-GOVERNMENT RESEARCH IN AFRICA

Mark Burke,

LINK Centre, Faculty of Humanities, University of the Witwatersrand

ABSTRACT: The state of research on e-government evolution in Africa is ripe for analysis. The article analyses e-government research and scholarly publishing through an assessment of the key features of the research and the community spearheading its emergence. This exploratory study seeks to map the terrain of e-government research in Africa at the end of the first decade of the 21st century. For this purpose, 50 articles were identified using the Scopus citation database, and were subjected to content analysis. This work is intended to encourage continental e-government researchers to further explore and analyse the e-government phenomenon from varying starting points, perspectives, disciplinary orientations and research traditions, and to pave the way for a greater understanding of the dynamics, nature and key features of e-government on the continent.

KEYWORDS:

e-government research community, state of e-government research, ICT and public sector reform, ICT and socio-economic development, Africa

INTRODUCTION

Africa is the second largest continent, with a population of 1.03 billion in 2010 making it the world's second most populated continent, representing about 15% of the world's population (WEF, World Bank, AfDB, 2011). It is a continent of extraordinary diversity and contrasts. Aggregate indicators provided in global development reports mask striking differences between countries in terms of physical and population size, density, economic output, human development and a host of other features including the range of political systems and cultural diversity. Table 1 provides a snapshot of this striking diversity.

TABLE 1: COUNTRY DIVERSITY IN TERMS OF PHYSICAL SIZE, POPULATION, ECONOMIC OUTPUT AND GROWTH

Basic indicators		Countries	Indicators
Physical Size (thousand square kilometres)	Largest	Sudan	2 506
	Median	Congo	342
	Lowest	Seychelles	0.45
Population size (thousands)	Largest	Nigeria	158 259
	Median	Tunisia	10 374
	Lowest	Seychelles	0.850
Population density (per square kilometre)	Highest	Mauritius	636
	Median	Morocco	46
	Lowest	Namibia	3
GDP (based on PPP valuation in USD million)	Largest	South Africa	521 779
	Median	Mauritius	156 306
	Smallest	São Tomé & Príncipe	327
GDP per capita (PPP valuation, USD)	Highest	Equatorial Guinea	26 472
	Median	Ghana	1 526
	Lowest	Zimbabwe	256
Annual real DGP Growth in (2002-10)	Highest	Equatorial Guinea	12.9%
	Median	Libya	5.2%
	Lowest	Zimbabwe	-3.1%

Source: Compiled based on data from OECD, 2011

It is argued that Africa's economic geography imposes limitations on its growth and development that need to be overcome. Venables (2010) asserts that Africa's distance from the main global economic hubs, its low population density and income and its fragmentation into a large number of small countries limits access to markets both outside and within the continent. Its cultural, linguistic and religious diversity further contributes to fragmentation and fractionalisation. These features have contributed to "low productivity through economies of scale foregone" (Venables 2010, p. 470). Yet a number of positive developments have occurred during the first decade of the 21st century, despite the constraints associated with its specific colonial history, physical geography and remoteness, and the fragmentation of its polity and economy.

Africa has experienced a decade of economic growth. Economic output has increased at an average of 5.2% since the turn of the millennium. This is second only to the Asia and Pacific region, which grew at an average rate of 6% over the same period, and is higher than the world average of 3.7% as indicated in Table 2:

TABLE 2: REAL GDP GROWTH RATE

Region	Real GDP growth (annual percentage change)											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
Africa	3.8	4.4	5.6	5.2	6.1	5.7	6.3	6.6	5.5	3.2	4.7	5.2
Asia and Pacific	5.7	3.3	5	5.7	6.8	7	7.8	8.5	5	3.4	8.2	6.0
Europe	4.6	2.5	1.8	2.3	3.3	2.7	4.1	4	1.4	-4.6	2.1	2.2
North America	4.4	1	1.7	2.3	3.6	3.1	2.9	2.1	0.2	-2.9	3.1	2.0
South America	3.2	0.9	0.1	2.2	7.1	5.2	5.7	6.7	5.5	-0.3	6.5	3.9
World	4.8	2.3	2.9	3.6	4.9	4.6	5.2	5.4	2.9	-0.5	5	3.7

Source: IMF, no date

According to the African Competitiveness Report (AfDB, 2011), this rate of growth can be explained by the implementation of more sustainable fiscal policies, inflation control and an increase in foreign direct investment and exports. However, concerns have been raised about the unevenness of this growth across countries and the continued dependence on oil and commodities exports to sustain growth. Yet the commodities boom only partly explains this growth, since resources only accounted for 24% of Africa's GDP growth from 2000 through 2008 (McKinsey Global Institute, 2010).

According to the McKinsey report (2010), the agricultural sector continues to dominate economic activity in many countries such as Burundi, Republic of Congo, Ethiopia and others, where it contributes more than 40% to GDP. Furthermore, the services sector is an important contributor to growth. The tourism sector remains a key sector in many countries, while services such as trade, financial services and real estate also contribute to growth. The major priority for the continent remains the structural transformation of the economy with a view to changing the sectoral composition of output. The aim of the transformation process is to ensure longer term sustained growth, an increase in labour productivity and a higher capacity for job creation (UNECA, 2011). At the same time, there is a need to ensure that continued economic growth is translated into tangible human and social development outcomes.

Sub-Saharan African ranks the lowest in terms of the Human Development Index (HDI), the measure for life expectancy, literacy, education and standards of living of countries. The region has, however, made the most significant progress over the last decade compared with other regions, due to rising income per capita in most countries, improvements in access to knowledge and health outcomes (AfDB et al, 2011). Closer inspection reveals stark contrasts. For instance, Burkina Faso has made the fastest progress in human development, with growth in access to water, expanding basic service and a decline in income poverty. At the other end of the spectrum, Zimbabwe has regressed from an HDI of 0.232 in 2000 to 0.140 in 2010 due to a contraction in all the indicators except literacy levels (UNDP, 2010), as shown in Table 3.

TABLE 3: REGIONAL HUMAN DEVELOPMENT INDEX, 2000-2010

Developing regions	Human Development Index		Average annual HDI growth rate
	Value in 2000	Value in 2010	2000-2010
Latin America and the Caribbean	0.660	0.704	0.64
Europe and Central Asia	0.648	0.702	0.80
East Asia and the Pacific	0.559	0.643	1.40
Arab States	0.525	0.588	1.14
South Asia	0.440	0.516	1.16
Sub-Saharan Africa	0.315	0.389	2.10
World	0.570	0.624	0.89

Source: UNDP, 2010

It is in this context of economic growth and improvements in social development that the role of government in economic development and in producing tangible human development outcomes is brought into sharp focus. Evidence suggests that countries able to successfully transition from agrarian to industrial or services economies had governments that played a leading role in facilitating the process of transformation (UNECA, 2011). African countries have been engaged, to varying degrees, in public sector reform, characterised by a redefinition of the role of the public sector and the rejuvenation of administrative systems (Ayee, 2008). These reforms have taken place in the context of competing public administration and management paradigms, including new public management (NPM) and conceptions of the state as a developmental state.

New public management has left an indelible mark on the three phases of public-sector reform in Africa (Ayee, 2008; OECD, 2002). The first phase between the mid-1980s to mid-1990s was a direct outcome of the structural adjustment programmes (SAPs) sponsored by the World Bank and the International Monetary Fund (IMF). The objective of these types of reforms was to make the public sector more efficient through cost reduction and containment measures, especially by way of rationalising the machinery of government. The second phase sought to address weak institutional and human resource capacity as the root problem in the poor delivery of public services. The key interventions included the development of staff skills, improving management systems and structures, restoring incentives and improving pay, as well as improving the work environment. Thirdly, the need to improve service delivery characterised the reform agenda after 2000. NPM-induced reform during this period called for less, but more efficient, government. Conceptions of the developmental state called for an interventionist approach by the public sector, noting the advances made by the Japanese state in fostering industrial development (Johnson, 1982).

Whether reform was influenced by NPM thinking or the more interventionist oriented conceptions of a development state, information and communication technologies (ICTs) were viewed as fundamental to strategies for public sector reform. Since government is the single largest collector, user, holder and producer of information (Heeks 1999),

technologies that facilitate its access, storage, communication and usage can make a significant impact on transforming government services and the informatisation of the public sector (Frissen, Snellen, Wolters & Brussaard, 1992). The informatisation of the public sector has provided the basis for the adoption and greater use of electronic information systems "beyond the computerisation of administrative tasks" (Abrahams & Newton-Reid, 2008). The term "e-government" is used to describe the use of "new information and communication technologies, and particularly the Internet, as a tool to achieve better government" (OECD, 2003, p. 23), and is considered a driver of public sector reform due to its perceived potential to improve the quality of the services offered to citizens and businesses and to rationalise the internal organisation of the administrative apparatus (Cordella, 2007).

Africa has been one of the most dynamic regions in terms of ICT growth over the last decade. In 2000 there were only 11 million mobile cellular subscriptions and three million Internet users. This increased to 32 million Internet users and 246 million cellular subscriptions by the end of 2008 (ITU, 2010; ITU, 2009). In addition, there has been a steady geographical expansion of telecommunications networks, with significant infrastructure growth in wireless networks and in submarine fibre-optic cables connecting Africa to the world (Williams, Mayer & Minges, 2011). Despite this progress, the region's absolute penetration rates and access figures remain low and far behind levels in other developing regions. Access to the Internet is growing slowly, due to high prices and low bandwidth in domestic backbone networks and fixed line access networks (Foster & Briceño-Garmendia, 2010).

TABLE 4: REGIONAL HUMAN DEVELOPMENT INDEX, 2000-2010

Basic ICT infrastructure access indicators	2003	2008	CAGR (%)
Main (fixed) telephone lines	9 552 700	10 617 000	2.5
Mobile cellular subscriptions per 100 inhabitants	5.3	32.5	44.0
Internet users per 100 inhabitants	1.3	4.2	27.0
International Internet bandwidth			
(bits per second per Internet user)	20.3	433	16.3
Fixed broadband Internet subscribers (in 000s)	32.2	643.9	82.1
	2002	**2007**	**CAGR (%)**
Proportion of households with Internet access	0.4	2.3	38.2
Proportion of households with computers	1.9	5.3	22.8

Source: ITU, 20

It is in this context that e-government in Africa has evolved. According to the e-Government Development Index (UN, 2010, p. 61), "Africa continues to lag far behind the world average". The index is a composite measure to assess a country's capacity and willingness to use e-government for development, and measures the quality of online services, telecommunication connectivity and human capacity. The latest survey, which ranks countries and regions on a scale between one and zero, indicates that Africa scores a low 0.27 compared to the world average of 0.44 (Table 5). Insofar as e-government project implementation is concerned, it is claimed that projects mainly ended in total or partial failure (Heeks, 2002), though some progress has been made post-2002. These assessments, if accepted uncritically, paint a sombre picture of e-government development in Africa.

TABLE 5: REGIONAL E-GOVERNMENT DEVELOPMENT INDEX

Region	e-Government Development Index
Africa	0.2733
Americas	0.4790
Asia	0.4424
Europe	0.6227
Oceania	0.4193
World	0.4406

Source: UN, 2010

The e-Government Development Index has been questioned for the relevance of some of the indicators used. For instance, Mwangi (2006) argues that the measures used in the telecommunications infrastructure component are based on telephony (the number of people per 1 000 with personal computers, telephone lines, mobile phones, televisions, online population), whereas Rwanda's IT system is based on radio waves and is not captured by the indicators currently in use. Furthermore, there is no evidence to suggest that public sector IT project failure rates are higher in Africa than in other developing regions. Thus, conducting research on how e-government is emerging in the African context is of critical importance in order to capture the history and identify lessons to inform future e-government policy and strategy formulation.

E-GOVERNMENT RESEARCH THEMES AND MATURITY

A scientific body of knowledge is defined by its theories, concepts, methods and community that emerge around fields of enquiry and intervention. Synthesis and meta-analysis of a body of knowledge are important to create mechanisms for defining the scope of the knowledge domain, as well as understanding its evolution, structure and application. The outcome of such synthesis and meta-analysis contributes to the accumulation of knowledge on the subject and provides markers along its evolution that describe its nature, shape and character. Several studies on e-government research now provide a mapping of the terrain (Kraemmergaard & Schlichter, 2011).

At its inception, e-government emerged as a field of enquiry for practitioners, who organised conferences to apply their minds to the challenges presented by the increasing application of ICT in government. Academia followed suit and contributed to the rapid growth of knowledge in the field. Several studies bemoaned the quality of the research in the early years of development. Grönlund (2004) critiqued the rigour and relevance of the early work. Heeks and Bailur (2007, p. 258) were particularly critical of papers "playing fast and loose with generalisations" and concluded that e-government research was in a poor state. Since then it has been argued that e-government has emerged as a distinct discipline (Scholl, 2007) that has grown beyond its infancy (Scholl, 2010). According to Scholl (2010) e-government research investigates information and technology use, public policy, government operations, government services and citizen engagement as the key concepts in the field. The main themes in the field are technological innovation and modernisation in the public sector; e-government programme evaluation and policy analysis; e-participation and digital democracy; e-services; and accountability, transparency and the dissemination of information (Bolívar, Muñoz & López Hernández, 2010).

The type of research against which the maturity of a field can be assessed has been categorised by Grönlund (2004) as philosophical, descriptive, theory generating and theory testing. Based on an analysis of 170 papers published in three major e-government conferences, he concluded that case studies and product descriptions were most frequent, while very few papers were produced contributing to theory generation and testing. Yildiz (2007) regards as a major obstacle the vagueness of e-government as a concept, and the general lack of in-depth analysis in regard to its political nature and the complex institutional environments in which e-government develops. This is seen to be further exacerbated by the lack of coherence and common bases for communication and accumulation of knowledge in the field (Heeks & Bailur, 2007).

The field is, however, in a dynamic state of evolution. More recent studies, based on larger literature samples, assert that the state of e-government research is maturing. The knowledge base consists of a body of literature in excess of 2 500 peer-reviewed papers, seven core journals, three core conferences, and two international professional associations. At least 300 new research papers are added to this knowledge stock every year (Scholl, 2010). In analysing the literature base, Scholl (2010) found that in the core e-government research community, 225 authors have published four or more papers and a further 55 authors have published eight or more papers. Furthermore, Erman and Todorovski (2009) confirm that the research field has a stable group of elite authors that are frequently cited and have a major influence on the field.

Kraemmergaard and Schlichter (2011) analysed 450 peer-reviewed journal publications from 2000-2009 and concluded that the growth in the number of papers published has stabilised and that the percentage of theoretical papers has increased during the decade, indicating that the field is reaching maturity. e-Government research draws on several disciplines. In a study of papers published in the first two years of an e-government publication, Dwivedi (2009) found that the disciplinary background of the authors is generally either in information systems, business, or computer science and information technology. According to Heeks and Bailur (2007),

e-government sits at the cross-roads of a number of other research domains, being principally computer science, information systems, public administration and political science. Scholl (2007) argues that e-government research draws on public administration, information systems and computer science, using procedures and methods prevalent in those fields, and that unique clusters of research problems are investigated that fall outside those disciplines. Therefore, e-government as a field of research belongs to a "class of integrative interdisciplinary sciences addressing evolving clusters of research problems systematically underserved and understudied within the boundaries of established disciplines" (Scholl, 2007, p. 29).

Yet after more than a decade of e-government research, the "theoretical ground is still under construction" (Assar, Boughzala & Boydens, 2011). Grönlund (2010, p. 23) asserts that as yet there is no explicit e-government theory and that the main challenge for the next generation of researchers is to "better understand the relation between technology, organisation and government values".

Understanding e-government research in different environments is an issue that has not yet been explored in much detail. Although Khan, Moon, Park, Swar and Rho (2010) begin to address this issue in their study on e-government in developing countries, more detailed work on the formation of the research field in different countries and regions of the globe would provide useful insights into how the field is developing under different conditions. Such studies should not only focus on the contribution that researchers from more peripheral regions make to the development of the field, but also on how the field is developing in those regions. Otherwise, there is the risk of setting up the dichotomy of centre-periphery logic without understanding what can be learnt from analysing the conditions for e-government development in specific contexts. It should be noted that countries and regions develop from different starting conditions and follow unique development paths, shaped by a range of factors such as resource endowments, research infrastructures, research problems and the dynamism of their respective research communities.

OUTLINE OF METHODOLOGY

An extensive search of the literature yielded no results for previous analytical studies on the state of e-government research in Africa. Exploratory research is useful when little or no knowledge exists about a process or activity, and research of this nature is therefore a "broad-ranging, purposive, systemic, prearranged undertaking" (Stebbins, 2001, p. 4). Thus, the aim of the study is to provide a description of e-government research pertaining to Africa, through a process of analysing the content of articles published in peer-reviewed journals and conference proceedings between 2000 and 2010. The dimensions covered in the exploration relate to: (1) the number of articles published in peer-reviewed journals and conference proceedings over this period; (2) the objectives of the research undertaken; (3) when the research was published; (4) collaboration among authors and where they were based at the time of writing the articles; (5) the type of data used in preparation of the article; (6) the methodology used in the research; (7) the maturity of the research undertaken; (8) the unit of analysis used; and (9) the publication outlets.

The Scopus citation database was selected as the database for the review of the literature on e-government in Africa. Citation databases have become key tools for research literature information retrieval and science evaluation. These databases are used to discover scientific and research literature and enable researchers to keep up to date with what has been published in specific fields. In 2004, the publishing company Elsevier introduced Scopus, which claims to be the largest abstract and citation database of research literature and quality web sources, covering nearly 18 000 titles from more than 5 000 publishers (Scopus, no date). Scopus compares well with other citation databases such as Web of Science and Google Scholar, offering a wealth of data when the citation period is limited to 1996 and onwards (Bar-Ilan, 2010; De Moya-Anegón, Chinchilla-Rodríguez et al, 2007).

The focus of the literature review was to discover bibliographic data covering research undertaken on e-government in Africa and thus research on e-government initiatives in any African country. The literature search took place in June 2011, using several terms to search the article title, abstract, keywords and authors' search fields, as indicated in Table 6. An initial list of 119 records was produced once duplicate articles had been removed. The list was further reduced to 84 articles when items other than refereed journal articles and conference proceedings were removed. A final list of 50 was produced after a review of each abstract for the relevance of the article in respect of covering research on e-government in an African country or in the region.

TABLE 6: SEARCH TERMS AND RESULTS

Search terms	Date	Results
Electronic Government AND Africa	06/06/2011	67
e-Government AND Africa	06/06/2011	17
e-Governance AND Africa	06/06/2011	16
Public Sector AND Information Technology AND Africa	06/06/2011	47
Internet AND Government AND Africa	10/06/2011	115
Information Technology AND Government AND Africa	10/06/2011	200
ICT AND Public Administration AND Africa	10/06/2011	4
e-Society AND Africa	22/06/2011	2
e-Services AND Africa	22/06/2011	10
e-Participation AND Africa	22/06/2011	3
e-Democracy AND Africa	22/06/2011	2
Digital AND Government AND Africa	22/06/2011	56
Information Society AND Africa	22/06/2011	247

A review of previous studies (Grönlund, 2004; Heeks & Bailur, 2007; Dwivedi, 2009; Bolívar et al, 2010; and Kraemmergaard & Schlichter, 2011) provided a basis for the development of an initial coding structure to undertake content analysis pertaining to the topics researched, authors, author institutions, main literature used, publication and methods used. Additional codes were developed to supplement the codes used in previous studies. This was done through applying

the initial set of codes to 10 randomly selected articles, representing a sample of 20%, and developing additional codes through a grounded approach to meet the requirements of the nine dimensions presented above. Each article was reviewed line by line with a view to identifying items relevant to the nine dimensions. Categories and labels were generated, reviewed and further clustered into categories pertaining to each dimension. The coding structure generated in this way is set out in Annexure A.

Once the coding structure had been formulated, an Excel database was developed to capture the results of the content analysis for each article and create the tables used in the analysis of the data. Each article was then reviewed over a two-month period between August and September 2011, applying the coding categories. Frequency tables were then generated for the purposes of analysis.

LIMITATIONS

Articles published in citation databases such as Scopus only represent a fraction of the research undertaken, especially research in developing countries (Shrum, 1997). Furthermore, the articles selected were limited to English-language, peer-reviewed articles that excluded contributions from Arabic and French-speaking Africa. African research is not widely disseminated or indexed outside the country of research or publication, or beyond the continent, thus limiting its visibility (Smart, 2005). African research is also poorly documented and represented online. Abrahams, Burke and Mouton (2010) argue that low visibility and accessibility have mutually reinforcing effects that work in tandem to place Southern Africa on a downward spiral as regards cycles of research productivity. This may apply equally to research on e-government in Africa. It can be deduced that the research found in internationally accredited journals listed in citation databases represents the tip of the proverbial iceberg. Thus, generalisations based purely on the visible literature should be made with caution.

FINDINGS AND DISCUSSION

Articles on e-government in Africa published in journals and conference proceedings indexed in Scopus only started appearing in the year 2003 (Odendaal, 2003). Table 7 indicates that the volume of journal articles more than doubled in the period 2007-2008 compared with the previous two-year period, jumping from nine to 19 articles. In the period 2009-2010, the volume appears to have temporarily stabilised at around 20 articles every two years. Articles on e-government development in Africa published in conference proceedings have grown at a steadier rate than journal articles. Despite this growth over the last decade, the annual volume of articles is low. For instance, if one considers the study undertaken by Kraemmergaard and Schlichter (2011) in which they identified 450 relevant e-government peer-reviewed journal articles published during the period 2000-2009, the number of journal articles produced on e-government development in Africa represents less than 1% percent of the total articles published. The scientometric study by Khan et al (2011 on e-government in developing countries found that only 11.1% of the 145 articles published in seven core e-government journals were of African origin.

TABLE 7: TOTAL NUMBER OF PEER-REVIEWED JOURNAL ARTICLES AND CONFERENCE PROCEEDINGS

Year	Total	Journal articles	Conference proceedings
2003-2004	2	1	1
2005-2006	9	8	1
2007-2008	19	10	9
2009-2010	20	11	9
Total	50	30	20

Additional Internet research was done to compile a database of all the authors identified in the study to determine, among other things, if authors were male or female. Table 8 confirms that research on e-government development in Africa is predominantly a male preoccupation. More than 80% of all authors are men and women take the lead in authoring articles in less than 15% of cases (the corresponding author was presumed to be the lead author). In his review of 41 articles published in one journal Dwivedi (2009) also found that the proportion of male authors (72%) is much higher than female authors (25.8%).

TABLE 8: AUTHORS BY GENDER

	Authors by gender		Lead author by gender	
	Frequency	Percentage	Frequency	Percentage
Male	72	81.8%	43	86%
Female	16	18.2%	7	14%
Total	88	100%	50	100%

The overwhelming majority of authors are based at universities, with only 11% based in the public sector (includes both government organisations and organisations in the not-for-profit sector), and less than 5% from industry. Table 9 shows that authors based in the public sector are more likely to author conference proceedings than journal articles. This is not surprising, given that conferences are more practitioner-oriented and the format and requirements for the publication of proceedings are less onerous.

TABLE 9: AUTHORS INSTITUTIONAL BASE

Research design	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
University	50	91%	24	73%	74	84%
Public sector	3	5%	7	21%	10	11%
Industry	2	4%	2	6%	4	5%
Total	55	100%	33	100%	88	100%

The largest number of articles is authored by single authors (46%), followed by papers written by two authors (40%). In cases where authors do collaborate, 41% of such collaboration takes place with authors based at the same institution. Collaboration between authors in more than half the cases is between authors based at universities, and in a quarter of the cases collaboration takes place between authors based at a university and a public sector institution, as shown in Table 10.

TABLE 10: AUTHOR COLLABORATION

Collaboration	Frequency	Percentage
Single author	23	46%
Two authors	20	40%
Three authors	3	6%
Four authors	4	8%
Forms of collaboration	**Frequency**	**Percentage**
Same institution	11	41%
University to university collaboration	15	56%
University and public sector collaboration	7	26%
University and industry collaboration	4	15%

An analysis of the disciplines in which the lead author is based shows that articles are most frequently written by authors based in library and information sciences. These authors typically approach e-government from an electronic records management (ERM) perspective (Mnjama & Wamukoya, 2007; Mutula, 2005), exploring how ERM supports e-government development and evaluating its constraints. This is followed by authors located in computer science and information systems, representing 12% of authors, (Table 11). Surprisingly, there are only three authors based in public administration, though this is a disciplinary area from which we could expect significant scholarly writing on e-government. A small number of contributions is made from authors based in a slightly broader range of academic disciplines, including history, communication science, public health and epidemiology, architecture, and geography.

TABLE 11: LEAD AUTHOR DISCIPLINE

Lead author discipline	Frequency	Percentage
Library and information science	17	34%
Computer science and information systems	6	12%
Practitioners	5	10%
Management science	3	6%
Public administration	3	6%
Political science	2	4%

The content analysis considered the research objectives of each of the articles. Most of the articles examine, investigate or evaluate various aspects of the adoption and usage of ICT in the public sector. One fifth of the articles draw attention to the implications of e-government and a further 16% examine the challenges that constrain e-government development and implementation, as shown in Table 12.

TABLE 12: RESEARCH OBJECTIVES

Research objectives	Frequency	Percentage
OBJ-ADO	18	36%
OBJ-IMP	11	22%
OBJ-CHA	8	16%
OBJ-IMT	6	12%
OBJ-CAP	5	10%
OBJ-OTH	2	4%
Total	50	100%

Secondary data comprised the main source used in the preparation of journal articles and conference proceedings, with 38% of papers indicating the use of secondary data such as existing academic literature and technical reports, official government reports and documents, unpublished research reports and project documentation. Of concern, however, is that nearly 25% of articles do not explicitly mention any data sources. This raises questions about the quality and rigour of the research. A quarter of the articles explicitly state that primary data was used in the research, with another 14% indicating the use of a combination of primary and secondary data, as indicated in Table 13. The frequency of using primary data in the case of articles published in conference proceedings is twice that of journal articles.

TABLE 13: TYPE OF DATA

Type of data	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
DAT-PRI	5	17%	7	35%	12	24%
DAT-SEC	15	50%	4	20%	19	38%
DAT-COM	3	10%	4	20%	7	14%
DAT-NON	7	23%	5	25%	12	24%
TOTAL	30	100%	20	100%	50	100%

An analysis of the broad methodological categories used in the study was undertaken following the schema by Kraemmergaard and Schlichter (2011). The most frequently used methodological approach is the descriptive kind (22%), in which a particular e-government phenomenon is described or argued, often only setting out a logical argument without any reference to data. Although this is somewhat of concern in regard to the quality of the research, it does provide a starting point for further research since these arguments often document observations, synthesise experience and bring together different ideas. Eighteen percent of articles use the

case study approach and a further 18% use data collected through surveys of a qualitative and quantitative nature. The case study approach is used three times more frequently in the case of articles published in conference proceedings (30%) compared with journal articles (10%). Table 14 indicates that theoretical research is one of the least frequently used methods.

TABLE 14: RESEARCH METHODOLOGY

Method	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
TYP-ARC	3	10%	2	10%	5	10%
TYP-CAS	3	10%	6	30%	9	18%
TYP-DES	8	27%	3	15%	11	22%
TYP-DSN	3	10%	1	5%	4	8%
TYP-EXP	2	7%	2	10%	4	8%
TYP-SUR	6	20%	3	15%	9	18%
TYP-THE	3	10%	2	10%	5	10%
TYP-NON	2	7%	1	5%	3	6%
Total	30	100% [1]	20	100%	50	100%

The analysis further determined what entity authors focused on in their research. Macro, meso and micro units of analysis have an established history in social theory (Smith, Schneaider & Dickson, 2006). Macro-level analysis describes the structures and patterns of societal change, meso-level analysis describes the organisational and institutional structures within society, and micro-level analysis refers to the individuals, their relationships and the factors that influence their behaviour. The majority of studies used the meso unit of analysis (52%), exploring those aspects of e-government relating to changes in the institutions of government and transformation in the organisation of government. This indicates that the usage by (micro-level) and impact of e-government (macro-level) on citizens and the economy is not yet a focus of African e-government research, as indicated in Table 15.

TABLE 15: UNIT OF ANALYSIS

Unit of analysis	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
UOA-MAC	2	7%	1	5%	3	6%
UOA-MES	15	50%	11	55%	26	52%
UOA-MIC	2	7%	3	15%	5	10%
UOA-COM	11	37%	5	25%	16	32%
TOTAL	30	100% [2]	20	100%	50	100%

1 101% due to rounding off
2 101% due to rounding off

Grönlund (2008) describes the maturation of a research field in terms of a model that moves through stages, from exploring unknown phenomena to more structured analysis as increasingly more knowledge is gained. This model identifies stages that incorporate philosophical research, in which new phenomena are observed with no or few explanatory theories and are speculative, based on philosophy; anecdotal case studies, in which a phenomenon is described without the use of theory; clustering, where similarities are identified among cases and used to hypothesize clusters; and theory creating and theory testing research, in which attempts are made to systematically analyse and interpret data for the purposes of model building, prediction and testing. Forty-six percent of articles fall within the philosophical research stage. This is followed by the anecdotal case study (30%) and clustering (14%) stages. Only 10% of articles involve any theory generation or testing, as indicated in Table 16.

TABLE 16: RESEARCH MATURITY

Maturity	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
MAT-PHI	15	50%	8	40%	23	46%
MAT-CAS	8	27%	7	35%	15	30%
MAT-CLU	4	13%	3	15%	7	14%
MAT-THG	2	7%	1	5%	3	6%
MAT-THT	1	3%	1	5%	2	4%
TOTAL	30	100%	20	100%	50	100%

There are now well established e-government conferences such as the dg.o conference, International Federation for Information Processing (IFIP) EGOV conference, and the e-Government track at the Hawaii International Conference on Systems Sciences (HICSS e-Gov), which provide opportunities for academics and practitioners to share their work and disseminate it globally through the publication of conference proceedings. Moreover, there are core journals that have provided in excess of 300 English-language, peer-reviewed articles per annum since 2004 (Scholl, 2010). The articles on e-government in Africa were published in a broad range of publications. The top three journal outlets are the Government Information Quarterly, the Electronic Library, followed by the Journal of Southern African Studies and the Records Management Journal. The ICEGOV Conference Proceedings is dominant in regard to publishing papers on e-government in Africa.

TABLE 17: PUBLICATION OUTLETS

Journals	Frequency	Percentage
1. Government Information Quarterly	4	8%
2. The Electronic Library	3	6%
3. Journal of Southern African Studies/ Records Management Journal	2	4%
Conference proceedings	**Frequency**	**Percentage**
1. ICEGOV Conference proceedings	12	60%
2. IST-Africa Conference proceedings	1	5%
3. Proceedings of the International Conference on Digital Government Research	1	5%

CONCLUSIONS

The terms electronic government or digital government first appeared in the academic and non-academic literature in the mid-1990s (Scholl, 2010; Grönlund & Horan, 2004) and the work has grown rapidly into an interdisciplinary research field. Compared with these developments, e-government research in Africa started relatively late with the first research paper appearing only in 2003 (Odendaal, 2003). Since then, there has been a steady growth of academic literature on e-government in Africa, with a doubling during the period 2007-2008 compared with the previous two years. At least a tripling of the productivity and visibility of articles is needed (to 30 or more articles and papers per year) for African research to make a significant impact on e-government practice on the continent.

The continental e-government research community is male dominated, overwhelmingly based at universities and most frequently authors' papers alone. When collaboration does take place, it tends to be with authors within the same universities or with other universities. Scholarly collaboration with practitioners in the public and private sector is infrequent. It is understood that collaboration cannot take place without effective organisation and resources. This involves bringing researchers together to share their work and learn from one another. A dedicated conference for scholars studying African e-government could serve as a catalyst for research collaboration among a more diverse community of researchers, through providing opportunities for networking and peer review.

At this stage of its development, authors from the library and information science, as well as the computer science and information systems disciplines, have made the most significant contribution to the literature. Surprisingly, authors from the public administration and development management disciplines feature poorly in contributing to the literature, despite the fact that globally, e-government research draws on public administration, computer science, information systems and political science as the core disciplines (Heeks & Bailur, 2007; Scholl, 2007).

The research undertaken on e-government in Africa is primarily aimed at gaining an understanding of, and insights into, the adoption and usage of ICTs in government. This is followed by a focus on exploring the implications of e-government from a transformation and change perspective, as well as interest in the challenges and constraints to e-government advancement. Data underpinning the studies is most frequently from secondary sources. Studies are primarily descriptive in nature, drawing on case studies and surveys as well as archival material in terms of research design and methods. Since government is the objective of study (Grönlund & Horan, 2004), the most frequent unit of analysis used is the meso-level, focusing on the institutions and organisation of government. Important new directions will include research that examines and publishes new macro- and micro-level data, as these types of research are necessary to understanding social and economic trends and to building future strategy and practice.

Research and scholarly publishing is in the early stages of development and is characterised primarily by its philosophical orientation, in which arguments are made to motivate for increasing the pace of e-government advance and for ensuring that strategies and programmes are contextually relevant. The clustering of similarities or attributes across cases is not yet prevalent in the research, hence this is important for future research as the basis for work that is explanatory and able to determine causality.

The authors and pioneers of e-government research have explored the terrain of e-government in Africa at the end of the first decade of the new millennium. The challenge now is to move beyond providing descriptions of e-government to providing deeper analysis, formulating perspectives and developing theories that explain its development, specific to the context and conditions shaping e-government in Africa in the second decade of the 21st century.

It should be noted that relatively few journals produced in the developing world and in Africa are indexed in databases such as Scopus, so that the volume of literature in this study almost certainly represents an underestimation of the total academic activity and research output on the subject of e-government. Future studies should broaden the scope of the literature review to include grey literature and other unpublished material. This would provide a more comprehensive view of the scope of e-government research in Africa.

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ANNEXURE A: CODING STRUCTURE

Dimensions and codes	Explanation
Research objectives	**The reason why the research was undertaken or the purpose of the article**
OBJ-ADO	Articles that examine, investigate or study the adoption and use of ICT in government.
OBJ-IMP	Articles that examine, investigate or study and highlight the implications of e-government development.
OBJ-CAP	Articles that examine, investigate, evaluate or study one or other capacity building aspect of e-government or e-government as a capacity building initiative.
OBJ-CHA	Articles that examine the challenges that confront e-government implementation or the needs that need to be addressed.
OBJ-IMT	Articles that examine, investigate or study one or other aspect of e-government implementation such as planning, resourcing, critical success factors, or management.
OBJ-OTH	Articles that do not fit into any of the above descriptions and require a unique classification.
Author number	**Number of authors**
AUT-ONE	One
AUT-TWO	Two
AUT-THR	Three
AUT-FOU	Four
AUT-FIV	Five
AUT-MOR	Six
Author Affiliation	**Type of institution to which the lead author is affiliated**
AU-UNI	Universities.
AU-IND	Private-sector institutions.
AU-PUB	Public-sector institutions (both government and organisations working in the not-for-profit sector).
Department	**University discipline in which the lead author is based**
DEP-PAD	Public Administration
DEP-PSC	Political Science
DEP-ACC	Accounting, Business and Economics
DEP-LIS	Library and Information Science
DEP-MSC	Management Science
DEP-CS&IS	Computer Science and Information Systems
DEP-MKT	Marketing and Communication
DEP-PRA	Practitioner
DEP-MUL	Multi-disciplinary Centre
DEP-OTH	Other than the list above
Gender	**Gender of the authors and the lead author**
GEN-MAL	Male
GEN-FEM	Female
GEN-LED	Gender of lead researcher

Number of Institutions	Number of institutions per article
INS-ONE	One
INS-TWO	Two
INS-THR	Three
INS-FOU	Four
INS-FIV	Five
INS-MOR	More than five authors
Data	**Type of data used in the study**
DAT-PRI	Primary
DAT-SEC	Secondary
DAT-COM	A combination of primary and secondary
DAT-NON	Not explicitly referred to
Publication	**Publication in which article was published**
PUB-NAM	
Methodology	**Data collection methodology used (Kraemmergaard & Schlichter, 2011)**
TYP-CAS	Papers reporting on studies that are involved with a single or a few sites often over a period of time
TYP-ARC	Papers using secondary data such as public records, existing data sets and statistics fall into this category
TYP-THE	Papers analysing existing theory, typically with the aim of developing new theory
TYP-SUR	Data gathered by means of questionnaires
TYP-EXP	Either laboratory or field experiments used
TYP-DES	Describes or argues solely for a phenomenon and often very practically oriented
TYP-DSN	Papers that construct systems and / or tools
TYP-EXR	Papers using qualitative methods to gain new insights into a phenomenon (often using grounded theory)
TYP-COM	Paper using a combination of the above categories
TYP-NON	Unable to determine type of paper
Unit of Analysis	**Unit of Analysis**
UOA-MIC	Micro
UOA-MES	Meso
UOA-MAC	Macro
UOA-COM	Combination
Maturity	Maturity insofar as body of knowledge is concerned (Grönlund 2008)
MAT-PHI	Reflects upon a phenomenon without data or reference to any theory
MAT-CAS	Describes a phenomenon
MAT-CLU	Clusters together the properties, features, or findings from several cases to establish the key elements of a theory
MAT-THG	Theory generation – attempts to analyse, interpret, quantitative or qualitative data in a systematic manner for the purposes of model building and prediction
MAT-THT	Theory testing – attempts to test a theory using quantitative or qualitative data

Two:

GRASSROOTS COMMUNITY PARTICIPATION AS A KEY TO e-GOVERNANCE SUSTAINABILITY IN AFRICA

Nixon Muganda Ochara,

Department of Informatics, School of Information Technology, University of Pretoria, South Africa

ABSTRACT

This article explores the theoretical sustainability of e-governance in Africa by assessing the nature of participation of stakeholders. It adopts an explanatory critique, drawing on perspectives debated in scholarly literature and based on reviews of country approaches. The exploration takes into account historical antecedents to participation in e-governance in Africa, revealing that dominant stakeholder interests effectively lock out the majority of citizens from active participation in e-governance, except as consumers of public services delivered through e-government. It considers the nature of attachment of stakeholders to e-governance projects. Global stakeholders increasingly have a low degree of attachment, while there is a relatively high degree of enrolment of local actors. The concept of e-governance remains solid, but is dispensable, since although government agencies have "embraced" the message of e-government, certain local actors are weakly mobilised. The policy process has failed to nurture the heterogeneity of actors, specifically grassroots actors, that is required for effective e-governance.

KEYWORDS:

e-participation, organising vision, e-governance, new public management, e-government project management

INTRODUCTION

This article explores e-participation as an organising metaphor for the development of e-governance visions. The premise for this approach rests on the rationale that visioning forms the foundation for the articulation of e-governance strategies that are linked to specific e-government projects. The process of developing a holistic e-governance vision and strategy(ies) is crucial for successful e-government project planning and implementation. Typically, the global perspective of the e-governance vision is for governments to serve various stakeholders through Internet-based web interfaces, thus reducing or removing the need to visit brick and mortar facilities (Arif, 2008). In contemporary governments, service orientation and e-governance are therefore inextricably intertwined, potentially transforming the way in which citizens participate in governance and public administration reform and the way good governance goals are met.

e-Government projects must therefore be linked to specific goals that e-governance is meant to realise. From an ICT for development (ICT4D) stakeholder perspective, Bhatnagar and Singh (2010) link three generic outcomes that should underpin the development of e-governance

strategies relevant to developing countries. Firstly, client–centric outcomes should focus on impacts that realise economic benefits and improved governance, while reducing corruption, enhancing accountability and transparency and increasing participation. Secondly, at government-as-a-whole level, agency outcomes should generate improved quality of service and agency processes and enhancement of the general image of e-government. Thirdly, as regards societal outcomes, e-government projects should emphasise long-term impacts related to human progress, sustainable development and the digital divide, as envisaged in the millennium development goals (MDGs). These outcomes are related to country policy issues that co-mingle with governance priorities, thereby influencing the prioritisation of e-government projects.

If realising e-government project success is inextricably linked to an organising vision, then such a vision should note that a significant volume of socio-economic activity in African countries is grassroots activity. The purpose of government in serving grassroots communities is therefore of paramount importance to the future of e-governance in Africa, failing which e-governance will address exclusively the needs of the middle class, thus entrenching a digital services, as well as an e-participation divide, excluding millions of people from participation in strengthening democracies and economies.

The traditional approach to participation in governance in the young democracies in Africa has been through public baraza (East African term) or indaba (Southern African term), which means a council or conference for deliberations. Increasingly, government information systems are expected to reflect the core values of some form of participatory democracy, whether online or offline (Jiang, 2009). The need to facilitate, through e-governance, greater online public participation and deliberations with respect to social issues has wide-ranging implications and requires a major shift in the way in which citizens are engaged. However, participation of the citizenry in e-governance is largely muted. To make e-governance more participatory, we must recognise how the Internet, the foundational infrastructure for e-government, is currently reinforcing existing social and political patterns (Margolis & Resnick, 2000), and how the "electronic face" of government is a symbolic architecture of power and legitimation (Chadwick & May, 2003), that results in the social exclusion of large segments of the society.

This article stems from a quest to provide an explanatory critique of the nature of, and challenges associated with, grassroots participation in e-governance unfolding in the African context, since the author's view is that e-government is enabling the evolution of public administration towards a technocracy and increasing managerialisation. The first part of the article investigates how the meaning of e-government has evolved in Africa, while the second part assesses the sustainability of e-government projects by analysing the participation of stakeholders. The soft claim made is that the value of initiating e-government projects is doubtful, unless project planners and implementers adopt an underlying rationale that incorporates e-participation. The e-governance failures in Africa may well arise from the lack of participation of the citizenry in e-governance projects. The analysis seeks to link the e-governance development trajectory to the governance paradox and Internet infrastructure in Africa, and to provide an explanatory critique of the evolving trajectory and sustainability of e-participation on the continent. Finally, conclusions are offered, based on the insights gathered from the critique.

A few definitions of terms are presented. The e-governance artefact is regarded as the public sector application of information and communications technology (ICT) for the transformation of governance in African countries. Governance is understood from the perspective that many developing countries have embraced, willingly or otherwise, the importance of effective governance as a precondition for effective development and poverty alleviation, with e-governance as one of the tools for attaining good governance (Grindle, 2004). When viewed from a project management perspective, the organisational basis of e-governance recognises the struggle by public sector organisations to make sense of the role of ICT in improving government functionality (e-government) and to sustain the guiding vision.

e-Governance therefore denotes reform initiatives involving the use of ICT for attaining effective governance goals. e-Participation is regarded as an attempt to ensure effective participation of various stakeholders in the governance process and in e-government service provision. Therefore, grassroots participation implies that e-governance project objectives should consider the impacts on grassroots stakeholders, as well as involvement of these stakeholders in the project management process. With the emphasis on participation, the article adopts the UNESCO conceptualisation of e-governance to mean the use of ICT by different actors in the society, with the aim of improving their access to information and building their capacities for societal engagement (UNESCO, 2011).

E-GOVERNANCE: THE GOVERNANCE PARADOX

Three literature-synthesis areas are discussed in order to anchor this contribution. The first is a re-statement of the social problem that e-governance attempts to address, located within the broader governance discourse. The second is the focus of e-governance and the third links e-participation to the nature of the Internet infrastructure.

THE SOCIAL PROBLEM OF GOVERNANCE

The social problem that e-governance purports to address in developing countries is that of promoting good governance. Goldsmith (2007) contends that the overriding rationale for good governance reforms has been a belief that such reforms can boost economic growth, as evidenced in the MDGs (UN, 2005). Empirical studies highlight that non-transparent, unaccountable and restricted governance is detrimental to development, while the opposite tendency is advantageous (Acemoglu, Johnson & Robinson, 2001; Rodrik, Subramanian & Trebbi, 2004; Goldsmith, 2007). These findings reinforce the idea that improvements in governance could raise per capita incomes significantly over the long run and have positive effects even over relatively short periods (Kaufmann, Kraay & Mastruzzi, 2006).

In order to manage governance challenges, African countries have evolved a concept of governance anchored in agreed evaluative parameters, such as involvement of citizenry in governance; positive perceptions of citizenry towards governance; security of people and businesses; and poverty eradication. This converged concept of governance is seen as an outcome of evaluation processes, as well as pro-active leadership espousing values of efficiency, fairness and adherence to certain universal values. The attainment of good governance is now touted as critically dependent on e-governance as a reform instrument (Heeks, 2002; Muganda, 2008).

e-GOVERNANCE

Ideas about e-governance for public service reform date back to the 1980s, often associated with the movement of new public management (NPM). The mantra of customer and citizen-centric focus has been specifically linked to NPM, even though other management philosophies have shared this emphasis (UN, 2008). The citizen-centric ideology of e-governance can be explained from both a demand-side and supply-side perspective. The demand-side explanation gravitates around national challenges of governance based on two assertions. The first is that public administrative reforms are closely intertwined with political reform aimed at strengthening the ability and capacity of elected officials to produce results (Cheung, 2005). This demand-side explanation is partly hinged on the politicisation of the reform agenda, which can be driven by bureaucracy, politics and society (Hojnacki, 1996).

A second orientation of the demand-side explanation is related to what may be referred to as the "political nexus triad" (PNT), in which politicians, bureaucrats and citizens negotiate their political interests regarding the function and structure of government (Moon & Ingraham, 1998). The dominant interests in the PNT emerge to shape the structure and function of government, which may be to the exclusion of others' interests. The PNT orientation can be used to explore a number of governance crises that have occurred in Africa. In Kenya, for instance, after having a highly centralised government since independence in 1963, the general elections of 2007 brought to the fore weaknesses in governance which culminated in a shift to a form of parliamentary system. This change was "forced" on the PNT after months of civil unrest, and was followed by years of negotiation, resulting in a political settlement and a new constitutional dispensation in 2010. More recently, Tunisia, Libya, Algeria and Egypt illustrate how the PNT stakeholders are engaged in negotiation of interests. In many parts of Africa, images of civil unrest are all too common as a form of citizens' grievance against the other members of the PNT.

The supply-side perspective rests on the notion that reform practices such as NPM are being exported by reform pioneering countries, institutions or leaders to imitator countries, such as developing countries (Cheung, 2005). However, an increasingly common post-NPM claim is the importance of civil society as a source of push for better governance (Polidano & Hulme, 2001). This may be indicative of two different versions of the supply-side explanation: a managerialist orientation and a socially-rooted good governance orientation (Cheung, 2005). The good governance perspective finds traction in the reality of citizens' needs and expectations and goes beyond public administration to address questions of how to strengthen the relationship between government and other institutions to meet societal challenges. Under the good governance paradigm, public management reform is necessary where the public sector has been tainted by uneven revenue collection, poor expenditure control and a bloated civil service (Cheung, 2005). The good governance banner in developing countries is often a combination of a managerially-oriented NPM, as well as a quest for more citizen involvement. Thus an e-governance project operating under the banner of NPM may consider the managerialist orientation as well as citizens' interests in good governance.

However, the defining logic of the mode of interaction envisaged in e-government visions may be managerialist and therefore in conflict with notions of democratic participation. The citizen locus of e-government emphasises the role of the citizen as a consumer of the products and services supplied by the government. On the other hand, e-governance initiatives aimed at enhancing democratic participation and deliberations with citizens characterise a locus which is socially-oriented. Muganda-Ochara, Van Belle & Brown (2008) and Brown et al (2007) reveal that the way the Internet is diffusing in a number of African countries is increasing the social exclusion of certain groups from participating in governance. Thus there needs to be a shift of e-governance policy priorities towards citizen participation in societal governance, not simply in consumption of services.

PARTICIPATION IN E-GOVERNANCE AND THE INTERNET INFRASTRUCTURE

Particularly pertinent to the concept of e-governance is that of participation of citizens in decisions about service delivery. Enabling citizens to effectively communicate personal values, priorities and expectations for public service delivery and improve their participation in shared decisionmaking are important elements of participation. Such participation should lead to a more comprehensive appreciation of the e-governance problem and the management solutions and outcomes that are agreed between citizens and government agencies. It should also generate greater citizen understanding of the challenges government agencies face in providing services, and greater satisfaction with the state of public service delivery may ensue.

Ineffective participation is exacerbated when Internet diffusion, the dominant infrastructure for an e-governance delivery model (Singh, Das & Joseph, 2007, is weak. e-Governance presumes a widespread adoption of computing technologies by the population, yet studies on Internet diffusion in Africa document low levels of technology adoption, partly due to widespread lack of telecommunications infrastructure and functional illiteracy (Bagchi, Udo & Kirs, 2007; Bernstein & Goodman, 2005; Brown et al, 2007; Foster, Goodman, Osiakwan & Bernstein, 2004; Muganda, 2008; Adeya & Oyelaran-Oyeyinka, 2002; UN, 2012). As a result of the inadequacy of the Internet-type public service infrastructure model in the African context, meanings that policy drafters embrace regarding citizen participation in e-governance may have unexpected consequences.

Of relevance to this article is understanding whether e-governance is an inclusive governance approach, given the wider debate on the duality of inclusion and exclusion. The Internet diffusion trajectory in Africa brings to the fore that telecommunications investments favour higher-income segments of the population, excluding large segments of that population from participating in activities that are reliant on the telecommunications infrastructure. Greater Internet diffusion should therefore be a major policy concern to address digital exclusion (Warschauer, 2003).

ANALYSING SUSTAINABILITY OF PARTICIPATION IN E-GOVERNANCE

The article adopts a minimalist version of Actor-Network Theory (ANT) by Hanseth and Monteiro (1998) and Ciborra (2004) as an organising metaphor for conceptualising the nature of stakeholder (both human and non-human) relations. The minimalist version of ANT adopts a meta-theoretic lens that allows a researcher to "follow" the actors during the adoption process of a technology. If a critical outcome of e-governance is e-participation, then the success of an e-government initiative is founded on the level of participation of the stakeholders. From an ANT perspective, a stabilised network of stakeholders is indicative of a situation in which irreversibility has been attained.

In Africa, e-governance initiatives have been ongoing for at least a decade. Thus, assessing the nature of grassroots participation calls for an evaluation of the roles and interests of the multiple stakeholders, for an analysis of whether the network of stakeholders has stabilised and whether the realised stability is irreversible. Stability is typically achieved through a process of mobilisation, where actors involved in a network find it difficult to withdraw (Papadopoulos & Merali, 2008). The network is then considered a coherent entity in which the actions of the individual actors are no longer discernible, but rather conform to collective interactions. Ciborra (2004) discusses how relations between actor networks become durable and how they can resist assaults from competing networks. In the author's view, stakeholder participation and irreversibility are strongly linked to e-governance sustainability. In order to analyse sustainability of e-governance, it is necessary to understand (a) how dominant actors inscribe their interests in the e-governance artefact and (b) how the shifting focus of stakeholders influences the stability of e-governance projects over time.

ANTECEDENTS OF PARTICIPATION IN E-GOVERNANCE

The global–local network framework of Law and Callon (1992) is deployed to show how the chain of events and episodes influences the stability and hence the possible sustainability of the network of stakeholders. The article traces the trajectory of stakeholder relationships through an evolutionary path of telecommunications, Internet and other activities that have influenced the adoption of e-governance in Africa. Three phases are distinguishable:

PHASE I: AGE OF TELECOMMUNICATIONS NEGOTIATIONS (PRE-2003)

It is argued that the Internet was brought to Africa by technology enthusiasts, and functioned for a while as a hobby for "techies" (Muiruri, 2004). The telecommunications infrastructure was a monopoly of fixed-line incumbents. Experience from developed countries had shown that relying on monopolies could not attract enough investment flows for universal access. This prompted a shift from developing telecommunications infrastructure towards telecommunications sector reform (Muiruri, 2004), as part of broader democratisation and reform initiatives. In relation to the Internet infrastructure, the role of the World Bank, World Trade Organization, International Telecommunications Union, Department for International Development (DFID) and the US Agency for International Development were important. Pressure for sector reform also came from the

United Nations Economic Commission for Africa, regional economic communities like the Economic Community of West African States, the Southern African Development Community, and the Common Market for Eastern and Southern Africa (COMESA), as well as from the African Union, African Telecommunications Union and associated regional regulatory organisations, such as the Telecommunication Regulators Association for Southern Africa (Muiruri, 2004).

Sector reform was negotiated among national governments who desired to retain control of telecoms infrastructure as part of national security infrastructure; civil society organisations that pressed for reform in order to spur Internet development; and international financial institutions and development partners who insisted on reform as a basis for budgetary support. Between 1990 and 2003, proponents for sector reform in Africa provided the impetus for Internet development and by 2000 a majority of countries had permitted private sector investment in cellular services, paging and the Internet (Muiruri, 2004). Milestones that characterised this period and the actors that played a key role are summarised in Table 1.

TABLE 1: "FORCES OF CHANGE" IN INTERNET DEVELOPMENT IN AFRICA

Actors	Milestone	Determinants
International donors; civil society; governments	Telecommunications liberalisation	Wider democratisation of Africa
Private sector	Cellular service takes root	Unresponsive fixed telephony
Private sector; civil society	Commercialisation of the Internet	Public resource constraints

An attempt at understanding the trajectory of development of those activities that rely on the African Internet infrastructure is incomplete without a historical assessment. Especially pertinent for our analysis is the role that various actors played (or did not play) in shaping how the Internet and related activities are evolving. The initial approach may have been too supply-oriented, with countries like Kenya witnessing a proliferation of Internet Service Providers (ISPs), many of which were unsustainable due to limited demand.

PHASE II: E-GOVERNANCE VISIONING (2003-2006)

The growth of the Internet in Africa played a significant role in informing visions of e-governance. The central theme from 2003 to 2006 was the rush by countries, developed and developing, to craft e-governance strategies linked to the Internet infrastructure. In thinking about stakeholders, the crafting of e-governance strategies in Africa was linked to the legitimising and mobilising role played by international institutions and donors. The legitimisation activities sought to link the e-governance artefact to the governance as problematic. Thus, to effectively enrol government players, institutions such as the United Nations (UN) presented e-governance as a partial solution to the crisis of "bad" governance in Africa (Goldsmith, 2007) and e-government visions and strategies came to be regarded as a panacea for "bad" governance (Heeks, 2003; Muganda, 2008). This linkage arose out of the view that public administration systems in Africa are ineffective to the extent that the implementation of "political will is barely possible" (Schuppan, 2009). Thus the legitimisation activity had its ideological basis in the perception of bad governance and achieving good governance through public sector reform (Heeks, 2002; Wang, 2001), while the mobilisation activities were seen as a response to the lack of political will.

However, legitimisation of the e-governance rationale is incomplete if there is no enrolment of key players in government to "activate, motivate, and structure the entrepreneurial and market forces that emerge to support the material realization of the innovation" (Swanson & Ramiller, 1997, p. 461). This is the role played by mobilisation activities. Some of the mobilisation activities that have been used to capture the attention of African governments have been covert; for instance, the frequent e-readiness assessment tests by the UN and other international institutions put normative pressure on countries to improve their rankings. The UN has a dedicated Public Service Day for Africa, where those governments that have excelled in e-government innovation are "rewarded" (UN, 2011).

Other mobilisation activities are more overt, taking the form of conferences, workshops and exhibitions organised by technology vendors, governments, supra-national organisations such as the UN, and academia. These activities include the World Summit on the Information Society (WSIS), the preparatory World Forum on the Information Society and the World IT Forum (WITFOR), sponsored by the UN and UNESCO. Thus we see the "force" of global actors as instrumental in initiating e-governance visions and strategies.

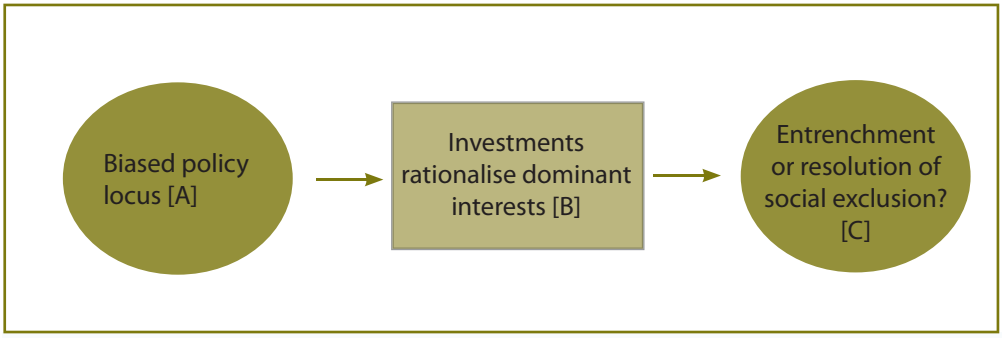
There are tensions evident in the outcomes of some of these covert mobilisation approaches. For instance, some of the countries that did well on the UN or EU e-governance rankings are now struggling to justify their e-government project choices and face systemic socio-economic challenges that should have been the focus of their e-strategies. The documentation of e-governance failures is not new, implying that despite the possible lofty intentions of the legitimisation and mobilisation activities, benefits still remain a mirage to a great extent. For instance, in the Namibian case, despite the growing availability of computers weaknesses in implementation seem to be holding back the effectiveness of e-governance (Tomlinson & Rabina, 2011). Legitimisation and mobilisation activities provided lofty ideals for the realisation of e-government; however, the "design-reality" gap (Heeks, 2003) remains. The e-governance concept found support in Africa; however, the reality of infrastructure dispersion has stifled the participation of the majority of the citizenry.

PHASE III: INFRASTRUCTURE INVESTMENTS (2006–ONGOING)

As the continent realised that more infrastructure investment was needed, policymakers grappled with twin economies[1] (Nassimbeni & Underwood, 2007) as a key feature informing telecommunications infrastructure policies. Interest in the global diffusion of technology is spurred by arguments that it may increase knowledge diffusion through improving communication efficiency (Jovanovic & Rob, 1989), improve political engagement (Norris, 2001), and allow developing countries to leapfrog traditional methods of increasing productivity (Steinmueller, 2001). The leapfrogging phenomenon remains an open question, given that the digital divide is a pressing problem for African countries, what Fuchs and Horak (2008) refer to as "digital apartheid", characterised by unequal distribution of resources through systematic exclusion. Despite realising the need for infrastructure investments for effective participation in e-governance, the investments have in large measure continued to rationalise dominant interests (Figure 1), further entrenching social exclusion and requiring resolution.

1 When referring to South Africa, the authors described it as comprising two economies: the first economy being modern and well-developed, the second economy characterised by masses of people living in dire poverty.

FIGURE 1: RATIONALISATION OF DOMINANT INTERESTS



COUNTRY REVIEWS

Assessing Internet diffusion as the infrastructure for enabling e-participation in three countries (Nigeria, Kenya, South Africa) illustrates that the dominant interests include government, the private sector and international agencies.

NIGERIA

Nigeria is the most populous country in Africa with an estimated population of over 166 million. It has vast mineral wealth and a productive agricultural base, powered by the proceeds of the petroleum sector. With nearly a fifth of sub-Sahara's population, it has limited ICT infrastructure. Possible influences of Internet connectivity stem from a desire by the Federal Government of Nigeria to diversify its sources of revenue away from the traditional oil revenue sources on which former military dictatorships relied (Muganda, Bankole & Brown, 2008). Efforts aimed at liberalising the sector are linked to economic development objectives, characterised by initiatives (Table 2) such as the Universal Service Provision Fund, the Wire Nigeria Initiative and the State Accelerated Initiative (Ndukwe, 2007). The perceived value of the Internet as an enabler of economic growth and governance by the civilian government since 1999 appears to be the overriding determinant for continuous liberalisation of the telecommunications sector.

TABLE 2: E-GOVERNMENT-RELATED INITIATIVES IN NIGERIA

Universal Service Provision Fund (USPF) Projects
The USPF was established by the Federal Government of Nigeria to facilitate the achievement of national policy goals for universal service and universal access to ICT in rural, unserved and underserved areas. Three core projects to be financed through the USPF are Large Scale ICT Infrastructure Projects; Community Communication Centers and ICT for All Nigerians (ICTAN) (Omobola, 2012).
Fibre-Optic Backbone Infrastructure Projects, Wire Nigeria Initiative (WiN) and State Accelerated Broadband Initiative (SABI)
The projects, conceived several years ago, aim at ensuring that all the States of Nigeria are linked to a national optic fibre backbone infrastructure. Implementation started in 2012 (Amafeule, 2012).
ICT in Schools
Reforms initiated by the Nigeria Communications Commission (NCC) have resulted in a number of initiatives intended to boost the inclusion of the education sector in e-governance. The Digital Appreciation Programme (DAP) is aimed at encouraging the use of ICT in schools; the Advanced Digital Appreciation Programme (ADAPT) focuses on computer literacy for teachers; the Digital Bridge Institute (DBI) was established to help overcome the shortage of skilled personnel (ITU, 2010).

Despite the positive changes in establishing a stable regulatory regime, the Internet user base remains low at around 45 million subscribers in 2011 (Internet World Statistics, 2012) or 27% of the population, with connectivity mostly in the urban centres. Computer access is low, Internet points of presence are only moderately dispersed and large segments of the population are affected by an unreliable electricity supply (Ndukwe, 2007). Poverty levels are high, with 67% of the population living below the poverty line (Akinsola, Herselman & Jacobs, 2005). Low penetration levels of these access technologies dampen individual demand; consequently private sector players make only limited investment in telecommunications infrastructure. This contributes to a lack of appreciation by large segments of the population of the value of Internet-based innovations such as e-governance.

KENYA

Kenya has a population of 42 million and an Internet population of 10.2 million (CCK, 2012) or 26% of the population. The Internet is still among the least accessible telecommunications services. According to a 2010/2011 Internet market report by the Communication Commission of Kenya, this state is attributed to low literacy levels, lack of infrastructure and lack of relevant local content (CCK, 2011). According to research by International Data Corporation, the cost of Internet access remains a hindrance, despite the drop in bandwidth and connection costs and government efforts to create an enabling environment for industry competitiveness (Telecompaper, 2012).

TABLE 3: E-GOVERNMENT INITIATIVES IN KENYA

Open Government Data Initiative
Unlike the Freedom of Information and Right to Information programmes where citizens are "pulling data", the Open Government Data Initiative is "pushing data". This is expected to enhance government data usability (Kenya ICT Board, 2011).
Digital Villages Project (DV)
The Ministry of ICT and the Kenya ICT Board have embarked on a connectivity and e-services delivery project to promote digital inclusion. The goal is to boost connectivity, improve service delivery, improve type and quality of information to and from citizens, and promote government's ability to ensure transparency (Kenya ICT Board, 2011).
Rising profile of ICT sector within government
The government has developed a national ICT Policy and Strategy, a Freedom of Information Policy, the Electronic Transactions Act and an e-Government Strategy. Many multinational corporations consider Kenya to be Africa's major ICT-hub outside South Africa (GoK-EGS, 2004; GoK-NICT, 2006; Kenya ICT Board, 2008).
Strengthening of public-private partnerships
Government and the private sector are collaborating on a number of ICT-related initiatives, including collaborations with Kenya ICT Federation, banking institutions and multinational organisations [MoICT, 2011].
National and regional infrastructure projects
Telecommunications infrastructure projects, including the Eastern Africa marine cable system (TEAMS), the EASSY cable and the National Fiber Optic Backbone Infrastructure (NOFBI) are financed by the private sector, the World Bank, the government of Kenya and consortia of local and multi-national organisations [CCK, 2012]. Other projects include the COMESA Telecommunications Project (COMTEL), aimed at improving connectivity across the COMESA region. This will put to an end to the rerouting of regional traffic through countries outside COMESA, thus reducing regional communications costs (MoICT, 2011).
Financing
The government explores financing mechanisms including public private partnerships, a universal access fund, a digital solidarity fund, multilateral and bilateral funding, promotion of investment through liberalisation and licensing of additional operators (MoICT, 2011; Kenya ICT Board, 2011).

While there are many ICT projects, there are factors that are unfavorable to dispersion of the Internet. High computer illiteracy (Håndværksrådet, 2006), low access to electricity (KPLC, 2011), lack of a developed venture capital system for entrepreneurs interested in investing in underserved areas, all hamper deployment of Internet infrastructure by the 78 licensed operators, only 35 of whom are operational (Muganda-Ochara, Van Belle & Brown, 2008). It appears that government is unable, with the regulator CCK, to craft a strategy for removing these bottlenecks.

The bottlenecks have resulted in an Internet diffusion trajectory that favours urban centres, while the rural population and some segments of the urban population remain unconnected. The lack of proper articulation of ICT as a national priority in the early years of Internet commercialisation may have contributed to this skewed development (Mitullah & Waema, 2007). The structural organisation of government is also a barrier to faster diffusion of the Internet (Muganda et al, 2008). The Ministry of ICT is charged with universal access issues and the Directorate of e-Government is tasked with co-coordinating back office integration of ICT projects, yet neither seems intent on fostering Internet diffusion. Citizens appear removed from e-government, except as consumers.

SOUTH AFRICA

In South Africa, government recognises the existence of twin economies (Padayachie, 2004), but has few policies to address the increasing divide. With regard to policy relevant to Internet diffusion, the Department of Communications envisages programmes that support economic growth in the ICT sector and ways of accelerating the advancement of ICT in the second economy (PNC-ISAD, 2006). However, the impact of this vision is not visible in key institutions such as schools or small enterprises, with only limited efforts towards e-skilling the nation (DOC, 2010).

Nassimbeni and Underwood (2007) point to the persistent lack of a national conceptualisation for advancement of ICT in the second economy. One of the policy pillars is to focus on the first economy (13% of the population) as a creator of jobs for the second economy (87% of the population). The policy focus exacerbates the social exclusion problem, since the ability of the first economy to create jobs for the second economy has not worked before (Kirsten, Aliber, Maharaj, Nhlapo-Hlope & Nkoane, 2006). The policy directions introduced since 2000 have not resulted in mass adoption of the Internet in the second economy, thus the ability of the population to participate effectively in e-governance is in question. Abrahams (2011) concurs that progress on the e-governance front is minimal and there are few online public services, while there is slow development of e-society due to high individual investment requirements. While there are laudable efforts by the South African government in starting initiatives aimed at increasing public participation in e-governance (Table 4), the Internet infrastructure is emerging in an environment of increasing exclusion of the rural population and the urban poor from participation in e-governance.

TABLE 4: E-GOVERNMENT INITIATIVES IN SOUTH AFRICA

"Batho Pele" Gateway Project – Towards e-Government
"Batho Pele" (People First) is a public service delivery framework whose e-government gateway was launched in 2004 and is geared towards a citizen-centric service delivery philosophy. However, the e-government gateway remains at the phase of "pushing" information to citizens and has not reached the transactions stage (Kaisara & Pather, 2011).
Digital Doorway Project (DV)
This is a joint project of the Department of Science and Technology and the Council for Scientific and Industrial Research (CSIR) aimed at enhancing computer literacy through the implementation of the concept of minimally invasive education. The emphasis is on awareness-raising for computer literacy with community-driven learning programmes (UN, 2011).
Establishment of the e-Skills Institute
This is an initiative of the Department of Communications to harness the potential of ICT to address socio-economic challenges, including e-skilling the nation for effective e-governance and service delivery (DoC, 2010).
National Infrastructure Initiatives
Initiatives aimed at improving the telecommunications infrastructure have not realised their objectives. There remains a need to establish a national information infrastructure to constitute the backbone for service delivery, extending Internet access points beyond multipurpose community centres to convenient places such as public libraries, shopping malls, government offices, hospitals, clubs and relevant public places for citizens to use free of charge (Mutula & Mostert, 2010).

STAKEHOLDER ROLES IN SELECTED E-PARTICIPATION PROJECTS

The categorisation of stakeholder roles (Table 5) is based on a theoretical thematic analysis of six presentations made by e-government champions from Ethiopia, Kenya, Uganda, Tanzania, Mauritius and South Africa during the 2011 United Nations and Africa Public Service Day in Dar es Salaam, Tanzania; the Commonwealth Telecommunications Organization (CTO) e-government workshop in Cameroon in April 2011; and a content analysis of how these e-government projects have evolved. Table 5 shows a categorisation of actors that have played the roles of e-participation policy designer and/or user.

TABLE 5: E-PARTICIPATION STAKEHOLDER ROLES AND INTERESTS

Actor group	Stakeholders	Role	Interests
Government departments	Ministries of ICT	Designer	Infrastructure projects Social inclusion goals
	Directorate of e-Government	Designer	e-Government implementation
	Ministry of Finance	Designer	Funds management
	Office of the President	Designer	e-Leadership
	Communications Commissions	Designer	Universal service funds/Universal access
Actor group	**Stakeholders**	**Role**	**Interests**
International institutions	World Bank/International Finance Corporation	Designer	Budgetary support
	CTO	Designer	Involving non-state actors
	UN	Designer	MDGs realisation
Actor group	**Stakeholders**	**Role**	**Interests**
Clients	Businesses	User	Commercial interests
	Citizens	User	Access services
	Government agencies	User	Efficiency
Actor group	**Stakeholders**	**Role**	**Interests**
Other non-state actors	Civil society	Designer	Social inclusion

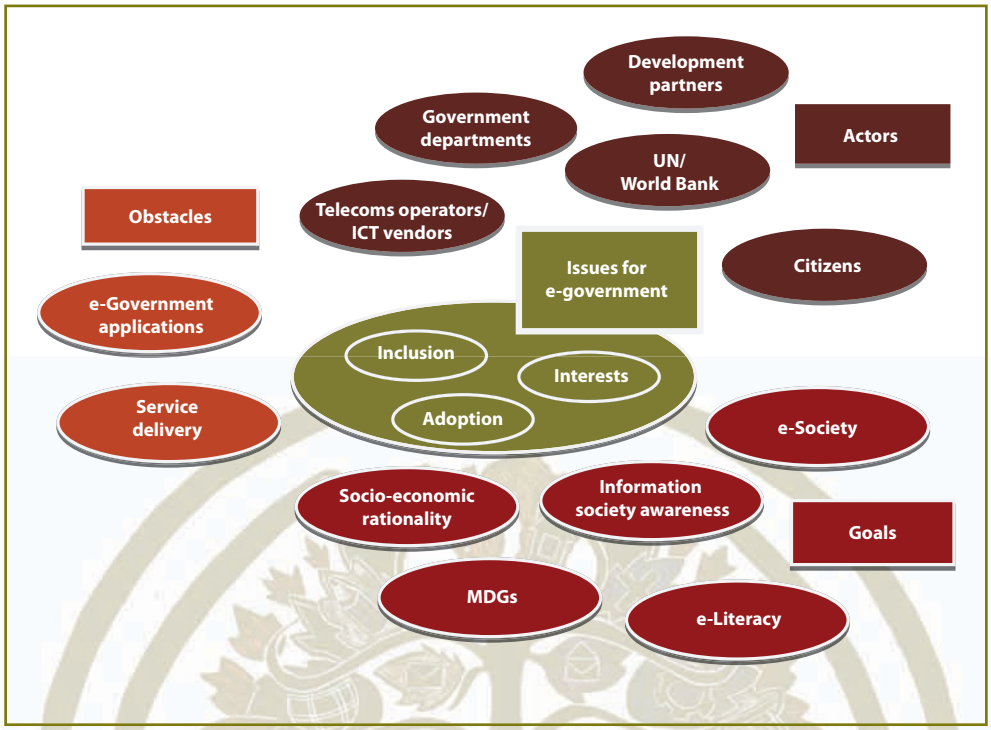
Figure 2 represents the constellation of various actors, their goals and the obstacles they face. The stakeholder expectations that appear to predominate in e-government projects include:

(a) Realising e-society and e-literacy goals (governments, UN, World Bank, citizens).

(b) Improved access to government services (government agencies, citizens).

(c) Attaining socio-economic rationality for e-government projects through various means such as MDGs (UN, World Bank, government agencies; telecoms operators and ICT vendors).

FIGURE 2: CONSTELLATION OF ACTORS, GOALS, OBSTACLES



LINKING E-PARTICIPATION TO NETWORK DEVELOPMENT

The earlier exploration of participation in e-governance argued that the dominant interests in the political-nexus-triad (PNT) effectively locked out the majority of citizens from active participation in policy design and implementation, except where they may be consumers of e-government services. This is likely to alienate those citizens who expect to actively participate in policy formulation and implementation, at both national and local level. However, engagement of citizens in the policy process would create a counter power, as they voice their interests.

In the design of e-government projects investigated in the three African countries reviewed above, there is little in the design interface, either technical or social, that allows for this possibility. Many government websites publish information on e-government policy, without necessarily engaging public input into the process. African governments are providing more policy information on their websites and the onus is on the individual citizen to interpret and "consume" this information. This creates the possibility that the role of traditional forms of organisation in Africa, such as churches, schools, public market places, may diminish as centres of policy interpretation. The result could be a highly entrenched information ideology of e-government, fostering the use of government websites, e-mail, bulletin boards, podcasts, etc as avenues for information "spin". e-Government projects have lacked effective engagement of local actors, limiting the availability of checks and balances through exercise of counter power. An alternative socially-oriented, democratising approach is needed.

A second intended or unintended transformation is occurring, which regards citizens as consumers. Many African governments aim to create "one-stop-shop" online services. Initiatives such as the building of digital villages or "pasha centres" in Cameroon and many parts of Africa are one way of providing access to government services. This raises the problems associated with conceptualising citizens as consumers: consumers having insufficient knowledge for effective usage of e-government or e-participation and seeing the relationship between government and citizens as a passive commercial transaction (Ryan, 2000). For example, while in countries such as South Africa and Kenya education results are released online and via mobile phones, the majority of individuals requiring these services rely on others for getting this information.

Table 6 summarises key events in telecoms network and e-government development and the impact on the enrolment of local and global actors, either positive or negative.

TABLE 6: TELECOMS AND E-GOVERNMENT POLICY DECISIONS AND CONSEQUENCES

Events	Local consequences	Global consequences	Impact on enrolment
A. Democratisation forces in Africa	Civil society involvement	Support from donor agencies and partners	Major (+) GA; Slight (+) LA [2]
B. Telecommunications reform and Internet commercialisation	Proliferation of ISPs/Evolution of infrastructure	Foreign direct investment in local businesses	Major (+) GA and LA
C. Articulation of e-government strategies	Citizen-centric logic of e-government, but inadequate infrastructure	Increased legitimisation and mobilisation by international partners	Major (+) in LA; Moderate (+) in GA
D. Establishment of e-government secretariats/ministries of ICT; e-readiness assessments	Inadequacy of infrastructure model for e-government, drawing board for investments, delays	National government lock-ins implies support wanes	Period of stagnation thus: Moderate (+) in LAs; (-) in GAs
E. LAN/WAN internal government focus	Enhancing internal bureaucracy rather than citizen-centricity	Concern for the digital divide picks up and ICTD4 gains ground	Slight (+) in LAs; Moderate (+) in GAs
F. Building international/national backbone infrastructures;	Vibrancy in mobile telecoms market and services; Increased local access; decrease in fixed telephony	International investment rationalisation; Company mergers the norm	Major (+) in LAs; (-) in (GAs)
G. Establishment of Universal Service Funds (USF); encouragement of local content development through digital villages	Local investment rationalisation; proliferation of SMEs; ISPs decrease due to USF provisions	Conflict with international donors on regulatory models	Slight (+) in LAs; Moderate (-) in GAs
H. Global recession; drought in many parts of Africa	Reductions in budgetary allocations for ICT	Shift in international priorities	Slight (+) in LAs; Major (-) in GAs

Regarding citizens as consumers, without taking into account the associations required for the interpretation of information, incorrectly assumes ICT literacy of the total population. The problem of regarding the relationship between the government and citizens as a passive commercial transaction may negate the necessity for interactive political engagement of citizens with government. Ryan (2000) contends that the objective is to diffuse the extent to which politics might interfere with administration, allowing administrative decisions to be based on rational, objective criteria rather than democratic

2 GA = global actors; LA = local actors

negotiation and bargaining. A consequence of this approach is that government is protected from the political demands of society (Ryan, 2000: p. 105).

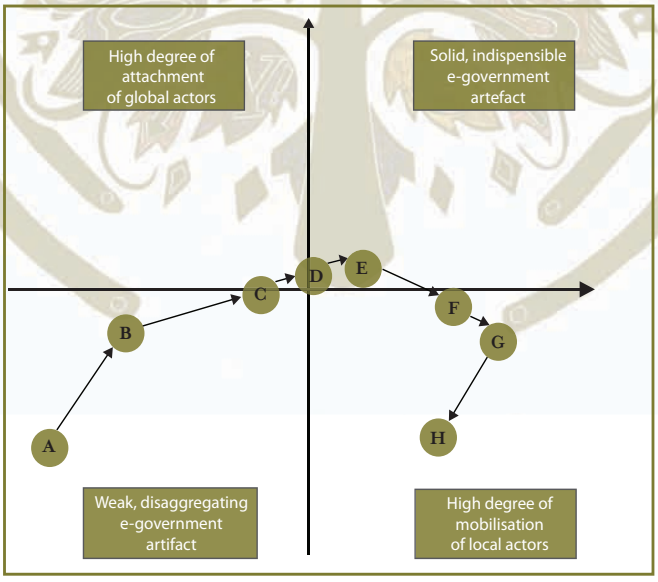
This analysis adds to the arguments of Heeks (2002) and Muganda-Ochara and Van Belle (2008) that in the design of many e-government initiatives in Africa, adoption results in a minimalist e-government participation model, due to the ineffective stake-holding of citizens, even as global actors in the e-government arena continue to dominate.

ASSESSING STAKEHOLDER SUSTAINABILITY

The global-local network framework (Figure 3) of Law and Callon (1992) is deployed to show how the chain of events and episodes in Africa have influenced the stability and hence the possible sustainability of e-government projects that can enhance grassroots participation. The global network in e-government projects is a set of stakeholder interactions that enables the project to take place with the resources provided, including money, expertise and political support. The local network is the "inside" of a project, representing interactions and associations of actors that implement and use the project. The changing strength of the global and local networks over time can be plotted on a two-dimensional graph, with the x-axis showing the degree of the local actors' mobilisation, and the y-axis showing the extent to which global actors are attached. The intention in undertaking a network analysis is to establish the stability of the emergent e-government network, since stability assumes that e-government solutions have effective engagement with citizens.

It is possible to plot the degree of mobilisation of local actors against the extent to which global actors are engaged (Law and Callon, 1992). The argument is based on the milestones, episodes and challenges that affect e-participation, as summarised in Table 6.

FIGURE 3: NETWORK ANALYSIS DIAGRAM



While the network model described above is an oversimplification of the "real world", it affords some inferences with regard to the unfolding scenario of how stakeholders are participating in e-governance in Africa. This environment is being influenced by a number of actors, whose interests influence the nature and sustainability of participation in e-governance. These interests are inscribed in the form of an e-government artefact that is solid but dispensable to the concept of e-governance and e-government projects that are largely weak and disaggregating. Therefore, this article makes the claim that since the direction of local actor mobilisation is decreasing, this may be an indication that e-government projects in Africa, while solid, may be dispensable, since local actor groups such as grassroots communities have not been effectively enrolled.

The analysis suggests a low degree of attachment of global actors, resulting in an e-government initiative that has waning support from the international community. This may be partly attributable to the economic uncertainty in many parts of the world, as well as the notion that e-governance has received some level of legitimisation in Africa that no longer requires a push from the donor community.

Overall, the mobilisation process suggests that participation in e-governance in Africa is solid, but dispensable, due to a relatively low degree of mobilisation of local actors combined with a low attachment of global actors. The e-governance policy perspective is solid because e-government, as an NPM instrument, has attained legitimacy in a majority of national governments in Africa (C). Further, the early involvement of the international community in the initial stages of telecommunications reforms (B) and wider democratisation forces that have continued to shape governance (A) still necessitates that national governments maintain a reform path. However, despite the fact that the logic of e-government is citizen-centric, there is an inadequate underlying computing and infrastructure model that hinders effective local actor participation (C, E). The implication is that local actor mobilisation, and therefore participation, remains muted from a citizen perspective. In addition, recent events, such as the global economic recession (H) may be impacting on the degree of global actors' involvement in e-government projects in Africa.

IMPLICATIONS OF PARTICIPATION IN E-GOVERNANCE SUSTAINABILITY

A number of implications are envisaged considering the nature of local actor mobilisation and the weak degree of global actors' attachment to e-governance in Africa. The first is how to mainstream local organising forms for effective local actor participation. The explorations undertaken have brought to the fore how citizens, as local actors, have been excluded, not only as necessary participants in policy development but also as interactive users of e-government applications. The possible inference is that the institutionalisation of the e-governance concept has ignored Africa's local organising forms such as schools, churches and the grassroots communities. Recognition of the role that local organising forms can play in e-enabling participation requires African governments to embrace local-actor networks as partners in e-governance and rationalising formal government agencies' interactions with these organising forms (Muganda-Ochara, 2012), allowing for the exercise of counter-power.

Mainstreaming local organising forms into formal governance systems is more likely to lead to an e-society than current systems organised around dominant interests.

Efforts geared towards achieving e-society call for re-crafting of the e-governance message in order to resonate with a community's realities. It was highlighted that key hindrances to grassroots participation in e-governance are the low levels of ICT access and the high levels of e-illiteracy, resulting in low usage of e-government applications. Attention would need to be given to fostering real e-literacy, emphasising use rather than connectivity and institutionalising e-literacy in school curricula and adult literacy programmes.

Furthermore, governments and other actors need to link e-government to a socio-economic rationality that is meaningful to local communities. For instance, efforts geared towards development of content should not result in mere accumulation of information on websites that is likely to result in "information spin". Rather, local practices that can enhance participation in e-governance should form the basis of dynamic content; for instance, coalescing content generation from cultural practices such as cultural fetes, initiation rites, worship rites, marriages rites and other community activities, which are rarely documented. These often form the basis for enhancing social cohesion, yet are sometimes ignored, presumably because they are considered backward. Interesting local practices can be captured and can form an economic rationality for developing tourism in an area. Next, the article summarises a few possible actions that can be undertaken to promote effective local participation (Table 7).

TABLE 7: ATTAINING LOCAL ACTOR E-PARTICIPATION

Challenge	Possibilities
e-Society	Identify state and non-state actors who can enable the e-governance mandate. e-Governance secretariat develops policy instruments that rationalise interactions with non-state actors. Incorporate e-participation as a public service performance metric for government.
e-Literacy	e-Literacy to be part of the school and literacy curricula. ICT education formalises e-literacy through computer societies.
Socio-economic rationality	Identify challenges/opportunities for e-applications in communities. Identify local champions. Link to specific socio-economic policy interventions.

CONCLUSIONS

The article considers the sustainability of the e-governance policy perspective prevalent in Africa in the past decade by considering the nature of attachment of stakeholders to e-government projects. The results indicate that despite low levels of local actor enrolment, the concept of e-governance remains solid in Africa, but may be dispensable because grassroots actors are weakly mobilised. The disaggregating nature of the e-governance policy and e-government implementation implies that the process has failed to nurture the heterogeneity of actors that is required for effective e-governance. The exploration showed that the dominant government, private sector and global interests effectively locked out the citizens and grassroots communities from participation in the policy implementation process, except as consumers of public services delivered through e-government.

In order to maximise grassroots participation in e-governance, local organising forms and the formal institutional infrastructure of the government need to be "joined up". The proposal therefore is to link disparate organising forms such as schools, churches or other community organisations and the administrative institutions of governance, such as the local authorities, sections of the public service, constituency offices, judicial offices and others, through electronic governance. Given their heterogeneity, the resource that can be used for joining them up is the optimal use of the institutional capacity of those in charge. Governments need to identify specific socio-economic objectives that are best addressed by linking electronically with other agencies and individuals outside mainstream public administration. The challenge is to craft the message of e-governance to be directly linked to the e-participation requirements of grassroots communities, of partnering organisations and of government. For this to be achieved, a key requirement is to enhance the capacities of people in government, private businesses and community-based institutions to act as change agents for championing e-governance in local contexts.

A further emphasis should be on electronic literacy, packaged in local languages to improve acceptance. How can this be achieved? ICT education should embrace electronic literacy, not only in formal educational setups but also in work practices. For instance, those employed in the institutional structures of government should be evaluated on the role they have played in enhancing electronic service delivery to the public. The onus should be placed on public servants to design how to use ICT to improve service delivery. Informal networks can also be incentivised, either through regulation or through financial rewards.

Attaining electronic literacy can be enhanced by including relevant content for educators and learners in syllabi. Many African countries have implemented adult literacy programmes. The current era dictates that there should be a shift of focus to include information and computer literacy. This will require re-training of educators, because educators play a critical mediating role between the citizenry and various governance structures. Qualifying as an educator should include electronic literacy.

In summary, the relationship between local organising forms and the institutions of government should be reciprocal, incentivising the former while the latter benefits through attaining the social, political and economic goals of governance.

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THREE: TELECENTRE APPROACHES IN CAMEROON AND KENYA ILLUMINATED USING BEHAVIOURAL ARCHAEOLOGY

David Hallberg,
Department of Computer and Systems Sciences, Stockholm University, Sweden

Carole Godem,
AIESEC, Douala, Cameroon

Walter Dzimey,
National Health Insurance Authority, Kuntenase, Ashanti, Ghana

ABSTRACT

Throughout the last decade, telecentres have provided access to electronic communications as a supporting ICT infrastructure for community, economic, educational and social development. While the origins of telecentres can be traced to Europe's telecottage and community technology centres in the United States in the 1980s, telecentres have taken varying forms and approaches. This article illuminates approaches used by telecentre projects in Kenya and Cameroon, using behavioural archaeology. Literature stresses that behavioural archaeology refers to understanding the artefact as a tool in human activity and technology as the embodiment of human activity in the artefact.

Application of behavioural archaeology to telecentres sheds light on the nature of technology use leading to particular results or societal outcomes. Using a qualitative methodology, managers, local contractors and technicians at local telecentres were interviewed. The results show differing approaches to the purpose and design of telecentres. In Kenya, the focus is on e-government services, while in Cameroon it is on conflict solving among different societal groups. In its use of behavioural archaeology, this article adds a new perspective on the challenges of making ICT and electronic media available in resource-poor environments.

KEYWORDS:

behavioural archaeology, telecentres, Cameroon, Kenya, electronic communications, resource-poor environments

INTRODUCTION: UNDERLYING REASONS TO CONSTRUCT TELECENTRES

In many African countries, household and community access to information and communications technology (ICT) is extremely limited. Telecentres have not always been successful in bridging the digital divide (Naik, 2011; Hallberg, Kulecho, Kulecho & Okoth, 2011). Behavioural archaeology (BA) has the potential to provide insight into the appropriate design of telecentres, for effective ICT adoption and diffusion. This article reflects on a behavioural archaeology approach to understanding ICT diffusion, adoption and usage with respect to resource-poor environments. A review of two projects, one in Cameroon, the other in Kenya, examines the approaches of telecentre managers in enabling remote populations to enjoy the benefits of ICT.

The origins of telecentres can be traced to the Scandinavian telecottage approach, which emerged in the 1980s (Crellin, 1994). Analysis of telecentre approaches recorded in the literature reveal seven inter-related rationales to construct telecentres. Firstly, telecentres may be used to raise consciousness of the value of ICT for economic access thus enabling poverty reduction and enhancing quality of life (Sharma, 2005; Terry & Gomez, 2010). Secondly, telecentres may bridge the digital divide (Rogers & Shukla, 2001; Agbeja & Salawu, 2007; Ibrahim, Yasin & Dahalin, 2010) by providing resources and materials to people in environments where access to technological materials is at barest minimum.

Thirdly, the notion that telecentres may provide everyday information needs (Ellen, 2003) is concerned with the electronic information which people need to use formally, for example for business purposes, or informally for everyday life activities. In this regard, barriers to everyday information seeking include external (societal, institutional) and internal (physical, intellectual) obstacles. Accessing information electronically for those whose first language is not English, as well as those with disabilities, may be problematic. Fourthly, telecentres may enable learning and education (Larson & Murray, 2008; Ramos, Nangit, Ranga & Triñona, 2007; Gómez, Díaz & Sandoval-Almazán, 2009), meaning that they may create new learning environments for access to educational and learning materials. Telecentres can be said to provide a platform where learners can mount and explore knowledge, rather than merely consume knowledge.

Fifthly, telecentres may be used explicitly for business purposes (Abbott & Yoong, 2005), for example to market business ideas and products, either synchronously or asynchronously. Because of the flow of information that may occur when using telecentres, individuals or organisations can capitalise on such mediums to establish micro and small business networks. In sixth place, telecentres may empower people (Terry & Gomez, 2010; Crellin, 1994; Aji, Yusof, Osman, & Yusop, 2010) by providing access to knowledge, which helps users to manage life events and make decisions. Access to knowledge may give users the desire and the capacity to challenge opposing forces and participate in deepening democracy. Finally, telecentres are often constructed to provide a broad target group with ICT benefits (Jensen & Esterhuysen, 2001), thus encouraging universal access and service as regards electronic communications (Table 1 below).

TABLE 1: TARGET GROUPS FOR TELECENTRES

Individuals (local community members, tourists, truck drivers and professionals such as engineers)
Small businesses
Schools
Youth
Disabled people
Farmers
Women's group
Churches
Clinics, hospitals and healthcare workers
Police
Non-governmental and community based organisations
Trade unions
Civic organisations
Political parties
Government departments
Sports clubs

Source: Jensen & Esterhuysen, 2001

For the purposes of this article, a telecentre, referred to either as a digital village (Kenya) or a telecentre (Cameroon), is a location at which people may enjoy the benefits of ICT including access to Internet, telecommunications, fax, printing and photocopier; and/or where educational value may be derived from electronic media, as in vocational training using ICT.

FACTORS PERTAINING TO SUCCESSFUL TELECENTRES

From a study of six telecentres in India and Sri Lanka, where Gaiani, Hansson, Meegammana & Mozelius (2009) interviewed both users and owners, the authors concluded that women experienced barriers to access of information. It is difficult to reach the most vulnerable at the bottom of the pyramid with information and services, as this segment of the population does not perceive that the services are intended for them. The local community has to be involved in the design of the telecentre. Every telecentre must accommodate local languages. The following aspects with regard to the success or failure of a telecentre were singled out from their study: ownership, sustainability, languages, education, literacy and media literacy, inclusion, and vision and strategy.

BEHAVIOURAL ARCHAEOLOGY: AN ANALYTICAL POSSIBILITY

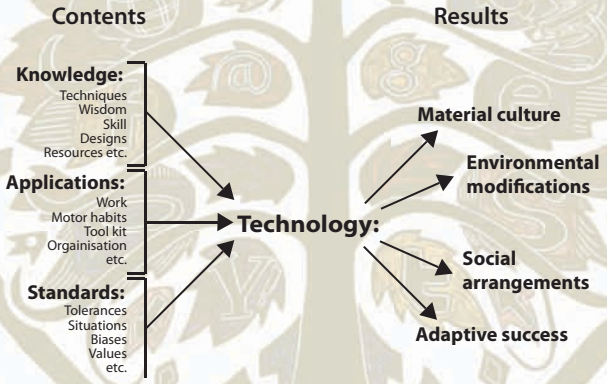
Behavioural archaeologists define human behaviour in relation to material culture (Hodder, 2001), which often implies an interest in how, why, when and where people use or make use of artefacts. This analytical approach recognises what happens when actors with particular knowledge, skills and resources – or lack thereof – change the world through the use of artefacts. The concept of behaviour, which includes humans and

artefacts, mediates ecological, social and cognitive processes. This is a holistic approach. An artefact's life story incorporates the behaviour that led to its creation, from selection of raw materials, through processing, to making available a useful product. The life story includes the bringing together of resources required for supporting manufacture of the product, including energy, human labour, time and other resources. Furthermore, the life story includes the utilisation of the artefact to produce value. These elements can be considered as components of a behavioural chain.

In addition to the concept of artefact as a concrete result of human activity, technology is a critical focus for behavioural archaeology because it sheds light on how the particular human activity led to the existence or usage of a particular artefact and resulted in a particular outcome. Archaeology and its related disciplines have been seen as useful for researching technology changes and usages (Bleed, 1997; Schiffer, 2002; Bird & O'Connell, 2006), because the nature of technology usage and value to society is revealed.

In order to understand the usage of a chosen technique when utilising technology, Bleed's perspective (1997: pp. 96-100) provides a description of technology as the embodiment of particular behaviours (content), where usage leads to particular results, (Figure 1 below)

FIGURE 1: BEHAVIOURAL PERSPECTIVE OF TECHNOLOGY: BLEED'S "CONTENTS AND RESULTS"



Source: Bleed, 1997

The application of Bleed's perspective (1997) enables the researcher to explore the behaviours embedded in technology adoption and usage, as well as where technology diffusion leads in terms of culture, changes to the environment, social arrangements and success or failure. These perspectives are what we seek to explore with respect to telecentres in resource-poor environments, through posing questions such as: Where is it envisaged that telecentres will lead in terms of benefit to communities? Which behaviours are exhibited in telecentre establishment in resource-poor environments?

Let us briefly examine the categories employed in the behavioural archaeology perspective used in this article, first with respect to content, then with respect to results.

CONTENTS

KNOWLEDGE

The knowledge element refers to the way in which the actor goes about achieving his/her purpose, how the actor manipulates his/her world. The actor needs knowledge and skills about techniques and methods that may be fruitful for each specific case of technology usage. Bleed refers to this as technological knowledge. It is also shown that there is an underlying wisdom that justifies those techniques and methods that the actor rationally chooses to employ, as the actor selects to work with tools designed in an appropriate manner. The actor may not be free to choose the tools and design, but needs to be wise in choosing the appropriate tools for the appropriate purpose.

APPLICATIONS

It is not sufficient to employ knowledge and wisdom about the best method to follow. The actor also needs to put his/her skills into practice through organising the tasks to be performed, drawing on acquired knowledge, and the design of available tools as well as exploring their practical limits. Thus the success of applications lies in their nature and in the actor's capacities.

STANDARDS

Standards are those regulations that the actor is obliged to follow when utilising technology. Such regulations are here referred to as values and principles to which the actor is culturally and morally obliged to adhere. Hence, standards are complex and for every situation there may be different standards. The actor is therefore required to use knowledge, experience and wisdom flexibly to choose and find the appropriate standards with respect to the existing cultural context.

RESULTS

MATERIAL CULTURE

Material culture and other results are the outcome of the actor utilising technology. All tangible and intangible results are an outcome of the actor's technology-oriented behaviour, meaning the input of the actor largely determines the output. Material culture refers to those results that define the value arising from technology adoption, usage and diffusion.

ENVIRONMENTAL MODIFICATIONS

The actor may bring about a change of environment when utilising technology. Even people who, directly or indirectly, experience the actor's performance will be affected by the changes introduced. The change may be in the form of access to knowledge through the technology use or changes in the socio-economic environment of the actor and his/her associates.

SOCIAL ARRANGEMENTS

Humans are social beings, hence the actor's actions will stimulate the introduction of new social arrangements that will lead to new and different relationships among people, as well as new forms of social organisation within communities and in the broader society

ADAPTIVE SUCCESS

Adaptation is necessary when a change occurs and in order for such change to generate success. In other words, a series of activities and events will need to take place, both consciously and subconsciously, in order for the desired goal to be achieved with individuals and social groups making continuous adaptations on an incremental basis.

The conceptualisation of Bleed's (1997) behavioural definition of technology informs the archaeological approach to this study, as the elements of the definition are explored and the artefacts and their usage are analysed with respect to the YNet digital village project in Kenya and the LUKMEF telecentre project in Cameroon.

"Technological activity must begin at some point, move through more or less discrete steps, and come to some kind of an end" (Bleed, 1997: p. 100).

QUALITATIVE RESEARCH METHODOLOGY

The article explores two projects in resource-poor environments in Kenya and Cameroon. It applies the frame of a behavioural perspective of technology to examine the artefacts pertaining to telecentres and the results of their use. In doing so, it draws on the results of a study of four digital villages, which form part of the Kenyan government's Digital Villages Project (DVP). The YNet Malindi project[1] , was initiated by the Kenya ICT Board (Kenya ICT Board, 2010) and is funded through the Digital Village Revolving Fund (DVRF), which advances loans to private contractors to enable them to run and establish these centres, also known as Pasha Centres.

The second telecentre project examined in this article was initiated by the NGO, Martin Luther King Memorial Foundation (LUKMEF)[2], in Cameroon. It was established as a medium to resolve social conflicts, bring peace, and increase knowledge about Cameroonian and global society.

The data collection process was designed to learn about (a) rationales for constructing these telecentres and (b) strategies employed by managers in order to make the telecentres sustainable, thus limiting the scope of the study. Empirical data was gathered between March and September 2010. Questions posed in the form of semi-structured interviews concerned content (information on planning horizons, access in local languages, competence network, available documentation and motivation for telecentres) and results (participation of women and minority groups, ownership and sustainability of telecentres, broad societal context). Programme managers for the telecentres were interviewed in Douala, Cameroon and Nairobi, Kenya, as well as by using Skype and email. Local contractors, local managers and technicians were interviewed at the telecentres in Menji, Cameroon and Malindi, Kenya. The design of questions was based on Bleed's (1997) frame, as well as on an understanding of the factors required for successful telecentres (Gaiani, Hansson, Meegammana & Mozelius, 2009). Additional questions were posed based on interviewees' responses.

1 YNet International: http://ynetinternational.wordpress.com/

2 LUKMEF: http://www.lukmefcameroon.org/

EMPIRICAL FINDINGS

At this stage of evolution of the telecentre projects, the scope of the study was limited as although it was possible to collect data on some aspects of content and initial results (Bleed, 1997), it was not possible to collect data on the results of embedded usage of ICTs. A further limitation is that the study explored only the perspective of the managers of the telecentres, not that of the users. It is noted that multiple longitudinal studies will need to be conducted to collect the requisite volume of data and depth of insight to enable a full-scale analysis of the benefits to users using behavioural archaeology. In that way the effects of a certain technological behaviour will become clearer. Nevertheless, as in all archaeology, it is important to collect even small amounts of data on rudimentary aspects of evolution, as they offer the foundation for creating a deep knowledge of the subject under study, the nature of and reasons for change, success and failure in the evolutionary path. The following data and analysis are offered as early steps in the archaeological exploration of telecentres.

INVESTIGATION A: YNET INTERNATIONAL, MALINDI, KENYA

The project is located on the coast, about 570 kilometres or 10 hours by bus from Nairobi. Malindi is considered by most Kenyans to be a rural, resource-poor area, with a population of about 120 000 people, though this is changing. The growth of Malindi is slowly turning it into a high-cost node, since it is a tourist destination. High illiteracy levels give it another face for locals, and many stick to old traditions and live under poor conditions. A local inhabitant, who has lived and worked in Nairobi, confirmed the view of Malindi as a resource-poor area:

Because of high prices and tourists being the target groups, many Kenyans cannot benefit from the services provided, such as infrastructure allocated and social amenities, which leaves them in conditions similar to the most remote areas.

PLANNING HORIZON AND COLLABORATION

The Kenyan government has recognised that there are great inequalities in the society between rural and urban communities and between women and men. In order to address this, it has invested in the Digital Villages Project (DVP), working with international stakeholders. This initiative takes place in the context of Vision 2030 (Government of Kenya, 2007), which aims, among other objectives, for a more equitable society in terms of gender. The digital villages are envisaged to have the potential to deal with these disparities to the extent that the disparities concern equal access to ICT for women and men. The long-term planning horizon presents the opportunity to respond to problems as they arise.

Limited availability of infrastructure is a constraint to rural access in Malindi. In order to combine local and global knowledge and resources to set up the digital village, the Kenyan government is collaborating with the Swedish International Development Agency (SIDA), which has contributed economic capital, and the US service company, Cisco Systems. which has contributed intellectual capital. These contributions affect the design of the project with respect to the selection of hardware and other solutions.

For example, the government's partners encourage the centres to rely on the Pasha Portals, using dedicated servers for this purpose. If any server goes down or other issues arise, it becomes a major concern for the telecentre manager:

> *I have a problem with the login system, 'coz it sometimes takes a long time to open. It sometimes tells you that the page cannot be displayed. You can get disappointed. Sometimes you will not find some information you were looking for because it's missing … Yes they have to upgrade it [the Pasha Portal]. They have to put all the information there.*

This collaborative partnership offers access to e-government, e-education, and e-health services. According to the manager:

> *They [the users] don´t have a problem with e-government services, it´s working perfectly but with e-health I talk to some health officers, some of the information they cannot access it … e-government is working, e-health has some information lacking, e-education they like it.*

FIGURE 2: YNET TELECENTRE, MALINDI, SUPPORTED BY THE DVP, KENYA

Photo collage: Kulecho & Okoth, 2010

LOCAL OWNERSHIP

In order to ensure sustainability, the Kenyan government intends to support the digital villages for a set period only. After this period, the digital villages would be managed by NGOs, private contractors or local people. In 2010, YNet International was being managed by local women. The manager of YNet International tells how she came up with the idea of running the centre:

> *IT was not my profession. I was a nurse. I studied in Mombasa but lived in Malindi. When I came back to my town Malindi, there was nothing like that. There was no cyber. I came up with an idea that I must do something in my town. I decided to leave my profession and I had to go back to school again to learn about computers, and take my time. I studied almost 14 hours a day. Now I want people to know about computers because it helped me and it can help them too.*

To spread information about the centre, managers go to local churches and advise people to use the services. The cost of Internet access has decreased, making the centre more viable:

> *No one could stay for an hour because it used to cost five (5) Kenyan Shillings [about EUR0,05] per minute, then it went down to three (3) Kenyan Shillings, then to two (2) Kenyan Shillings. Now it is one Kenyan Shilling. Now everybody can afford it and use it.*

LANGUAGE USAGE

The digital village initiatives are made complex by the existence of multiple local languages and lack of knowledge of English and Swahili among users of the centre, requiring content to be made available in a variety of languages, as expressed by a local person assisting at the YNet:

> *I am staying in coast and I have to adapt to the coastal way of life … First of all, I know the local language and I have to talk to them in their local language to understand what they are studying. Malindi is a Giriama town and I can speak Giriama fluently, even the jokes; so most of them think I am a Giriama. When they come here they speak to me in Giriama and I have to respond to them because they know I am a Giriama, but I am not, I am a Luo.*

COMPETENCE NETWORK

To ensure resources at the digital villages are maintained, managers work with technicians who are called in when needed, as the centre cannot afford to employ full time technical staff. This means that the overall responsibility for the centre is the manager's alone. Apart from the technician, who is called in, the manager relies on two young men as attendants, but if it is a complicated case, for instance if the Internet goes down, she has to call the technician:

> *Yes, it´s always available and if it goes down I call the Telkom technician to fix it.*

DOCUMENTATION AND MEASURABLE RESULTS

To document and measure the outcome of digital village usage, the manager has introduced a software application. She refers to the application as cyber software that can detect results and outcomes. For instance, when a user is logged in, the application can detect and measure printouts and what pages a visitor is using and when. It is also possible to monitor computer availability from a central computer so as to detect when something goes wrong. However, the self-assessment of the manager is also important and should be documented:

> *I don´t pride myself but I take my time to satisfy my customers. I have a really good customer care, I listen to them. I make sure that anyone who comes to YNet International must come back and must tell others that, if they have a problem with Internet, that woman [manager] there is number one and will take care of you. Now they know me for my customer care and so does my competition.*

USER GROUPS

Users of the centre, details derived from interviews and observations, included local community members, school pupils and youth, disabled people, small-scale farmers, women's groups and churchgoers. The centre uses web portals through which users can receive societal information and conduct e-government transactions. Visitors to the centre can use a pin number to submit their tax returns via the Kenya Revenue Authority (KRA) website, hence they do not have to go to the KRA offices. Citizens can also check progress in processing identity documents online.

A major concern stated by the manager is that the poorest members of the community find it difficult to reach the centre, because of its location. This is mainly because of the expansion of Malindi to make it a tourist destination:

> *If I were given the chance, I would like to open one pasha centre in their village to cut the transport cost. They have to take two transport cars to come to the centre for around KES200 only to use KES30 at the centre. It doesn´t make sense and they have to come because they have no choice.*

Although the e-health aspect of the portal is not fully operational, this is the content that would be most useful to many user groups:

> *In Malindi there are many idle people. They do drugs, the girls are involved in prostitution. I don´t have e-health to teach them how to eradicate these issues. I would like to teach them the dangers of drug use and prostitution, the outcome of going into prostitution.*

INVESTIGATION B: LUKMEF, MENJI, CAMEROON

The community telecentre project is situated in Menji, in the department of Liebalem in the South Western region, and has a population of about 43 000. The area is isolated, with rugged, unpaved roads. This is a major concern for the managers of the telecentres, as the locals find it difficult to reach the centre. However, there are facilities such as a small motel, a hospital and a prefecture school. Almost the entire population in this area lives off agriculture.

The telecentre is referred to as a multipurpose community telecentre, financed by The Enhanced Heavily Indebted Poor Countries Initiative (EHIPCI). The project is also a part of the project 100 Télécentres Communautaires Polyvalents (TCP) founded by the Ministry of Posts and Telecommunications.

PLANNING HORIZON AND COLLABORATION

According to the Director, the Board of LUKMEF has decided to focus on using ICT in rural villages to achieve the following purposes: mobile banking for the rural poor; inter-tribal dispute resolution and conflict prevention; rural food security through weather forecasting; and improving primary school performance via the integration of IT with village school networks. The concepts are being developed by different teams. The director explains that the primary school performance project initiated in 2009 is supported by the American University of Dubai,

which is training a number of primary school teachers in the use of IT as a teaching tool. Menji currently has the only community telecentre in the department of Liebalem, which comprises 50 villages. The goal is to have a telecentre in each village. Future plans are to increase the number of available devices to provide better opportunities for access; to create a village centre where international calls can be made at lower cost; and to create a local website:

> *Our vision is to have telecentres in every village, at least in south western region and north western region. The important thing is not that people will come to the telecentre to send and receive their email, but our preoccupation is how people can communicate with the world, know human rights and distance learning.*

In the long term, the organisation plans to extend telecentres to other localities and villages. In the short term, the organisation plans to increase the number of computers to 15 at Menji, then to create a call centre for people to make international calls to family. In terms of achievement, the vision is limited by lack of software and materials:

> *Now we are using a local operator for the calls by using a credit card and we don't have these cards constantly and also it's expensive. It would be better and cheaper if people could contact family via Internet but there are no headphones.*

FIGURE 3 MENJI TELECENTRE, SUPPORTED BY LUKMEF, CAMEROON

Photo collage: Carole Godem, 2010

LOCAL OWNERSHIP

The telecentres in Cameroon were initially owned by the government and after a period of activity, they were handed over to the community, NGOs or village organisations. LUKMEF is an example of an NGO that took over operation of the local telecentre. One problem it encountered was that the available suppliers of telecommunications had not extended their networks to rural areas. The first solution to this problem was the establishment of mobile telecentres. Later, communities set up their own centres, displacing the mobile telecentres. Local people manage the telecentres, either in collaboration with NGOs or in collaboration with government.

Part of the focus is on trying to connect all telecentres to form a telecentre network. The long-term goal is to link all villages with each other and to create the foundations for future global interactions. Long-term planning is seen as important in order to promote human rights, distance learning and video conferencing, through ICT access. As regards human rights, LUKMEF believes that telecentres have the potential to bring peace among the different language groups. It is believed that by exposing the users to the world outside their own community through the content provided on the Internet, they will come to better understand one another and their own human rights. It is believed that such access to knowledge has the potential to reduce conflicts of interest among different societal groups. The Director stresses that these views are still in the conceptual stage, with the project having commenced in 2009: The idea of creating such a project is necessary to the population. This is the case with the resolution of conflicts, because it can enable village leaders in conflict to resolve their conflicts without ever meeting, by teleconference.

COMPETENCE NETWORK

To achieve these ideals, LUKMEF has national and international partners. The national network of telecentres meets every three months, providing a platform for managers to discuss the difficulties encountered in their centres, and to exchange experiences and share ideas. A benefit in this kind of telecentre network is that it provides technical support to telecentres, including the one in Menji. To take care of key issues in telecentres, managers are trained at the school, Nationale Supérieure des Postes et Télécommunications de Yaoundé:

> *We want to receive training in computer management and maintenance because when a device fails we are forced to move to another town to fix it, and this is risky and very expensive considering the distance and poor roads.*

The infrastructure and level of education among the locals makes it difficult to maintain a high standard of equipment:

> *We don't have people who can make computer maintenance. If something happens with the computers we are forced to go to the town, which is difficult for us and expensive … We wish to have an engineer here to solve some problem, because it is a risk to go to town to maintain the computer because of the roads.*

The telecentre experiences the most basic hardware and software problems including mouse, keyboard and operating system failure.

LANGUAGE USAGE

Language occupies an important place in the management of the Menji telecentre. There are three spoken languages in Menji, namely French, English and Bamgwa, a local dialect.

From the outset, language was seen as being a hindrance to our development. Thus the management team consists of people originated from Menji to resolve problems related to language.

To make the centre accessible to the majority of the local population, telecentre staff translate and write documents in the local language. There are plans to extend the translation and the creation of websites in local languages of the region:

> *We help people who don't speak English and/or French by translating into and out of the local languages, creating e-mails and playing the role of intermediary for those who are non-computer literate …*

DOCUMENTATION AND MEASURABLE RESULTS

To ensure the work done by managers is fruitful, they document their progress and record information on the increasing number of clients and trainees:

> *The results, are positive, we note for example an increasing number of clients and trainees.*

The centre also receives a grant from the government via the Ministry of Posts and Telecommunications, and sometimes it receives external support. Overall, however, they cannot say much about how to measure results and impact:

> *The performance indicators that we have used until now are limited to the number of people coming to the telecentre. In terms of measuring the economic impact on the village, we cannot yet say much.*

The project uses policy documents provided by the Ministry for Post and Telecommunications, Minpostel, to identify whether they are working towards the set goals of the Ministry. The Ministry has set short- and long-term goals with regard to telecommunication, delivery times of ICTs, and usage among the people.

TARGET GROUPS

Users of the centre - data ascertained from interviews and observations - include local community members and passing professionals, small businesses, schools, disabled people, women's groups, clinics, hospitals and healthcare workers, NGOs and community-based organisations, trade unions, and government departments.

The managers undertake campaigns among the groups in the centre. One such campaign is summer training. During three months, for a price of FCFA5 000 (approximately EUR7,62), they teach different groups and especially women to use ICT. On occasion, the centre offers discounts or the usage of Internet free of charge.

There are still problems in reaching people, particularly the women in the community, as women are generally engaged in childcare and household labour, leaving little time for other activities.

The few women who come to the telecentre are teachers and students, most of them young:

> *Time after time we try to convince other women to come to the telecentre, showing them the importance of ICT in daily life, and they are interested and share this knowledge with other women.*

Organisations are considered the village elite by one manager:

> *Our plan of implementation is to consult the village elites in order to identify local needs for new information technologies and communication. Then they (will) consult the people on the eventual establishment of the centre.*

In the long run, the centre wants to expand the target groups and make the centre adequate and better equipped for the farmers. For this vision to be achieved, it must rely upon local knowledge:

> *The administrative management of (the) telecentre will be ensured by the indigenous in the long term. The villagers will also be responsible for feeding the site regularly with information such as tourism opportunities, groups and associations, agriculture and especially on culture.*

ANALYSIS: UNDERSTANDING TELECENTRE DEVELOPMENT THROUGH AN ARCHAEOLOGICAL EXPLORATION OF TECHNOLOGY, ARTEFACTS AND BEHAVIOUR

The rationale for investing in the telecentre projects is similar in both cases. One difference is that LUKMEF directed its focus towards social arrangements (bringing peace among societal groups), while YNet International placed its focus on both social arrangements (equality) and material culture (connecting villages to each other). Both centres believe that language is a barrier to equality and thus language is an important medium for building mutual understanding and learning.

In both projects, large organisations are important collaborators. These collaborations generate both intellectual and economic contributions, though these contributions are based on ideas external to the resource-poor environment. As a counterbalance, YNet's work and decisions are largely based on the manager's local knowledge. LUKMEF organises general meetings to enable managers to make common decisions and learn from each other.

Since this study only covers the views of managers, not users, Bleed's "results" are presented as "desired results". These desired results inform the telecentre design. As the telecentres illuminated in this paper develop their features, services, artefacts and technology, the nature of technology use and adaptation will become clearer, enabling further exploration using behavioural archaeology.

The cases of the Malindi and Menji telecentres provide a basis for considering how Bleed's Content and Results may be used to analyse the adaptive development of telecentres (see Table 2).

TABLE 2: A BEHAVIOURAL ARCHAEOLOGY VIEW OF TELECENTRE FORMATION, DRAWING ON BLEEDS (1997)

	YNet International, Kenya	LUKMEF Cameroon
Content		
Knowledge	Local knowledge of language, international knowledge of technology introduction, local knowledge of technology usage	Local knowledge of language, international knowledge of technology deployment and usage for a defined purpose, local knowledge of local needs in an HIPC*
Applications	Access to societal information, e-government applications such as tax transactions	Mobile banking for the rural poor; inter-tribal dispute resolution and conflict prevention; rural food security through weather forecasting; improving primary school performance
Standards	Objectives of greater rural-urban and female-male equality expressed in Vision 2030	Human rights and mutual respect
Technology	**Use of all types of ICT to achieve a desired result**	
Desired results		
Material culture	Disconnected villages in resource-poor environments become digital villages connected nationally and globally	Telecentres connect villages to each other and to global communications
Environmental modifications	Improved electronic communications infrastructure and electrification/power	Improved electronic communications infrastructure and electrification/power
Social arrangements	Socialisation includes ICT in education, small business, e-government and other social and economic sectors	Information exchange, socialisation and networking increases mutual respect and reduces conflict amongst different groups in society
Adaptive success	Would be seen to be achieved when women from different language groups can use the services on equal terms with men...	Would be seen to be achieved when people from different societal groups use the services in ways that build mutual benefit and reduce conflict

*HIPC - heavily indebted poor countries

In considering how to enable remote populations in resource-poor environments to enjoy the benefits of ICT and presenting ideas to inform the future design of telecentres, the behavioural archaeology approach appears to have merit in illuminating the path for decisionmakers if they strive to explore the relationship between content, technology and results as discussed above.

CONCLUSIONS

The projects in Kenya and Cameroon may have either a low or high impact on the society in general and on communities in particular. It is not clear whether the digital villages will bridge the digital divide between rural and urban communities, reduce inequalities between the sexes, or bring peace and understanding among language groups. Planning for the future of telecentres can focus upon:

1. Implications for adaptive success in society.

2. Implications for adaptive success for practitioners.

IMPLICATIONS FOR ADAPTIVE SUCCESS IN SOCIETY

From the two project reviews presented, it can be deduced that there are high expectations of what electronic communications and ICT can offer communities in resource-poor environments. It is expected that the access to information, knowledge sharing, social networking, and online public services made possible through electronic communications can offer the opportunity to craft changes in the social arrangements and material culture of society, thereby addressing issues such as gender equity and ethnic conflict. It is envisaged that technological collaborations can be used to share ideas, so as to enhance the quality of life of rural communities by providing access to local or indigenous knowledge, as well as provide information on advances in a wide range of technologies that may be of interest. In the resource-poor communities visited in this study, knowledge connectivity is becoming an integral part of the developmental processes of the society. Telecentres are becoming instrumental in providing network connectivity for people in otherwise isolated environments.

The projects show resource-poor communities in the early stages of adoption and adaptation with respect to ICT. In order for the telecentres projects to eventually achieve success in transforming the indigenous way of life, a process directed towards adaptive success is required. The process must be able to enable communities to retain the cultural artefacts that they value, while also experiencing social progress. Measures towards adaptive success can be designed through the application of an analytical framework such as behavioural archaeology to understand resource-poor environments and to develop in ways that enable local people and communities to create their own ICT technology-enabled environments through telecentres or adaptations of telecentres.

IMPLICATIONS FOR ADAPTIVE SUCCESS FOR PRACTITIONERS

With an eye on adaptive success, managers of telecentres can use a stylised behavioural archaeology map, such as that presented in Table 2 above, to progressively upgrade and enhance the use of telecentres in ways that draw on how people in the local environment use and learn to use ICT technological devices and services. Rather than introducing technology from the perspective of the collaborating partner, technology can be introduced from the perspective of what the user requires and how the user adapts his or her technology use to achieve equality or conflict resolution. Such an approach can strengthen national and international collaborations and promote the establishment of the proposed telecentre networks.

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FOUR: ENABLING g-GOVERNMENT IN THE GAUTENG CITY-REGION

Chris Wray,
Gauteng City-Region Observatory (GCRO), a partnership between University of Johannesburg, University of the Witwatersrand and Gauteng Provincial Government

Rex van Olst,
School of Electrical and Information Engineering, University of the Witwatersrand

ABSTRACT
The term g-government, a subset of e-government, was first introduced in 2000 as the convergence of geographical information systems (GIS) and the Internet to create more effective government interaction with citizens. More recently, it has been revised to describe the combination of GIS and Web 2.0 technologies that can enhance government services and delivery. Most government data is spatially based and can be visualised and interpreted using a Web GIS mapping application, but this data is often not available to other government departments, or the general public, frustratingly so.

In South Africa, problems with accessing spatial data continue to exist. The Gauteng City-Region Observatory (GCRO) recognised that g-government remains a challenge within the Gauteng city-region (GCR), and in 2010 developed a GIS website for the GCRO and Gauteng Provincial Government. This article is presented in the context of the global shift to fully connected governments through technologies such as Government 2.0 and g-government. It provides a specific focus on the GCRO GIS website and how it enables g-government by providing local and provincial government with the spatial data and tools required to better understand the city-region, and to make informed decisions about future development in the city-region. The article also reviews Technology Acceptance Model (TAM) scores measured at the launch of the website. Finally, monthly website visits are examined. This confirms that local and provincial government are ready to utilise the g-government website.

KEYWORDS:
effective government, g-government, GIS, spatial data

BACKGROUND TO e-GOVERNMENT IN THE GAUTENG CITY-REGION

The Gauteng city-region (GCR) is an integrated cluster of cities, towns and urban nodes that together constitute the economic heartland of South Africa (Figure 1), accounting for 34% of national Gross Domestic Product (OECD, 2011). It is anchored by the three large metros of Johannesburg, Tshwane and Ekurhuleni, with a number of smaller urban centres that extend across the Gauteng Province to create an almost continuous urban agglomeration. The economic footprint of the GCR, however, extends beyond the border of Gauteng to include Rustenburg in the north-west, Potchefstroom and Klerksdorp in the south-west, Sasolburg in the south and Witbank, Middleburg and Secunda in the east. All of these centres are functionally integrated with the cities and towns of Gauteng and represent an extended GCR with a total population of 13 million that spills over into the three neighbouring provinces of North West, Free State and Mpumulanga.

The GCR is currently facing major socio-economic challenges. These include high unemployment rates (26.9% in Quarter 1, 2011), alarming levels of economic and spatial inequality and poverty (22.3% of households living in informal or traditional dwellings), persistent public housing backlogs and mounting environmental challenges such as rising water contamination and air pollution (OECD, 2011).

FIGURE 1: THE GAUTENG CITY-REGION (GCR)

Source: Wray, 2011

The GCRO was established in 2008 as a partnership between the Gauteng Provincial Government (GPG), the University of Johannesburg (UJ) and University of the Witwatersrand, Johannesburg (Wits). Local government is also represented on the GCRO board. Behind the motivation for setting up the GCRO is a vision for South Africa's economic heartland as a region that is competitive, spatially integrated, environmentally sustainable and socially inclusive. Better planning, management and cooperative government relies on improved data, information, analysis and reflective evaluation, which the GCRO seeks to provide.

A measure of success of the GCRO will be the provision of information such as the results from the 2009 Quality of Life survey,[1] in a usable format that is understood and used by government to develop future policies and programmes, as well as by the public to interact with the data or use it for their own purposes. GCRO recognised the need for g-government within the Gauteng city-region and a project was initiated at the start of 2010 to develop a Web 2.0 GIS mapping application to provide publicly accessible spatial data describing the GCR and to serve as a model for a g-government website.

1 The first Gauteng city-region-wide Quality of Life/customer satisfaction survey, completed in 2009, measures a wide range of issues such as levels of satisfaction with government services, poverty, socio-economic status, movement within the GCR and quality of life.

This article discusses the early introduction of g-government in South Africa in the context of a global shift to fully connected governments through technologies such as Government 2.0, g-government and opening access to government spatial data. The example of the GCRO GIS website will be considered in terms of how it enables g-government by providing both local and provincial government with the spatial data and tools required to better understand the GCR, and make informed decisions pertaining to future development. The website's initial acceptance, measured using a Technology Acceptance Model questionnaire, and subsequent usage is reviewed to provide an indication of the adoption of g-government applications by provincial and local governments governing the GCR.

DISCUSSION OF THE LITERATURE: THINKING GOVERNMENT 2.0

As the world advances towards an increasingly connected and spatially enabled Internet society, citizens and stakeholders are demanding that governments deliver more effective and efficient services as conventional governmental systems fail to address the current challenges of increasing globalisation, crime, poverty, pandemics and service delivery failure (Hughes, Macmillan & Medd, 2008). The post-apartheid phenomenon of violent service delivery protests in South Africa, with Gauteng as the most protest-afflicted province in 2010 (SABC, 2011), highlights the need for rapid improvements in service delivery, requiring new management tools. Governments need to respond to these new challenges and redefine how they manage and share information, make policies and deliver services. Hughes, MacMillan and Medd (2008) proclaim: "Change your world or the world will change you" in their report on the future of collaborative government and Web 2.0.

Web 2.0 is a second generation of web development and design technology, focusing on facilitating communication, information sharing, interoperability and collaboration on the Internet (Wikipedia contributors, 2009a). Web 2.0 is not just about new technologies such as blogs and wikis, it represents a shift in culture that views the Internet as a platform for deploying services, rather than merely as a source of information from static web pages (Hughes, Macmillan & Medd, 2008). Web 2.0 promotes the principles of sharing, collaboration and data integration on the Internet.

Internet users have embraced public Web 2.0 applications such as Flickr, MySpace, You Tube, Facebook and more recently the social networking and micro blogging application Twitter. The statistics are staggering, with over 500 million active users on Facebook (Facebook, 2010) and 190 million users tweeting 65 million times a day on Twitter (Schonfeld, 2010). Examples of Web 2.0 GIS websites include the commercial web mapping applications such as Google Maps, Microsoft Bing Maps, Google Earth, Yahoo Maps and Mapquest (Fu & Sun, 2011a). The use of these online map applications is also impressive with nearly a billion people having used Google Maps and at least 500 million having downloaded Google Earth (O'Doherty, 2010). Businesses and enterprises have similarly realised the advantages of Web 2.0. The 2009 McKinsey global survey reports that 69% of respondents' companies have gained measurable business benefits, such as more innovative products and services, more effective marketing, better access to knowledge, lower cost of doing business and higher revenues (McKinsey & Company, 2009). Companies are making use of social networking applications such as Facebook,

blogs and wikis to actively engage with customers and staff (Websense, 2008). Despite the recent recession, respondents also reported that they would continue to invest in Web 2.0 (McKinsey & Company, 2009).

When collaborative government, simply defined as working in conjunction with others (Wanna, 2008), is empowered by Web 2.0 technology, the result is referred to as Government 2.0. Government 2.0 is about leveraging the power of Internet-based Web 2.0 tools to change the way governments interact with society, share information and ultimately, achieve better outcomes for citizens (Hughes, Macmillan & Medd, 2008). g-Government relates to the use of electronic maps to improve Government 2.0. The value of GIS and spatial data to governments should be better understood, as much of government data is spatially based and is best visualised and interpreted using a Web GIS mapping application. For more than a decade, GIS remained a tool used only by GIS professionals, limiting the full potential of GIS as an analysis and problem solving tool (Pratt & Fu, 2011). Web 2.0 mapping applications such as Google Earth, however, have revolutionised public access to spatial data and GIS technology, forever altering public expectations of what is possible online. Governments need to meet these expectations by spatially enabling their data and systems with fresh innovative Web GIS mapping applications and opening access to their vast resources of data.

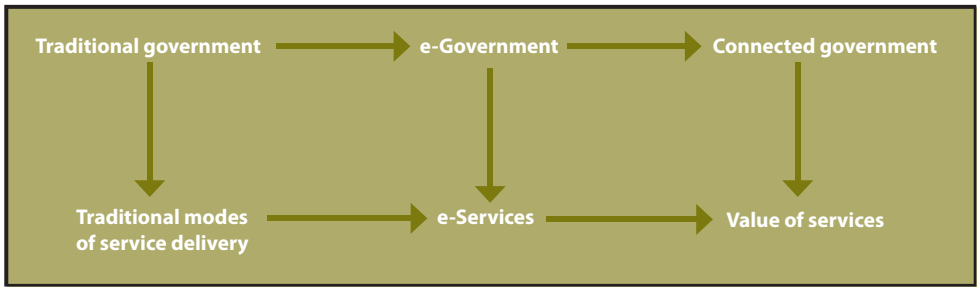
There are still many barriers to overcome as "constraints on access to data remain one of the greatest challenges to extending the use of Web GIS in government" (Pratt & Fu, 2011). Studies in Singapore have revealed that 83% of government departments required spatial data, but only 35% had access to the data and a mere 40% of spatial data was shared (Dasgupta, 2010a). A similar situation exists in South Africa, as Sharif (2009) has indicated there are still problems accessing government information, a concern that the Gauteng City-Region Observatory is attempting to address.

Governments around the world need to change the way they function and interact with society, or they will fail to overcome today's current challenges and will alienate their citizens (Hughes, Macmillan & Medd, 2008). This need has been primarily spurred by citizens around the world placing new demands on governments to reform the public sector (United Nations, 2008).

> *The days of governments at all levels – national, state/provincial or local – operating primarily as singular entities are over. Tomorrow's governments cannot deliver the policy outcomes that society expects if they continue to hold onto yesterday's monolithic-leadership model* (Hughes, Macmillan & Medd, 2008).

The evolving approach to public service delivery is illustrated in Figure 2 with an initial shift from traditional government and modes of delivery to e-government and e-services, to a new paradigm of a fully connected government committed to enhancing the value of services available for all citizens (United Nations, 2008).

FIGURE 2: EVOLVING APPROACH TO PUBLIC SERVICE DELIVERY



Source: United Nations, 2008

The first wave of e-government, which focused on "the use of information and communication technology to provide and improve government services, transactions and interactions with citizens, businesses and other arms of government" (Wikipedia contributors, 2009b), was a significant step forward with regard to interacting with and making information available to citizens. Web 2.0 is proposed as the latest technological initiative to assist in bringing governments closer to their citizens (Hui & Hayllar, 2010) and opening access to government data, ushering in a second wave of e-government.

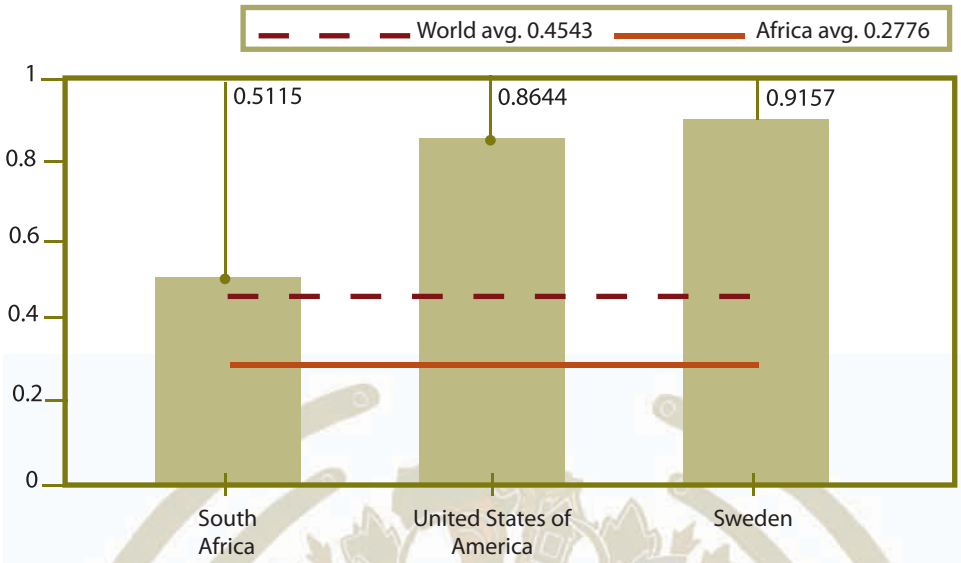
However, governments themselves have not been transformed and need to embrace a new networked model of government (Hughes, Macmillan & Medd, 2008). This need to transform, together with emerging Web 2.0 technologies, will facilitate a new form of collaboration to improve how governments function together with other governments, non-governmental organisations (NGOs), the private sector and citizens, to solve complex problems and enhance service delivery. Elements of Government 2.0 include collaboration, mashups, social networking, user generated content such as crowd sourcing and Volunteered Geographic Information[2], cloud computing and open systems (Evans, 2010).

The 2008 United Nations survey report of e-government readiness[3], which presents an assessment of e-government progress across the world, ranked South Africa 61 out of a total of 189 countries, with an e-readiness score of 0.5115 (United Nations, 2008). The survey was led by Sweden (0.9157) followed by Denmark, Norway and the United States. Africa as a region lagged far behind the world average of 0.4543, with a score of 0.2776 (Figure 3).

2 Volunteered Geographic Information (VGI), is defined by Goodchild (2007) as the creation of geographic information on the web by large numbers of private citizens.

3 The e-government readiness index is a composite index comprising the web measure index, the telecommunication infrastructure index and the human capital index, with the survey focusing mainly on the "government to citizen" (G to C) and "government to government" (G to G) aspects of e-government (United Nations, 2008).

FIGURE 3: 2008 E-READINESS COMPARISON



Source: United Nations, 2009

The E-Government Survey 2010: Leveraging e-government at a time of financial and economic crisis, concludes that "citizens are benefiting from more advanced e-service delivery, better access to information, more efficient government, management and improved interactions with governments, primarily as a result of increasing use by the public sector of information and communications technology" (United Nations, 2010). However, of concern is the decline of South Africa's ranking from 61 to 97 out of 184 countries, with an e-government development index[4] score of 0.4306, its lowest score since the first global e-government survey report was released in 2003. This 2010 index score, listed in Table 1, places South Africa fourth in the African region, behind Tunisia, Mauritius and Egypt.

The reason for South Africa's drastic drop in rankings is not given in the report, but may in part be due to significant changes to the survey instruments that were introduced, which focused more on how governments are using websites and portals to deliver public services and increase opportunities for their citizens to participate in decisionmaking (United Nations, 2010). The majority of the countries' rankings decreased slightly compared with the 2008 survey, but the report makes a pertinent point: "a drop in a country's ranking may serve as a reminder of the need to devote greater resources to improving online services and expanding access to telecommunication infrastructure" (United Nations, 2010). These pointers serve as important foci for the South African government in improving e-government services.

4 e-Government development index is a weighted average of three normalised scores on the most important dimensions of e-government, namely: scope and quality of online services, telecommunication connectivity, and human capacity (United Nations, 2010).

TABLE 1: 2010 UNITED NATIONS RANKING OF E-DEVELOPMENT IN AFRICA

		e-Government development index value		World e-government development ranking	
Rank	Country	2010	2008	2010	2008
1	Tunisia	0.4826	0.3458	66	124
2	Mauritius	0.4645	0.5086	77	63
3	Egypt	0.4518	0.4767	86	79
4	South Africa	0.4306	0.5115	97	61
5	Seychelles	0.4179	0.4942	104	69
6	Cape Verde	0.4054	0.4158	108	104
7	Libya	0.3799	0.3546	114	120
8	Botswana	0.3627	0.3647	117	118
9	Lesotho	0.3512	0.3805	121	114
10	Gabon	0.3420	0.3228	123	129
	World average	0.4406	0.4514		

Source: United Nations, 2010

At the 2008 Govtech conference, national government decisionmakers promised that the South African government would not be left behind and was working towards a Government 2.0 model with real time access to information for both government and its citizens (Du Toit, 2008). The R2.5 billion "Who am I" online project with smart identity cards, by the Department of Home Affairs, was listed as a prime example of a Government 2.0 project. However, previous failures of expensive government IT applications and projects, such as the R408 million eNaTIS project, which made headlines as a result of a number of system failures and shortcomings raised by the Auditor-General (Hoskin, 2008; SAPA, 2007), may influence government's willingness to adopt and invest in new applications and technology. The web as an information sharing tool is also restricted within some government spheres, with a number of local municipalities struggling to get broadband Internet access (Tate, 2005), a situation which has not changed significantly in recent years. e-Government and Government 2.0 remain a challenge in South Africa.

G-GOVERNMENT (WEB 2.0 GIS) AND OPEN ACCESS TO PUBLIC DATA

g-Government is defined as using the Internet and GIS to create more effective government (Thomas, 2001). The g-government definition has been recently updated by describing the use of GIS and new Web 2.0 technologies as g-government (Tickner, 2009). According to Dangermond, ESRI President, it is all about Web GIS extending the vision of e-government (Artz, 2009). Approximately 80% of government data is spatially based (Pratt & Fu, 2011) and can be best visualised and interpreted using a Web GIS mapping application. Tickner (2009) states that g-government can enhance the way governments connect with citizens by hosting map web portals to organise and display the vast government data resources.

As a key component of the Web 2.0 revolution, O'Reilly (2005) recognised that data would provide the competitive advantage in harnessing collective intelligence: "Data is the 'Intel Inside' of the next

generation of computer applications". Parsons (2010), a geospatial technologist at Google, expands this by stating that "there is a simple relationship between ease of access to information and economic activity". Although not as yet quantified, each new technological advance that resulted in more effective publication and distribution of information has generated massive economic activity by creating new markets and businesses (Parsons, 2010). O'Reilly quotes the example of the Apple iPhone that has attracted some 150 000 applications, but almost none of which were developed by Apple itself (Chafkin, 2010).

INTERNATIONAL EXAMPLES OF G-GOVERNMENT

The United States has been a strong supporter of g-government, where in 2000 the term "G-Gov" first appeared when then Vice President Gore realised its potential: "We have an unparalleled opportunity to turn a flood of raw data into understandable information about our society and planet" (Tickner, 2009). As compared to other parts of the world, where GIS adoption has been slow due to government data not being freely available, government data in the United States has been made freely available for a number of years, resulting in the widespread use of GIS and varied GIS applications (Ball, 2009). The MD iMap viewer utilised in the State of Maryland is just one example of a Web 2.0 mapping application which provides both government and public access to the State's enterprise GIS, by combining maps with government performance statistics and graphs in a rich Internet application (RIA) (ESRI, 2009). The initiative was recognised by President Obama during an address to the National Governors Association on 23 February, 2009: "Instead of passing the buck on accountability and efficiency, governors like Martin O'Malley and Governor Kaine have revolutionised performance management systems, showing the American people precisely how their governments are working for them" (ESRI, 2009).

Other countries are also beginning to realise the importance of g-government and open access to data. The United Kingdom's (UK) Ordnance Survey (OS), which traditionally charged for access to its data, launched the OS OpenData initiative on 1 April 2010. OS OpenData is an online portal providing free access to a range of GIS layers (Ordnance Survey, 2010a) and web map development tools such as the OS OpenSpace API (Application Programming Interface). The quote below, from Ordnance Survey Communities Secretary Denham, summarises the benefits of g-government and opening access to public data:

> "This shows the UK is at the cutting edge of a digital revolution. The move to free up public data encourages fresh thinking – people re-using information in different and more imaginative ways than may have originally been intended. A seemingly endless stream of new applications and websites continues to show the potential of combining information, creative vision and digital technology. Increasing access to Ordnance Survey data will attract a new wave of entrepreneurs and result in new solutions to old problems that will benefit us all. It will also drive a new industry, creating new jobs and driving future growth. The changes signal a wider cultural change in Government based on an assumption that information should be in the public domain unless there is a good reason not to – not the other way around. Greater openness, accountability and transparency in Government will give people greater choice and make it easier for individuals to get more directly involved in issues that matter to them" (Ordnance Survey, 2010a).

The UK government is further enhancing the use of government data through the "Show us a better way" website run on behalf of UK government by the Power of Information Taskforce (Power of Information Taskforce, 2010). The website promotes new and innovative uses of public government datasets, through a competition that funds good ideas of proposed applications to be built with public information, with examples such as crime mapping, fix my street and farm subsidy maps. Ordnance Survey has a specific GIS-based competition called GeoVation, innovation through geography, which aims to help "communities address their unmet needs through the application of geographic data, skills and expertise" (Ordnance Survey, 2010b). These are excellent examples of a true realisation of Government 2.0 and g-government, with citizen participation in uploading data and presenting ideas to the government, and government supporting and funding the use of government data and development of applications that meet the needs of communities.

G-GOVERNMENT IN THE SOUTH AFRICAN CONTEXT

South Africa has numerous spatial data policies and legislation in place, such as the Promotion of Access to Information Act (Act 2 of 2000) and Spatial Data Infrastructure (SDI) Act (Act 54 of 2003), that were designed to promote access to information. However, there are still problems accessing government or public sector information (PSI) in South Africa, such as:

- "Open availability of information.
- Lack of systematic approach to collect, manage and store the data.
- Institutional and socio-cultural barriers.
- Poor quality and quantity of data and information at municipal levels.
- Timeliness of information.
- Reliability of information (use of private external consultants and the difficulty to verify and trust the methodologies used in these reports).
- Lack of the culture of appreciating the value of PSI" (Sharif, 2009).

Clarke, Chief Director: National Geo-spatial Information in the Department of Rural Development and Land Affairs, argues that institutions continue to operate in silos with limited cooperation between key stakeholders (Dasgupta, 2010b). Sharif (2009) maintains that it is not the policies that are the problem, but rather the implementation of PSI policy. For example, it has taken seven years from the promulgation of the SDI Act to the formation and first meeting of the Committee for Spatial Information (CSI), a committee responsible for the successful implementation of South Africa's SDI and for ensuring that South Africa makes effective use of its geospatial data for the benefit of all its citizens (Van Zweiten, 2010).

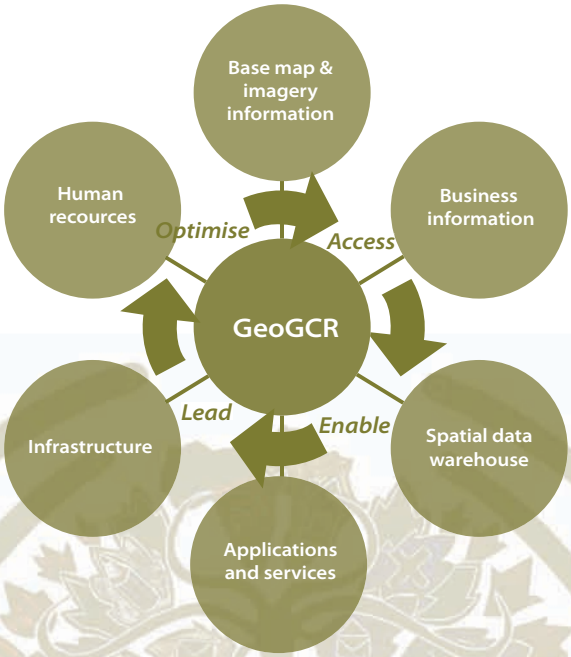
Many of the national base mapping layers such as 1:50 000 topographical layers and 1:10 000 orthophoto map series are freely available from the national mapping organisation, the Chief Directorate National Geo-spatial Information (CDNGI) (Vorster & Duesimi, 2010). However, access to the CDNGI data is obtained through manual requests and a copy of the data delivered on a DVD (Digital Versatile Disc) or hard drive. The CDNGI is attempting to rectify this by developing a multi-server environment to provide seamless direct access to all the CDNGI's spatial and related data through an Intranet/Internet web portal with Web Feature Services (WFS) and Web Map Services (WMS) (Vorster & Duesimi, 2010).

At a provincial level, data is not publicly accessible and it is often only available to other provincial or local departments through personal relationships. The Cape Urban Observatory (CUO) is working on a Memorandum of Understanding (MOU) between the Western Cape Provincial Government and the City of Cape Town (Cape Urban Observatory, 2009). "These negotiations aim to facilitate formal relations between the two organisations, reducing the reliance on personal relationships and providing a clear data sharing framework" (Cape Urban Observatory, 2009). Furthermore, improved integration of spatial data between national, provincial and local government in the Western Cape is being facilitated by the CUO through the development of a regional SDI (Smit, Makanga, Lance & De Vries, 2009).

Within the GCR, online access to spatial information in the GPG is limited and not publicly accessible via web mapping services. Furthermore, some GPG staff have expressed frustration with the lack of access to shared spatial information within the various Gauteng departments (Wray, 2009). The Gauteng Department of Economic Development (GDED) has recognised the need to fundamentally transform provincial information service delivery and launched an ambitious project in 2010 called the GeoGCR, or Geographic Information System for the Gauteng City-Region (GDED, 2008; Kekana, 2010). The project, depicted in Figure 4 aims to provide:

- Access – through the establishment of a single gateway to provincial geographic information.
- Enablement – by spatially enabling the public sector.
- Optimisation – by defining the legal, hardware and software requirements to make use of the latest mapping technologies.
- Leadership – by leading the way in public sector data and infrastructure provisioning and meeting the business needs of each stakeholder.

FIGURE 4: THE BUILDING BLOCKS OF THE GAUTENG GEOGCR



Source: Kekana, 2010

Web GIS applications are available at a municipal level within the larger metropolitan municipalities in the GCR. A study by Ogra and Singh (2011) assessed the geospatial readiness of Ekurhuleni, City of Johannesburg and City of Tshwane metropolitan municipalities in terms of "geospatial readiness of local governments in providing Web-enabled citizen centric services". The study concluded that the level of e-governance services are at differing levels of maturity within local government, with existing citizen access to basic information such as water supply, electricity and building plans, but with further scope for the integration of and access to citizen centric services such as solid waste management, emergency services, social and other community assets. Ogra and Singh (2011) also recommend that municipalities should strengthen their decisionmaking for better planning, governance and management, through geospatial analysis across various municipal services.

It is clear that in order to overcome the many policy implementation problems, to create effective public services and ensure open and easy accessibility to government data, a high level of coordination and collaboration is urgently required (Sharif, 2009). Some of the measures proposed by Sharif (2009) include: increasing the awareness about the importance of public sector information and implementing new follow-up, monitoring and evaluation methods and activities to ensure effective utilisation of public sector information. This is the role that the newly formed CSI has to fulfil in order to meet the geospatial needs of the country, and the GCRO has to fulfil to satisfy the g-government requirements for the GCR.

GCRO GIS WEBSITE DEVELOPMENT

There was an initial focus by the GCRO, in its first year of operation in 2009, to collect existing government base datasets and generate new datasets to be used to map and research the city-region. Various maps were prepared and made available as pdf/jpeg downloads on the GCRO website (www.gcro.ac.za). However, the GCRO recognised that in order to ensure that the GCR information was fully utilised, the GIS maps and data needed to be visualised in a dynamic interactive GIS website. This website would enable the users to have a better understanding of the GCR by providing base data and thematic layers offering different perspectives of the GCR, such as population distribution, poverty and the 2009 Quality of Life survey results as maps and dynamic graphs; and GIS analysis tools for the user to make better informed decisions and policies regarding the future development of the GCR.

The primary users of the application were identified as the main GCRO stakeholders, namely the GPG Planning Commission, GPG Office of the Premier, GPG Department of Economic Development, local government officials and other GCR government agencies. These users are responsible for planning the future development and direction of the GCR and are mostly high-ranking government officials with minimal mapping or GIS experience. Hence the need for a simple "Google Maps-like" Web GIS design. Public access was also a requirement to ensure open access to information about the GCR, through the Internet, to all GCR citizens.

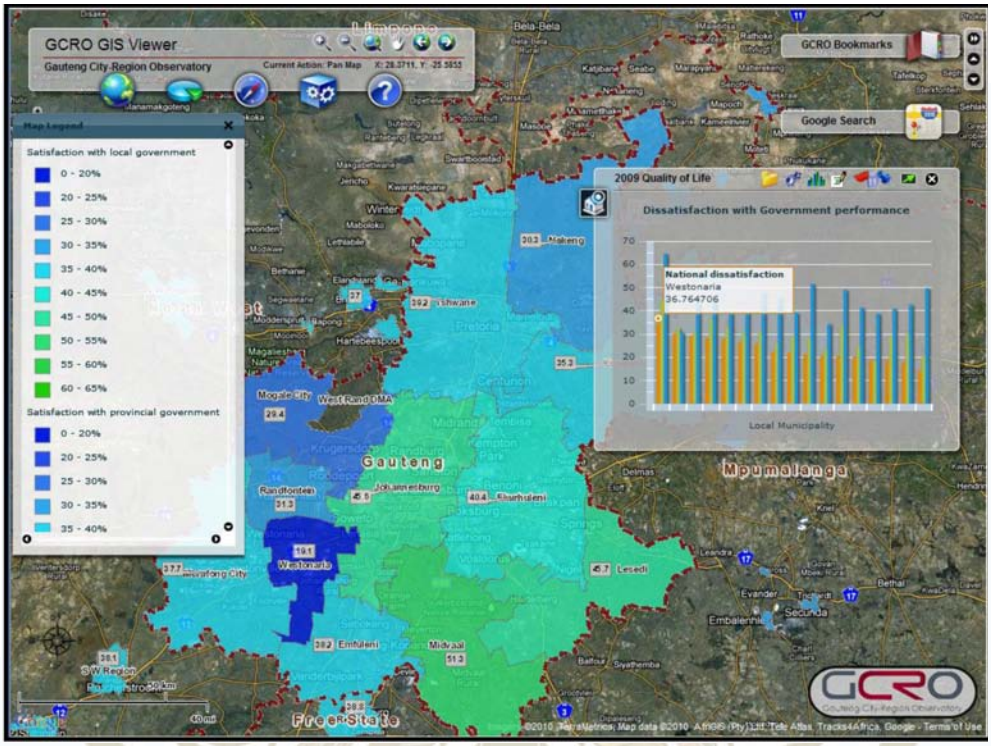
To obtain and maintain the latest data from the local and district municipalities and provincial governments constituting the GCR would require a devoted effort, given that data availability, accuracy and currency varies greatly across the different authorities. Many freely available mapping websites such as Google Maps offer more up-to-date imagery and base layers, such as streets, than the data available within government departments. GCRO recognised that online spatial datasets can provide a viable alternative to sourcing base datasets, including imagery and streets, and deliver seamless mapping coverage across a wide area. Web 2.0 technologies such as data mashups and APIs provide the tools to access these online datasets.

There are numerous sources of online base datasets: Google maps, Bing maps and ESRI online resources. Other sources include open data initiatives, such as OpenStreetMap, which offer free (licensed under the terms of the Creative Commons Attribution Share-Alike 2.0 licence) downloadable street datasets for the world (OpenStreetMap, 2009). Google Maps was found to offer the most up to date imagery and dynamic functionality such as Google street view, and was therefore selected to provide the base layers in the GCRO GIS website application.

With regard to the various GIS layers that had been assembled, the GIS data was divided into several themes that users could interact with individually, or overlay layers from different themes. Six themes were prepared for the first release of the viewer, namely: GCRO administrative layers, demographics, GCRO 2009 Quality of Life Survey, economic, spatial structure and transport data. The development of these data themes is an ongoing process as more GCR data becomes available or is generated from GIS data projects or analysis.

The GIS website, developed using ESRI software with the Adobe Flex API, is viewable in all the main Internet browsers (such as Internet Explorer, Safari, Firefox and Google Chrome), but does require the Adobe Flash Player plugin (version 9) to be installed. The website offers comprehensive base data and thematic layers covering the GCR, and is fast and easy to use, with a fun element of RIA popup windows and dynamic graphs. An example is provided in Figure 5 with the 2009 Quality of Life Survey "satisfaction with local government" layer shown on the map, and "dissatisfaction with government performance" drawn in the graph.

FIGURE 5: QUALITY OF LIFE (QOL) DYNAMIC THEME WITH GRAPH



Source: Wray, 2011

GCRO GIS WEBSITE LAUNCH AND SUBSEQUENT USAGE

The GIS website was formally launched by the Observatory on 1 September 2010, with launch sessions held over three days at the Wits School of Electrical and Information Engineering's computer lab. Each session focused on a different group of users, ie government GIS specialists, local government officials involved in planning, and provincial Heads of Department. After an introduction explaining the business need for the GIS website and development process, an interactive demonstration of the website was presented, with participants able to actively interact with the various tools and datasets using the engineering lab computers. Attendees then evaluated the website by completing an online questionnaire, designed to measure user acceptance of the new application, using the Technology Acceptance Model (TAM), the most widely employed model of IT adoption and use (Venkatesh & Bala, 2008).

In response to the question regarding website usage, the 38 respondents were unanimous in agreeing that they would utilise the website, with an average TAM score of 6.82 out of a possible 7 for behavioural intention to use. This is supported by comments from the questionnaire such as:

> *Our district does not have access or rather developed systems to access some geographical data, therefore this website will definitely help us access some of this information and improve the effectiveness in our tasks.*

In terms of usage, two thirds of the respondents (68.4%) replied that they would use the website on a daily or weekly basis, with the main use of the website identified as accessing GCR data (87%), followed by 71% of respondents intending to use the website to assist with planning. The overwhelmingly positive response is evident in the Wordle[5] graphic of launch questionnaire comments (Figure 6).

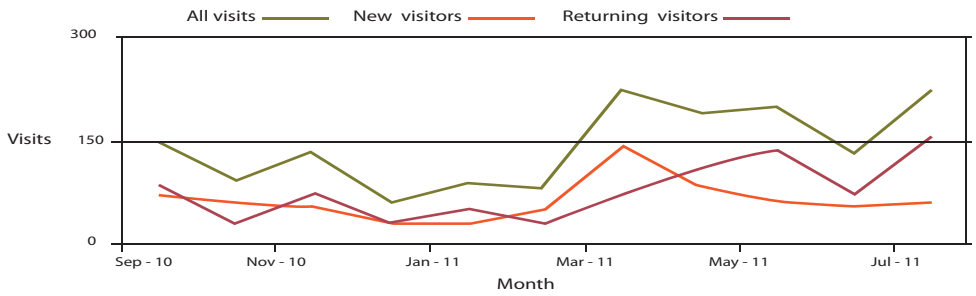
FIGURE 6: WORDLE GRAPHIC OF COMMENTS FROM THE LAUNCH QUESTIONNAIRE

Source: Wray, 2011

Actual usage of the website has been monitored with Google Analytics statistics, which captured a total of 1 571 visits to the GCRO GIS website over the period 1 September 2010 to 31 July 2011, with 55% logged as returning visitors, and 45% as new visitors. Figure 7 illustrates that usage peaked in March and July 2011 with an overall upward trend of usage, specifically with returning visitors. The data indicates continued new interest in the website, as well as regular returning users. However, it is good website practice to continually market or update the website with new data or tools to ensure continued interest, a process that GCRO is undertaking.

5 Wordle is a free online application for generating "word clouds" from text with greater prominence given to words that appear more frequently in the source text (Feinberg, 2009).

FIGURE 7: GCRO GIS WEBSITE TOTAL NUMBER OF VISITS PER MONTH



Source: GCRO, 2011, compiled from analysis of GIS website visits

A total of 1 350 of the visits (86%) were from South Africa, with 57% of the South African visits captured as returning visitors. Within South Africa, the website was mainly accessed from Gauteng, with 1 150 visits representing 85% of South African visits and 73% of the total visits.

An important acknowledgement of the website's success is an approach from the Gauteng Department of Agriculture and Rural Development (GDARD) to host an environmental theme on the GCRO website. Due to the lack of an external GIS website and restrictive IT policies that prevent external publishing of the department's GIS data, GDARD was limited in making environmental data available to the public. A Memorandum of Understanding was drafted to provide for cooperation on data sharing and web hosting in terms of a GCRO GIS website environmental theme. This new website theme enables government and public users to overlay and print GDARD layers with various Google Maps and GCRO GIS layers, thus providing access to and basic analysis of provincial environmental data. The website was recently commended by a public environmental non-profit organisation that utilised the environmental theme to visually present property development proposals in relation to the provincial environmental data, illustrating the benefits of g-government for ordinary citizens. The Gauteng Department of Sports, Arts, Culture and Recreation has also expressed an interest for GCRO to host the provincial sports data sets.

The Google Analytics statistics, responses from government employees who attended the launch, approaches by provincial government departments to host their department's data and examples of public usage of the site, confirm that the g-government website is being utilised by government to provide information and assist with planning and policymaking within the GCR; and by citizens to access spatial government information, with specific examples of citizen usage being visualising current environmental policy (including the GDARD layers) and planning for future development (with attention to the spatial structure theme layers, such as the urban development boundary). However, the true value of the GIS website is the easily integrated manner in which users can visualise, overlay and map different statistics and themes, made possible through Web GIS.

CONCLUSIONS

> *Harnessing the power of Web GIS will greatly benefit, or even determine, the future of many organisations* (Fu & Sun, 2011b).

Web 2.0 has revolutionised the Internet and the way we interact with information and people, by offering new ways to collaborate and communicate, and providing exciting new Web GIS applications and sources of online spatial data. This presents governments with an opportunity to evolve towards a new form of connected e-government with enhanced value of services for all citizens through Government 2.0. According to O'Reilly, one of the pioneers of Web 2.0, not only is Government 2.0 the future of technology, but the future of democracy (Chafkin, 2010).

This article has focused on g-government within the Gauteng city-region. By combining the use of GIS and Web 2.0 technologies, g-government uses Web GIS to promote collaboration within government and connect to its citizens through online maps and spatial data. South Africa, however, still faces many challenges with regard to g-government, with the United Nations e-government survey 2010 indicating a decline in South Africa's e-government development, thereby highlighting the need to devote greater resources to enhancing online services and increasing access to ICT infrastructure (United Nations, 2010).

There are still problems accessing government information (Sharif, 2009), with limited cooperation and institutions operating in silos (Dasgupta, 2010b). It is promising, however, that there are attempts to address these challenges with a number of Web GIS projects such as the CDNGI Intranet/Internet web mapping portal, the CUO's attempts to establish an MOU and regional SDI with Western Cape provincial and local governments, and the GeoGCR initiative to provide a single gateway to Gauteng's spatial information.

The GCRO recognised the need to provide online spatial information and GIS tools to develop a better understanding of the GCR, assist the GCR policymakers to make more informed decisions and open up public access to government datasets. This business need was met through the development of a g-government solution for the provincial and local government stakeholders within the GCR. It makes use of Web 2.0 technologies, such as data mashups, to integrate data from various sources. It is one of the first government GIS websites in South Africa to utilise open datasets such as Google Maps to provide the base data and tap into the Google Maps search engine to provide powerful searching capabilities.

The TAM questionnaire results from the website launch and website usage statistics from Google Analytics have confirmed that a Web 2.0 GIS g-government website site has been successfully developed for the GCRO and local and provincial government, by turning government data and GIS layers into dynamic interactive maps and graphs, easily accessible by both policymakers and citizens.

The g-government website has an important role within the city-region as the GCRO, GPG and Gauteng Planning Commission attempt to improve the way government connects with its

citizens and promote coordination between different departments within the Gauteng province and between the different spheres of local and provincial government. It is hoped that the g-government website will serve as a prototype for the GeoGCR plan that the GPG is embarking on. Furthermore, as the success of the GCR is of national importance, it is also anticipated that the website will be a vital tool for the newly constituted National Planning Commission, tasked with contributing towards the South African government's long-term plans and strategic vision through the production of high quality, evidence-based research (South African Government: The Presidency, 2010).

Further innovation is required for the extensive adoption of g-government. The next phase of website development will focus on upgrading to the latest version of the ESRI Flex viewer and providing the functionality, as requested by the launch questionnaire respondents, for users to incorporate their own data (in ESRI shapefile format or WMS) into this g-government application.

With the growing availability of mobile phone Web GIS applications, such as Google Maps for mobile and ESRI mobile phone APIs, and increasing numbers of mobile phone users accessing the Internet through smartphones, further research consideration should be given to the mobile platform for provision of g-government. Not only can information be served to mobile phone applications, but government employees and citizens can feed information back to government.

Mobile phones can be used as locational devices, serving as valuable sensory input to government information systems as Volunteered Geographic Information. The health-enabling mobile phone pilot project, Impilo Health in our Hands, launched in 2009, utilised the mobile phone user's location (as determined by the Impilo application) to provide access to health and welfare information from the HIV-911 database at a cost of just ZAR0.20 a call (AMREF South Africa, 2012). This inexpensive solution is an example of an interactive mobile service that governments should be developing to provide Government 2.0 services accessible by all communities including the poor.

According to Williamson (Dasgupta, 2010b), "The need is to manage information spatially and not manage spatial information". g-Government provides the technology to achieve this and the GCR governments and stakeholders have embraced the GCRO GIS website. Further research should provide insight into the tangible benefits and public use of g-government, to direct future g-government innovation.

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FIVE

FIVE: SERVQUAL AS A SOCIO-TECHNICAL APPROACH TO MEASURING e-GOVERNMENT SERVICE QUALITY AND GUIDING e-GOVERNANCE STRATEGIES

Hossana Twinomurinzi,
Department of Informatics, University of Pretoria, South Africa

Mphikeleli Gabriel Zwane,
Department of Informatics, University of Pretoria, South Africa

Legesse Kassa Debusho,
Department of Statistics, University of Pretoria, South Africa

ABSTRACT

e-Government services and e-governance have been embraced in many African countries. Nonetheless, measuring the value of e-government remains a challenge. Key to a successful evaluation of progress towards e-governance is the contextual approach, in which ICT is embedded as part of a holistic solution to governance. When carried through without considering the complementary influences of society on ICT and of ICT on society, e-government services can lead to little added value, or even to an exacerbation of societal problems and lack of progress towards e-governance. Although much has been written on e-governance in Africa, few authors have extended the discussion to measuring quality of service and lack of progress towards e-governance. In South Africa, the Batho Pele (People First) policy of service quality is the contextual approach within which e-governance is embedded, because of its good governance attributes. This article relates Batho Pele to SERVQUAL, a framework widely used to measure customer service quality in the retail sector, and adapts the framework for measuring service quality in community e-government service centres, known as Thusong Service Centres (TSC). The analysis, using Structural Equation Modeling (SEM), is consistent with what is known: service quality in TSCs is low and requires regular measurement and evaluation to inform future quality improvements. The article argues that an adapted SERVQUAL instrument, taking into account Batho Pele principles and situational context, can be used as a guide to innovation in e-government service delivery. It is an appropriate sociotechnical tool to collect data to inform e-governance strategies in African countries which share the same social context as South Africa.

KEYWORDS:

e-government service quality, e-governance strategies, measurement, socio-technical approach

INTRODUCTION: CITIZEN SERVICE CENTRES AND BATHO PELE

There is a strong global drive to move government online and to open it to public scrutiny using information and communication technologies (ICT), more popularly known as e-government. The aim of e-government is to create opportunities for government to be more efficient and effective to the business and organisational community (government to business – G2B) and internally (government to government – G2G), and more transparent to individuals (government to citizen – G2C). G2C and G2B interactions are largely dependent on the strength of G2G activities, because a stable ICT platform within government is critical for meaningful digital interaction with individuals and business.

It is generally well accepted that e-government adds value to the citizen, business and government constituencies when implemented well (Carter, Zhang & Schaupp, 2012). However, the increasing demand for e-government to be translated into better governance, e-governance, is pressurising many African governments to uncritically introduce ICT without reflecting on the best approach to value creation in each unique context (Dwivedi, Weerakkody & Jansen, 2011). The weak results from e-government in Africa in the past decade (Muylkens, 2010) highlight the importance of reflecting on how ICT can add value to service delivery and governance. Further, few studies attempt to measure e-governance, which is a socially participative approach, but rather focus on measuring e-government which is a services push approach.

Like many countries, South Africa introduced multi-purpose community centres (MPCCs) to take government services to citizens. The programme, initiated in 1999, lost momentum and MPCCs were under-utilised. In 2006, MPCCs were re-branded as Thusong[1] Service Centres (TSC), with ICT considered as necessary to provide an integrated platform for government officials to offer citizen services and to act as a doorway for digital interaction between government and local communities (Republic of South Africa, 2007). The TSCs promoted computer literacy in an effort to motivate citizens to interact with government using email and the Internet.

South Africa introduced a citizen centric service delivery policy titled Batho Pele (Republic of South Africa, 1997), which means "People First". Batho Pele provides a good basis for addressing the important intangible benefits required from service delivery, beyond time and cost savings. The application of Batho Pele principles to public service delivery, for example the requirement for explicit service standards and value for money, offers a substantive architecture to inform the design of e-government, including citizen experiences at TSCs. The TSCs aim to give citizens access to government services within a five kilometre radius of their place of residence, while also providing electronic access to public services.

Each TSC offers basic services such as social grants, health, education, passports and identity documents. Any further government presence at a TSC is based on the needs of the local community. At least one TSC is envisaged for each of the 283 municipalities before the end of 2014 (Republic of South Africa, 2007). There are currently 142 TSCs in the nine provinces (Table 1).

1 Thusong is a local South Sotho word which means "a place where you can find help"

TABLE 1: THUSONG SERVICE CENTRES

Province	Number of TSCs
Eastern Cape	7
Free State	9
Gauteng	40
KwaZulu–Natal	17
Limpopo	19
Mpumalanga	13
Northern Cape	5
North West	11
Western Cape	21

The Department of Home Affairs (DoHA) is the most important department at TSCs because of the nature of the services they provide, including birth, marriage and death certification, and identity documentation. The DoHA ICT capabilities at each TSC are designed to ensure similar services are offered to those at any DoHA regional office. DoHA processes are executed through the National Population Register (NPR) system or the Home Affairs National Identification System (HANIS). NPR and HANIS are the main systems required for all TSC transactions. Citizens are able to access NPR and HANIS through DoHA officials at TSCs, or access e-services directly. These officials do not have full access to all NPR and HANIS functions. For example, they can register births, but cannot amend the personal records in the system. Through the Track and Trace web-based application, citizens can access the Internet to query the application status of identity documents, passports, marriage status and other matters, using a unique identity or reference number.

This article adopts a social-technical perspective in viewing e-government as comprising people, data, processes, hardware and software interacting together in enabling government services and interactions. Specifically, it discusses an adapted SERVQUAL methodology and its value to building the elements of e-government needed to deliver effective and efficient services, based on a case study of services

rendered by the Department of Home Affairs in Thusong Service Centres. SERVQUAL is a framework widely used in the retail sector to measure customer service quality. Batho Pele defines service quality for the public service as: to ensure consultation; and that there be standards for every government service rendered with an opportunity for redress where poor service is provided, access to information, openness and transparency in interactions with government and the perception that citizens receive value in their interactions with government. e-Government in South Africa would therefore need to take into account the Batho Pele principles. Most ICT implementation in African governments has focused only on implementing the ICT hardware and software, without consideration of the processes, people and data that holistically form e-government. In this article, we postulate that SERVQUAL, with its emphasis on users of a service, could be adapted to assist in enabling efficient and effective e-government.

PURPOSE AND RESEARCH QUESTION

The main purpose of the research was to understand how the SERVQUAL framework can be adapted to the e-government context, based on a study of Thusong Service Centres. Specifically, the study sought to answer the research question: How can service quality and citizen perceptions of the value of e-government be measured?

LITERATURE REVIEW: MEASURING AND UNDERSTANDING STAGES OF E-GOVERNMENT AND E-GOVERNANCE

e-Government theory offers a range of maturity models, though these are not necessarily incongruent. Maturity models are conceptual reference models that are used as benchmarks within a given discipline to measure the maturity of an organisation and provide for the evolution of the organisation towards increased maturity (Becker, Niehaves, Poeppelbuss & Simons, 2010). Lee (2010, p. 5) compared and contrasted the 12 most distinctive e-government maturity models that have been developed and employed over the period 2000-2010, using a qualitative meta-synthesis analysis. Qualitative meta-synthesis is an approach which uses as data the findings from other qualitative studies, and attempts to bring together those findings into a single holistic framework that better reflects the different assumptions underlying each of the qualitative studies (Zimmer, 2006). Lee's (2010) meta-synthesis resulted in a common frame of reference model that revealed five distinct maturity processes (Table 2).

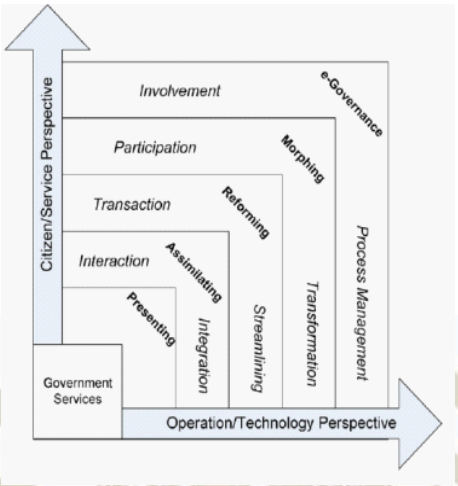
TABLE 2: E-GOVERNMENT MATURITY META-SYNTHESIS

Metaphors	Descriptions	Stages	
		Citizen and service	Operation and technology
Presenting	Present information in the information space	Information	
Assimilating	Assimilates (or replicates) processes and services in the information space with those in the real world	Interaction	Integration
Reforming	Reform the processes and services in the real world to match the information space requirements, fitting for efficiency	Transaction	Streamlining
Morphing	Change the shape and scope of processes and services in the information space as well as those in the real world, fitting for effectiveness	Participation	Transformation
e-Governance	Processes and service in both worlds are synchronously managed, reflecting citizen-involved changes with reconfigurable processes and services	Involvement	Process management

Source: Lee, 2010, p. 5

It is apparent from Lee's model that some maturity models focus on citizens while others focus on the technology artefact. The model suggests that as the technology platform of e-government matures, it offers better opportunity for interaction with citizens (Figure 1). e-Governance therefore stands out as the highest maturity level of e-government where government processes and services are continuously improved, based on a vibrant exchange of ideas between citizens and government. It would be naïve to assume that government must progress from stage to stage towards e-governance. For example, social media has enabled governments to skip stages, moving from the absence of technology to using Web 2.0 platforms, such as Facebook and Twitter, to enable citizens to offer opinions and participate in government decision making.

FIGURE 1: A COMMON FRAME OF REFERENCE FOR E-GOVERNMENT STAGE MODELS



Source: Lee, 2010, p. 10

By utilising Web 2.0 in government, citizens can easily access services and information anywhere, any time, from any device, and comment on what they expect and experience with respect to services. The use of Web 2.0 in government, also referred to as e-gov 2.0, enables citizens and government to realise intangible value, such as improved decision making, which cannot be measured using traditional time and cost factors.

REVIEW OF THE SERVQUAL METHODOLOGY AND ITS APPLICABILITY TO E-GOVERNMENT

When a service is rendered it follows that there is often a gap between what the service is expected to be like and what it turns out to be (Lewis & Booms, 1983). The gap can vary depending on the standards used to measure the quality of service, the difference between the recipient's expectations and the experience, the difference between what customers were told and what they experience, and the difference between what management think the service experience will be like and the actual experience (Zeithaml, Parasuraman & Berry, 1990). The degree to which the service experience conforms to the expectation is one way of defining service quality. Service quality is therefore a fair representation of the distinction between what an individual expects prior to experiencing a service and the perception or satisfaction after experiencing the service (Lewis & Blooms, 1983). For service-offering organisations such as government, citizen perceptions and degrees of satisfaction or dissatisfaction (Moorman, Blakely & Niehoff, 1998) are important to understand, in order to ascertain to what extent citizens are experiencing the value of the service.

SERVQUAL is a service quality tool that has been widely used in the retail sector to measure customer experience of services rendered against their expectations (Parasuraman, Zeithaml & Berry, 1988). SERVQUAL initially measured 10 dimensions of service quality, but was refined to the five dimensions of tangibles (equipment, appearance of service staff, visually appealing materials), empathy (caring, individual attention, understanding customer needs), reliability (service as promised, error-free information), responsiveness (prompt service, willingness to help) and assurance (instilling confidence, people feeling safe about their transaction) (Parasuraman, Zeithaml & Berry, 1994, p. 207).

The application of a SERVQUAL type approach would be an opportunity for government to develop ways to understand what type and quality of e-government is expected and how its value is perceived. Since SERVQUAL is a service quality tool that has been applied with respect to commercial transactions, it requires adaptation to an e-government context. One of the differences between business customers and citizens is that customers can leave when they perceive services to be poor, while citizens are often unable to choose an alternative government service point. Furthermore, there are theoretical and operational criticisms of SERVQUAL that need to be addressed. Theoretically, SERVQUAL is criticised for not drawing on established theory, not considering the outcomes of a service encounter, and for its dependence on context, while operationally, the expectations component is regarded as being vague (Buttle, 1996). This study seeks to recognise the value of a structured service quality framework, while adapting the tool to the context and addressing the critique of theoretical weakness and vagueness. The adaptation of SERVQUAL was addressed by relating the design of the framework to theory on e-government, and to important contextual elements, namely the practice of e-government at TSCs and the Batho Pele quality approach to service delivery. Since the article focuses on the e-government experience, the outcomes of an individual service encounter, though important, were not considered.

The Batho Pele policy defines eight principles for service delivery, including that there be consultation; standards for every government service rendered; access to information; openness and transparency in interactions with government; an opportunity for redress where poor service is rendered; and the perception that citizens receive value in their interactions with government. It should follow therefore that e-governance should be measured by the extent to which ICT is leveraged within each of the above elements, for example, the extent to which ICT enables consultation between government and citizens or organisations.

While government attempted to use ICT in e-government (Republic of South Africa, 2001), it later recognised the challenge in making e-government work, citing especially the inconsistent ICT and public administration frameworks that are in use across different sectors of government (GITOC, 2009). The choice was therefore to create a government-wide enterprise architecture that will guide the adoption of ICT across government (GITOC, 2009). In this article, we argue that the creation of a complex ICT framework is misplaced, because most government ICT officers are not familiar with enterprise architectures (Twinomurinzi & Rambau, 2012). It would be more contextual to utilise an established approach such as Batho Pele to inform the framework for delivery at e-government services centres. This article therefore sets out to interpret, from Batho Pele, measures that can be used to determine the value of e-government. It postulates that an adapted SERVQUAL tool can be applied to understanding customer expectations and experiences of e-government at citizen service centres, thus enabling governments to improve their service delivery and e-governance efforts.

MAPPING SERVQUAL DIMENSIONS TO BATHO PELE PRINCIPLES

Table 3 shows the five dimensions of service quality measured by SERVQUAL can be mapped to the Batho Pele principles of consultation, service standards, access, courtesy, information, openness and transparency, redress and value for money.

TABLE 3: MAPPING BATHO PELE PRINCIPLES AND E-GOVERNMENT TO SERVQUAL DIMENSIONS

SERVQUAL dimension	Batho Pele principle	Mapping to e-government
Reliability	• Information • Redress	e-Services should be given fully, based on detailed and correct information. Explanation and/or options should be given for services not rendered.
Empathy	• Courtesy • Access	e-Services should be given with empathetic consideration. The citizens have a right to services and should find the e-services easily accessible and communicated clearly
Assurance	• Openness and transparency	.nformation should be available about what government delivers and how it operates. e-Services should be given in trust and confidence, and should therefore be credible and secure.
Responsiveness	• Service standard • Consultation • Value for money	There should be an awareness of the expected quality of the service and the benefits of ICT access to e-services. Users should be consulted about the quality of e-services rendered and given a choice about the e-services offered. Affordable e-services should be offered.
Tangible	• Infrastructure arrangements	The ICT infrastructure and appearance of personnel should be above a minimum standard.

RESEARCH HYPOTHESES

The following five statements were hypothesised to represent the quality of service rendered in the e-government service centres:

H10: Tangibles experienced by the citizens have no influence on the quality of service rendered in the TSC.
H11: Tangibles experienced by the citizens have an encouraging influence on the quality of service rendered in the TSC.

H20: Reliability experienced by the citizens has no influence on the quality of service rendered in the TSC.
H21: Reliability experienced by the citizens has an encouraging influence on the quality of service rendered in the TSC.

H30: Responsiveness experienced by the citizens has no influence on the quality of service rendered in the TSC.
H31: Responsiveness experienced by the citizens has an encouraging influence on the quality of service rendered in the TSC.

H40: Assurance experienced by the citizens has no influence on the quality of service rendered in the TSC.
H41: Assurance experienced by the citizens has an encouraging influence on the quality of service rendered in the TSC.

H50: Empathy experienced by the citizens has no influence on the quality of service rendered in the TSC.
H51: Empathy experienced by the citizens has an encouraging influence on the quality of service rendered in the TSC.

SERVQUAL ADAPTATION AND TESTING

The Batho Pele policy and the Thusong Service Centre experience provided the citizen-centric context to inform adaptation of the SERVQUAL questions. The first adaptation of the framework was applied to the three TSC sites of Eldorado Park, Ipelegeng and Kopanong in Gauteng Province. The Eldorado Park and Kopanong TSCs are based in local community centres with dedicated rooms. The Ipelegeng TSC operates out of an Anglican Church that made available a building for community projects such as life skills training and youth development programmes. All three TSCs fall under the City of Johannesburg metropolitan municipality and the Gauteng West Region of the Department of Home Affairs (DoHA).

The DoHA ICT capabilities at each TSC are designed to offer the same services offered at any other DoHA regional office. Using the NPR and HANIS systems, officials can register births, but not amend the personal records in the system. The services offered are listed in Table 4.

TABLE 4: DEPARTMENT OF HOME AFFAIRS SERVICE OFFERING MATRIX

Service – Centre	Ipelegeng	Eldorado Park	Kopanong
ID – First issue	P	P	P
ID – Re-issue	P	P	P
Birth registration	P	P	P
ID application status Enquiries	P	P	P
Amendments	P	P	P
Passport application	P	P	P
Estimated daily stats	40	65	50

The e-government SERVQUAL questionnaire operates in the quantitative tradition, using a cross-sectional survey methodology based on 44 contextually adapted questions. In order to test the applicability of the survey, it was administered to a convenient sample of 168 citizens at three TSCs over a period of four weeks. The questionnaire was compiled in English and a verbal translation was offered to participants who preferred any other local language. Each questionnaire was administered before and after a user experience at the TSC. The responses were analysed and further adaptations were then made to the framework to ensure a contextualised instrument. The final adapted SERVQUAL framework is presented in Appendix A.

ANALYSIS

VARIABLES IN THE ANALYSIS

Tables 5 and 6 describe the variables (items in each SERVQUAL dimension) for expectations and experience respectively. Respondents rated the statements on a 4-point scale ranging from 1 = strongly disagree to 4 = strongly agree. The raw results were as follows:

TABLE 5: EXPECTATIONS SCALE ITEM MEAN AND STANDARD DEVIATION (N = 168)

Items in SERVQUAL dimension	Mean	SD
Tangibles		
CV8: The physical facilities of excellent service centres will be visually appealing.	3.52	0.50
CV13: Excellent e-government service centres will have modern-looking equipment.	3.35	0.48
CV15: Employees at the excellent e-government service centres will be neat in appearance.	3.35	0.49
CV16: Materials associated with the e-government services (pamphlets) will be visually appealing at an excellent e-government service centre.	3.36	0.50
CV10: Excellent e-government service centres will perform the service correctly the first time.	3.46	0.50
CV12: When a customer has a problem, excellent e-government service centres will show sincere interest in solving it.	3.36	0.48
CV17: Excellent e-government service centres will provide the service at the time they promise to do so.	3.38	0.50
CV26: When excellent e-government service centres promise to do something by a certain time, they do.	3.36	0.48
Responsiveness		
CV27: Excellent e-government service centres will insist on error-free records.	3.34	0.48
CV6: Employees of excellent e-government service centres will tell customers exactly when the service will be performed.	3.51	0.50
CV18: Employees of excellent e-government service centres will give prompt service to customers.	3.38	0.50
CV22: Employees of excellent e-government service centres will always be willing to help customers.	3.37	0.48
CV23: Employees of excellent e-government service centres will never be too busy to respond to a customer's request.	3.34	0.49
Assurance		
CV7: The behaviour of employees of excellent e-government service centres will instil confidence in customers.	3.52	0.50
CV11: Customers of excellent e-government service centres will feel safe in transactions.	3.41	0.49
CV20: Employees of excellent e-government service centres will be consistently courteous with customers.	3.36	0.48
CV21: Employees of excellent e-government service centres will have the knowledge to answer customers' questions.	3.33	0.47
Empathy		
CV9: Employees of excellent e-government service centres will understand the specific needs of their customers.	3.54	0.50
CV14: Excellent e-government service centres will have their customers' best interests at heart.	3.33	0.48
CV19: Excellent e-government service centres will have employees who give customers personal service.	3.36	0.48
CV25: Excellent e-government service centres will give customers individual attention.	3.35	0.48
CV24: Excellent e-government service centres will have operating hours convenient to all their customers.	3.33	0.47

TABLE 6: EXPERIENCE SCALE ITEM MEAN AND STANDARD DEVIATION (N = 168)

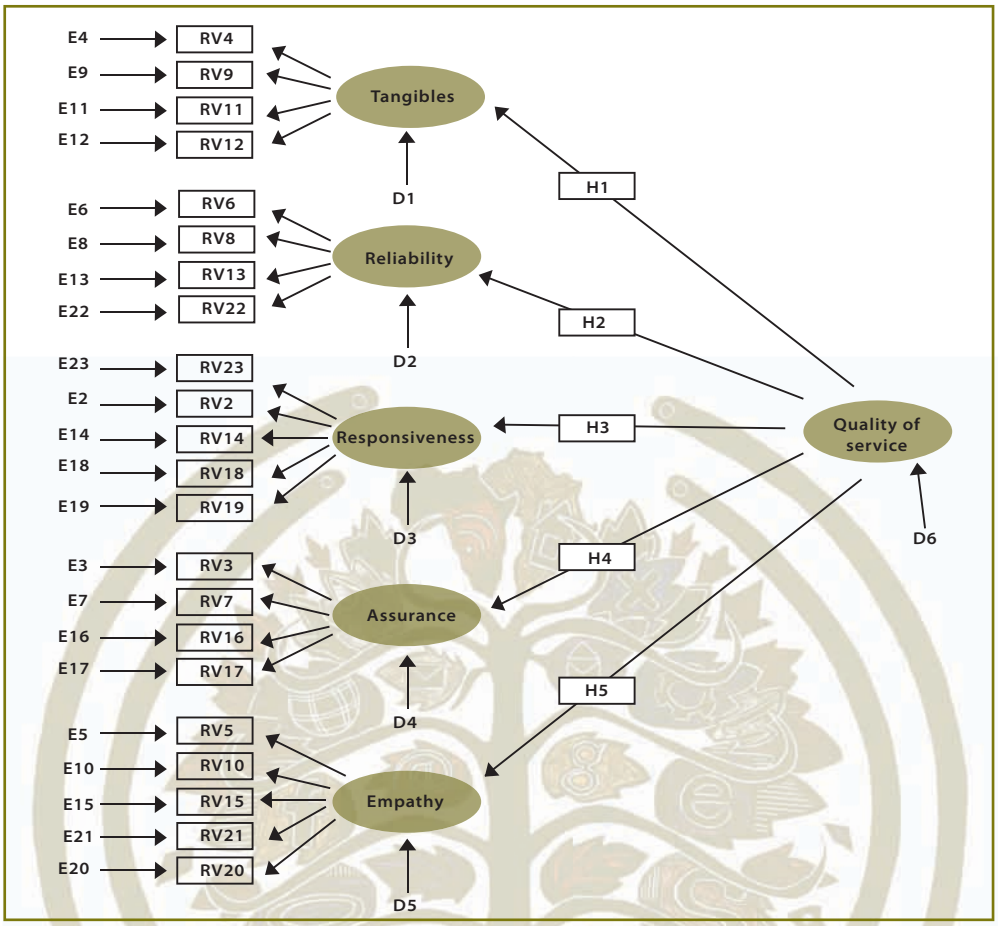
Items in SERVQUAL dimension	Mean	SD
Tangibles		
RV4: The centre's physical features are very appealing.	2.36	0.48
RV9: The centre has modern-looking equipment.	2.08	0.27
RV11: The centre's reception desk employees appear neat.	2.18	0.28
RV12: Materials associated with the e-government service (pamphlets) are visually appealing at centre.	2.08	0.28
Reliability		
RV6: The centre performs the service correctly the first time.	2.30	0.46
RV8: When you have a problem, the centre shows sincere interest in solving it.	2.24	0.43
RV13: The centre provides its service at the time it promises to do so.	2.16	0.37
RV22: When the centre promises to do something by a certain time, it does so.	2.14	0.35
Responsiveness		
RV2: Employees in the centre tell you exactly when the services will be performed.	2.40	0.49
RV14: Employees in the centre give you prompt service.	2.15	0.36
RV18: Employees in the centre are always willing to help you.	2.14	0.35
RV19: Employees in the centre are never too busy to respond to your request.	2.17	0.38
RV23: The centre insists on error-free records.	2.15	0.36
Assurance		
RV3: The behaviour of employees in the centre instils confidence in you.	2.40	0.49
RV7: You feel safe in your transaction with the centre.	2.28	0.45
RV16: Employees in the centre are consistently courteous with you.	2.15	0.36
RV17: Employees in the centre have the knowledge to answer your questions.	2.15	0.36
Items in SERVQUAL dimension	**Mean**	**SD**
Empathy		
RV5: The employees of the centre understand your specific needs.	2.35	0.48
RV10: The centre has your best interest at heart.	2.18	0.39
RV15: The centre has employees who give you personal attention.	2.15	0.36
RV21: The centre has operating hours convenient to all its customers.	2.14	0.35
RV20: The centre gives you individual attention.	2.86	0.35

APPLICATION OF STRUCTURAL EQUATION MODELLING

The structural equation model (SEM) was adopted to analyse the results. SEM is a general numerical modelling technique, which is used in the behavioural sciences to provide researchers with a complete means of assessing and modifying theoretical models (Anderson & Gerbing, 1988). SEM depicts the relationship between hypothetical constructs that are represented by regression or path coefficients among other factors. In this research, the SERVQUAL questionnaire items are the observed variables which citizens had to rate for the expected and experienced service. The observed variables were grouped to define causal relationships with latent variables. SEM is also called a second-order confirmatory factor analysis (CFA) model, where the five SERVQUAL dimensions are first-order factors and the quality of service is the second-order factor. Establishing a well-fitting CFA model will result in successfully testing the relationships among latent variables. The subject of this study was the relationship between SERVQUAL dimensions and service quality with respect to citizens' expectations and experiences.

The adapted SERVQUAL questionnaire had 22 items each for EXPECTATIONS and EXPERIENCE, measuring five dimensions. The questionnaire was administered to citizens before and after they had visited the TSC to assess the expected service quality and the service quality experienced. The hypothesised relationships of the SERVQUAL dimensions against the quality of service are presented in Figure 2. The relationships were tested using a data set collected through the SERVQUAL questionnaire, and analysed using a structural equation model.

FIGURE 2 THE HYPOTHESIZED STRUCTURAL EQUATION MODEL

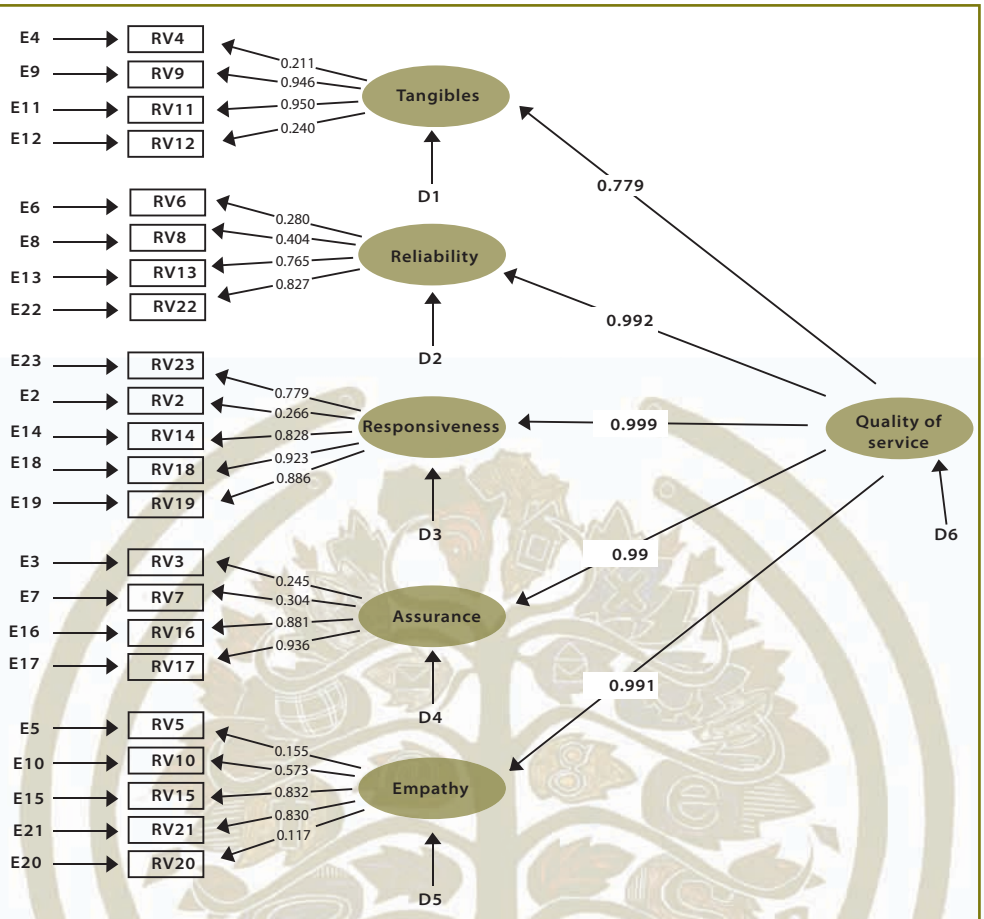


NOTE The variables in squares are the observed variables and the variables in ovals are the latent variables. The arrows show the causal relationships between the variables

RESULTS AND DISCUSSION

The researchers assessed the quality and adequacy of the proposed measurement model by investigating reliability and convergence validity. The convergence validity was supported as a result of the fact that the overall fit of the final model was good, and that all the path loadings were statistically significant at 5% level of significance. With respect to the structural components of the model (Figure 3 below), the results showed that all five SERVQUAL dimensions have a statistically significant effect on the quality of service. The researchers therefore rejected the five null hypotheses at 5% level of significance and confirmed that there is a causal relationship among the SERVQUAL dimensions and the quality of service rendered in the TSCs.

FIGURE 3: FINAL MODEL RESULTS



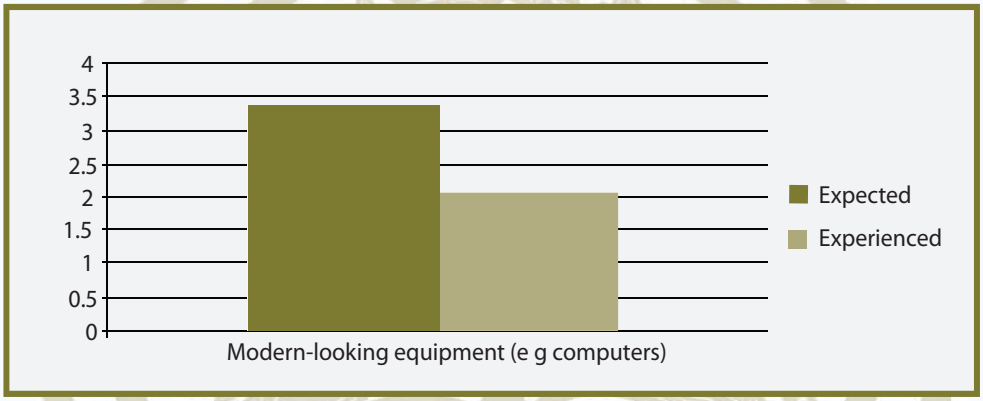
NOTE The numbers on the path diagram are standardised regression coefficients where arrows point either from first-order latent variables to the observed variables or from second-order latent variables (quality of service) to the first-order latent variables (which are also the dependant latent variables)

COMPARISON OF ITEMS BETWEEN EXPERIENCE AND EXPECTATION

Tables 5 and 6 above describe the average scores of citizens' response to experience and expectations items respectively. The results imply that citizens' experience of all dimensions of e-government in terms of tangibles, reliability, responsiveness, assurance and empathy was below their expectations. The greatest difference between what citizens expected and what they experienced was with respect to the physical facilities of the centres, the timing of the services rendered, the employees instilling confidence and the best interest of the citizens. Each of these is described in more detail below.

As one measure of tangibles, the findings show that citizens have high expectations of the ICT infrastructure. Overall, they were disappointed with what they experienced (Figure 4).

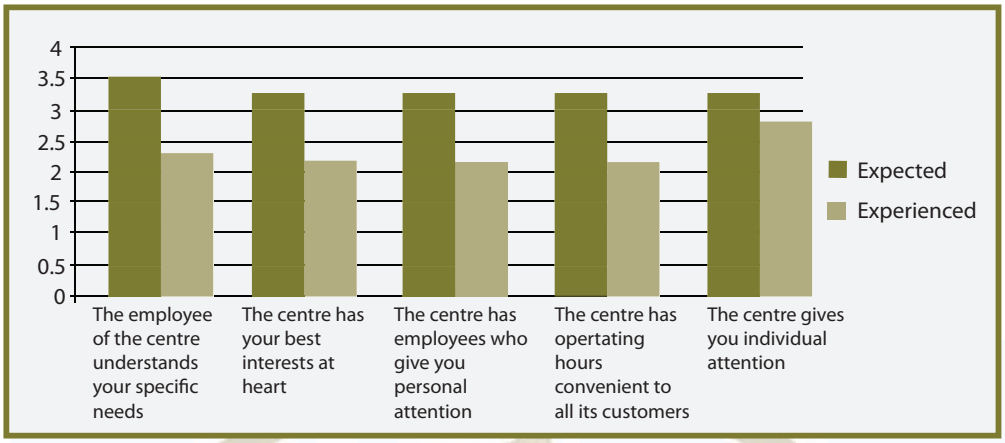
FIGURE 4: AESTHETICS OF ICT AT E-GOVERNMENT SERVICE CENTRES



The TSCs should have similar ICT infrastructure since the Universal Service Agency of South Africa (USAASA) has been engaged in introducing ICT at TSCs. USAASA can outsource ICT implementation to service providers and should create a set of "aesthetic ICT" standards that must be adhered to by service providers.

In terms of empathy, the utilisation of ICT has led to the design of customer relationship management (CRM) systems, enabling the presentation of service profiles such that the customer is addressed as an individual, well known and valued by the company. The CRM approach can be extended to e-government, such that TSC personnel can be empathic because they are able to view the citizen's profile and address each user as a unique individual, valued by government. The findings of this study show that citizens expect the personnel at TSCs to understand their needs and make them feel like unique individuals (Figure 5)

FIGURE 5: EMPATHY IN RELATION TO E-SERVICES AND E-GOVERNMENT



The results show the value that citizens attach to empathy as a key ingredient to successful e-government. Empathy is a skill that can be learned and does not require much effort to implement, especially when complemented with ICT systems.

In terms of assurance and professionalism, ICT can enable services to be rendered in trust and confidence, and to be treated as credible and secure. Assurance and professionalism can be ensured through enabling user participation in identification, for example by using biometric systems to authenticate citizens. The personnel can provide the citizen with a full trail of their interaction with the DoHA. Such simple measures can build trust and enable personnel to treat every matter with confidence and courtesy (Figure 6).

FIGURE 6: ASSURANCE AND PROFESSIONALISM IN E-GOVERNMENT

ICT can enable reliability and responsiveness through keeping citizens updated regarding the status of the services they have applied for. Simple means, such as text messages sent to a citizen, instil a sense of a reliable and responsive government. Additionally, keeping the citizen informed of the trail of activity would make citizens aware that their matters are being dealt with and when the matter will be resolved, illustrating the reliability of e-services and e-government. Such approaches can shift the existing negative experience of reliability and responsiveness (Figures 7 and 8).

FIGURE 7: RELIABILITY OF E-GOVERNMENT SERVICES

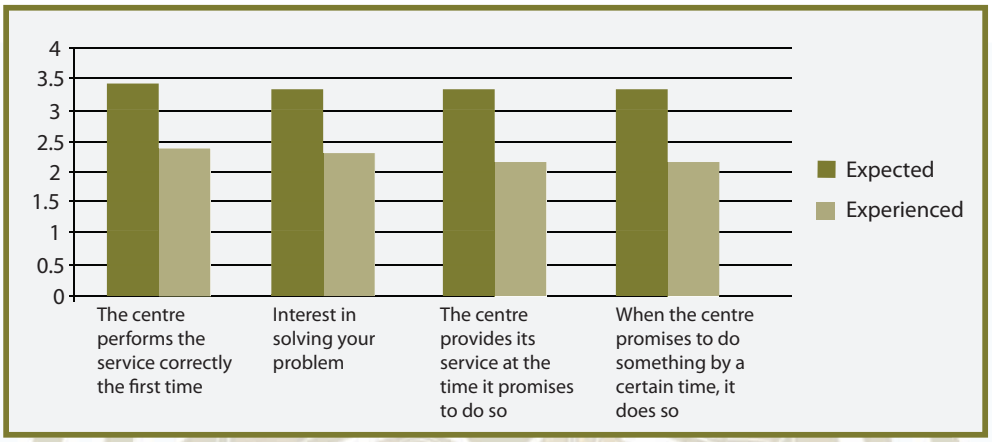
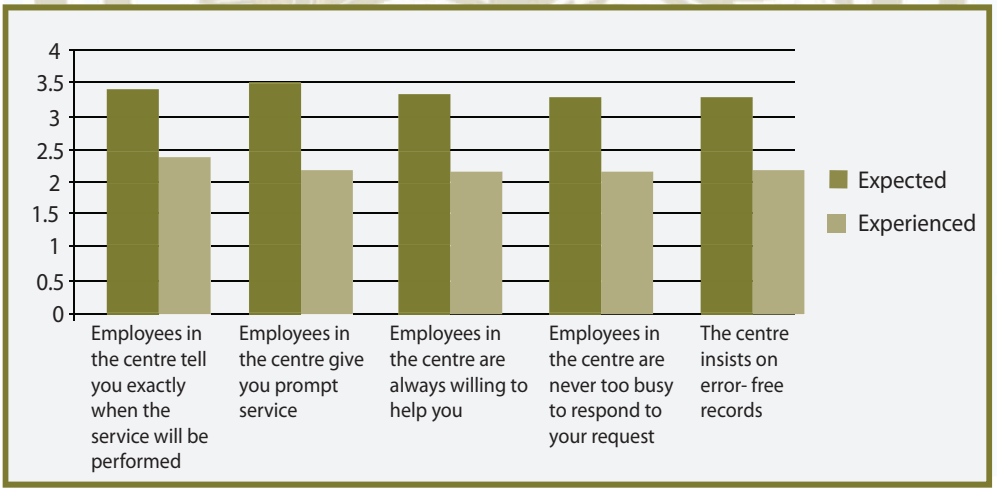


FIGURE 8: RESPONSIVENESS OF E-GOVERNMENT



ICT can enable e-government services centres to give a fair estimate of the time in which every matter will be resolved and, in the event that timelines have not been met, to continually update the citizen of progress through affordable means such as a text message service.

CONCLUSIONS

The study question was: How can service quality and citizen perceptions of the value of e-governance be measured? The study shows that designing e-government cannot be simply about using generic approaches, but requires a degree of contextualisation to the particular country. In the case of South Africa, Batho Pele provides a public service quality framework to measure service delivery. A framework like SERVQUAL can therefore be adapted to South Africa, based on this contextualisation.

The research set out to investigate the adaptation and application of the SERVQUAL framework to e-government, based on a survey of community e-services centres (Thusong Service Centres), where ICT is integrated as a primary component of delivering government services. The research revealed a relationship between the SERVQUAL dimensions, the Batho Pele service quality principles and citizen-centric e-government. In particular, the research showed that the SERVQUAL dimensions can be adapted to measure e-government as follows:

(1) In terms of tangibles, it is important to measure and enhance the aesthetic appearance of the ICT environment in the e-services centres.

(2) To encourage empathetic conduct, ICT needs to be used to support, giving individual attention to each citizen and each query.

(3) Because ICT systems store a great deal of data, reliability and responsiveness can be measured by the degree to which ICT (a) shows the trail of activity for the government services that have been applied for, (b) ensures that the service is free of errors and (c) is used so that information is sent to the citizen at regular intervals.

(4) Assurance can be integrated using ICT by allowing citizens to authenticate their personal details, so that they feel secure about their transactions with government.

Based on the above findings and conclusions, we recommend an adapted SERVQUAL approach to measure e-government services and progress towards e-governance, as set out in Table 7 below and as detailed in the questionnaire in Appendix A. This can be applied in South Africa and in other countries with similar concerns and interests in improving the quality of e-government services and advancing towards e-governance.

TABLE 7: ADAPTED EXPECTATION SERVQUAL INSTRUMENT TO MEASURE E-GOVERNMENT

SERVQUAL	Batho Pele	e-Government expectation measure	e-Government experience measure
Tangibles	Infrastructure arrangements	1 Government service centres will have working and effective ICT equipment	1 Government service centres had working and effective ICT equipment
Reliability	Information and opportunity for redress	2 Government service centres will perform the service correctly the first time through the use of ICT	2 Government service centres performed the service correctly the first time through the use of ICT
		3 Government service centres keep citizens regularly updated about the status of the service that has been applied for	3 Government service centres kept citizens regularly updated about the status of the service that was applied for
Responsiveness	High service standards and consultation	4 Government service centres will use ICT systems which ensure error free records	4 Government service centres used ICT systems to ensure error-free records
		5 Personnel using ICT can tell citizens exactly when the service will be performed	5 Personnel using ICT could tell citizens exactly when the service would be performed
Assurance	Openness and transparency	6 Citizens can participate in authenticating their personal details so they feel secure in using ICT to interact with government	6 Citizens were able to participate in authenticating their personal details and felt secure in using ICT to interact with government
		7 Personnel of government service centres use ICT for knowledge to answer citizen questions	7 Personnel of government service centres used ICT for knowledge to answer citizen questions
Empathy	Courtesy and access	8 Personnel of government service centres use ICT to understand the specific needs of their customers	8 Personnel of government service centres used ICT to understand the specific needs of their customers
		9 Government service centres will ensure that ICT and e-services are available at operating hours convenient to citizens	9 Government service centres have ensured that ICT and e-services are available at operating hours convenient to citizens

Most countries in sub-Saharan Africa share similar social contexts to those in South Africa, with respect to the challenges of taking public services to the majority of citizens and ensuring good quality of service provision. This article argues that the adapted SERVQUAL instrument can be used as a guide to innovation using ICT to enhance service delivery through e-government services. It is an appropriate socio-technical tool that can be used to inform the design of broader e-governance strategies in African countries, including South Africa.

The research was limited to measuring the services of one department at the Thusong community centres. It would be of value to public service managers designing e-government services and e-governance initiatives to conduct wider research covering a broader range of departments, public services and government-citizen interactions. As e-governance progresses, additional attributes should be measured. For example, a citizen should receive an integrated service and should not need to be aware of the different departments being dealt with but should be able to simply access services as and when they are needed. Furthermore, citizen service centres should promote participative democracy through e-governance

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APPENDIX A: E-GOVERNMENT SERVICE QUALITY (EGOV-SERVQUAL) QUESTIONNAIRE:

PART A: AN ASSESSMENT OF e-GOVERNMENT EXPECTED SERVICE QUALITY

Respondent number V3 [ ][ ][ ] 5

Please answer each question by drawing a circle around an appropriate number in a shaded box or by writing your answer in the shaded space provided

1. Location of service provider

Site 1	1
Site 2	2
Site 3	3

V2 [ ] 4

2. Date of assessment

V3 [ ][ ][ ] 5

3. What is your gender?

Male	1
Female	2

V4 [ ] 11

4. What is your age?

V5 [ ] 12

5. Please read each of the following statements below and rate your EXPECTATION of e-government service centres associated with each statement on the scale supplied

	Strongly disagree	Disagree	Agree	Strongly Agree			
Employees of e-government services centres tell users exactly when the service will be performed.	1	2	3	4	V6		13
The ability of employees to use ICT to service citizens instils confidence.	1	2	3	4	V7		14
The e-services centre's ICT equipment is working and effective.	1	2	3	4	V8		15
The e-services centre's ICT equipment is working and effective.	1	2	3	4	V9		16
Employees at e-services centres understand the specific needs of their users.	1	2	3	4	V10		17
e-Government services centres perform the service correctly the first time.	1	2	3	4	V11		18
Users feel secure when performing electronic transactions.	1	2	3	4	V12		19
When a user has a problem, employees show sincere interest in solving	1	2	3	4	V13		20
e-Government services centres have email and Internet facilities for users to access electronic services.	1	2	3	4	V14		13
it. e-Government services centres have their users' best interests at heart.	1	2	3	4	V15		21
Employees at the e-services centres are neat in appearance.	1	2	3	4	V16		22
Materials associated with the e-services (pamphlets, other) are informative.	1	2	3	4	V17		23
e-Government services centres provide the service at the time they promise to do so.	1	2	3	4	V18		24
Employees of e-services centres give prompt service to users.	1	2	3	4	V19		25
e-Government services centres have employees who give users personal service.	1	2	3	4	V20		26
Employees of e-services centres are consistently courteous to users.	1	2	3	4	V21		27
Employees of e-services centres are able to access electronic records to answer user's questions.	1	2	3	4	V22		28
Employees of e-services centres are always willing to use ICT to help users.	1	2	3	4	V23		29
Employees of e-services centres are never too busy to respond to user's requests.	1	2	3	4	V24		30
e-Government services centres have operating hours convenient to all their users.	1	2	3	4	V25		31

	Strongly disagree	Disagree	Agree	Strongly Agree			
e-Government services centres access user's individual electronic records.	1	2	3	4	V26		32
When e-services centres promise to provide an electronic service by a certain time, they do.	1	2	3	4	V27		33
e-Government service centres insist on error-free electronic records.	1	2	3	4	V28		34

PART B: AN ASSESSMENT OF e-GOVERNMENT *EXPERIENCED* SERVICE QUALITY

Respondent number V3 | | | | 5

Please answer each question by drawing a circle around an appropriate number in a shaded box

6. Please read each of the following statements below and rate your EXPERIENCE associated with each statement on the scale supplied

	Strongly disagree	Disagree	Agree	Strongly Agree			
Employees in the e-government services centre tell you exactly when the services will be performed.	1	2	3	4	V2		4
The behaviour of employees in the e-services centre instils confidence in you.	1	2	3	4	V3		5
The e-services centre's ICT equipment is working and effective.	1	2	3	4	V4		6
The employees of the e-services centre understand your specific needs.	1	2	3	4	V5		7
The e-services centre performs the service correctly the first time.	1	2	3	4	V6		8
You feel secure when performing a transaction at the e-services centre.	1	2	3	4	V7		9
When you have a problem, employees at the e-services centre show sincere interest in solving it.	1	2	3	4	V8		10
The e-services centre has email and Internet facilities and offers easy access to e-government services.	1	2	3	4	V9		11
The e-services centre has your best interests at heart.	1	2	3	4	V10		12

	Strongly disagree	Disagree	Agree	Strongly Agree			
The e-services centre's employees are neat in appearance.	1	2	3	4	V11		13
Materials associated with the e-services (pamphlets, other) are informative.	1	2	3	4	V12		14
The e-services centre provides its service at the time it promises to do so.	1	2	3	4	V13		15
Employees in the e-services centre give you prompt service.	1	2	3	4	V14		16
The e-services centre employees give you personal attention.	1	2	3	4	V15		17
Employees in the e-services centre are consistently courteous to you.	1	2	3	4	V16		18
Employees in the e-services centre have the knowledge to answer your questions.	1	2	3	4	V17		19
Employees in the e-services centre are always willing to help you.	1	2	3	4	V18		20
Employees in the e-services centre are never too busy to respond to your requests.	1	2	3	4	V19		21
The e-services centre has operating hours convenient to all its users.	1	2	3	4	V20		22
The e-services centre gives you individual attention.	1	2	3	4	V21		23
When the e-services centre promises to do something by a certain time, it does so.	1	2	3	4	V22		24
The e-services centre insists on error-free records.	1	2	3	4	V23		25

SECTION II

COUNTRY PERSPECTIVES ON e-GOVERNANCE EMERGENCE

SIX: A CRITICAL ANALYSIS OF e-GOVERNMENT IN ZAMBIA

Mjumo Mzyece,
French South African Institute of Technology (F'SATI), Tshwane University of Technology, South Africa

ABSTRACT
This article presents a critical analysis of e-government in Zambia. It reviews the relevant literature and then explains the structure and operation of the Zambian government in the context of e-government. It presents and analyses the results of a small sample study on e-government in Zambia and points to six areas for policy reform, highlighting leadership, stakeholder engagement, prioritisation, increased funding, private sector participation and mobile channels as key elements needed for future success.

KEYWORDS:
e-government policy, reform, Zambia

INTRODUCING E-GOVERNMENT IN ZAMBIA

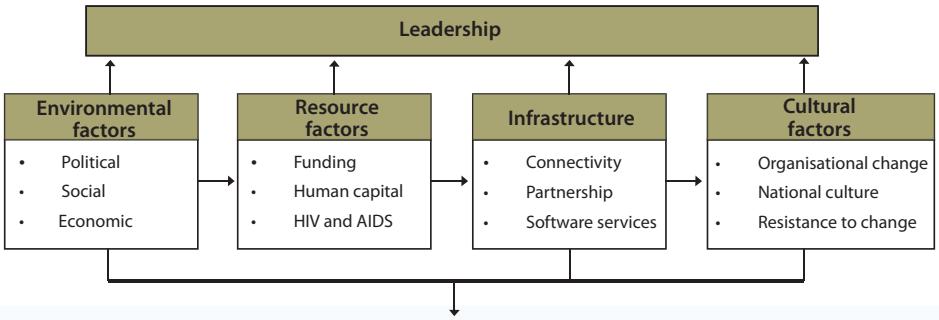
Zambia's National Information and Communication Technology Policy 2006, defines e-government as:

> *The delivery by Government of products, services, policies and the engagement of stakeholders in civic and government matters through the use of Information and Communication Technologies in order to achieve Government to Consumers, Government to Business and Government to Government interaction and transactions (Government of Zambia, 2006b, p. vii).*

In this policy, ICTs are presented as the means of e-government, while electronic interactions and transactions are regarded as primary in delivering public services and in promoting e-government. Good governance has been identified as a cross-cutting issue in the fifth and sixth national development plans (Government of Zambia, 2011; Government of Zambia, 2006a). e-Governance has been identified as a powerful enabler of good governance and e-governance programmes are explicitly defined and budgeted for in the two national development plans. e-Government is regarded as a national priority and therefore deserves attention from scholars and policymakers interested in the development of Zambia. However, the reality of e-government progress has fallen far short of its potential and its stated importance in policy documents.

There is a limited body of literature on the state of e-government in Zambia. Weerakkody, Dwivedi, Brooks, Williams & Mwange (2007) studied the extent of implementation of e-government in Zambia. Their survey explored the perceptions of government officials with respect to e-government implementation challenges in eight categories (Weerakkody et al, 2007): technological infrastructure; partnership and collaboration; strategy; institutional and environmental issues; human capital development; change management; leadership roles; and legal frameworks. Based on their analysis, they propose a framework for e-government implementation that emphasises the relationship between risk and value (Figure 1).

FIGURE 1: PERSPECTIVE ON A FRAMEWORK FOR E-GOVERNMENT IN ZAMBIA



Implementation outcome of e-government strategies: balancing Risk and Value in selecting projects			
Low risk - low value	Low risk - high value	High risk - low value	High risk - high value
For example, establishing the national e-government website for dissemination of basic information to the public	Includes online service delivery by departments such as drivers' licences, passport application and land registration	These projects need to be avoided at all costs	Projects requiring large investment, coordination of various departments and long implementation time frame. Examples include e-tax, e-customs and implementation of PKI

Source: Weerakkody et al,, 2007

In other writing, Bwalya (2009) analyses positive and negative factors favouring or hindering the adoption of e-government in Zambia and proposes an e-government adoption model based on Davis' (1989) Technology Acceptance Model (TAM). Positive factors include: up-to-date information; convenience and ease of use; strong local support and participation (since e-government projects tend to be initiated and funded by foreign donors); decentralised platforms; and "anytime, anywhere" availability. Negative factors include: lack of sustainability, particularly when donor-funded projects come to an end; poor ICT infrastructure; exorbitant Internet connectivity costs; restricted access (eg systems accessible to Internet users only); poor ICT infrastructure; unwillingness of staff to adopt new systems; and lack of content in indigenous languages.

Coates and Nikolaus (2010) assess the state of e-government in Zambia and find it to be generally weak. They focus their attention on the availability and functionality of e-government websites in Zambia and Texas. The authors propose a public private partnership (PPP) model for Zambian e-government, along the lines of the TexasOnline portal in the US state of Texas. TexasOnline is operated by a private company, BearingPoint, under the oversight of the Texas Department of Information Resources.

This article makes an important contribution to studies of e-government in Zambia by providing multiple perspectives gained from government; the private and NGO sectors; ICT specialists and non-specialists; network operators and network solution providers; and application developers and application users, including end-users and those providing them with technical support. The article critically analyses e-government in Zambia, so as to shed light on why it has not fulfilled expectations. The analysis leads to the presentation of ideas to improve the state of e-government.

ZAMBIA'S E-GOVERNMENT POLICY EVOLUTION

The key policy documents relating to e-government are the National Information and Communication Technology Policy 2006, the Fifth National Development Plan 2006-2010 and the Sixth National Development Plan 2011-2015.

The National Information and Communication Technology Policy (Government of Zambia, 2006b) includes the policy goal of "promoting electronic government"', identifies a number of existing e-government initiatives and targets them for further advancement. Comments on initiatives such as the Integrated Financial Management Information System (IFMIS) are stated in the policy document, noting lack of coordination and integration, ICT infrastructure and a supportive institutional framework; a shortage of ICT specialists in the public sector and concerns about information and network security – all issues requiring attention. A candid account of the IFMIS initiative (Mwango, 2004) argues that although IFMIS scored notable successes, it was hampered by inefficient procurement procedures and extremely high and unsustainable funding requirements.

On e-government as a means to improving public sector management and delivery of services, a number of generic commitments, objectives and proposed strategies are outlined, including the commitment to "develop an E-Government model to facilitate effective and efficient delivery of goods and services in the public sector"; the objective to "transform Government service delivery and improve two-way communication in the management and operation of the public sector"; and the proposal to "develop and implement a comprehensive E-Government strategy targeting: Government to Government (G2G), Government to Business (G2B), Government to Citizens (G2C) and Government to Employee (G2E) services". However, no specific timelines, budgets or implementation responsibilities are provided for and implementation plans, resource mobilisation and monitoring and evaluation are referred to only in broad, generic terms. The policy states that "all [government] sectors shall draw their ICT policies and implementation plans from this policy […] and will be consolidated into The National ICT Implementation Plan, with sub-plans for implementation on a priority basis covering the short, medium and long term …". To the author's knowledge, this nationwide ICT implementation plan has not yet been formulated. There would appear to be significant limitations with respect to the concreteness, coherence and coordination of e-government.

The Fifth National Development Plan, 2006-2010 (Government of Zambia, 2006a) or Fifth Plan, which is contemporaneous with the national ICT policy, does allocate funds for e-government: ZMK4 billion (approximately USD1 million as at December 2006), or about 0.01% of the entire

Fifth Plan core programmes budget. However, this Plan also fails to outline concrete plans, though it does refer to an e-government programme and its associated objective and strategies. Specifically, e-government is included in the "E-Government and ICT Application" programme for the communication and meteorology sector. The programme's objective is "to establish and maintain an integrated and effective information and communications technology system for effective decision-making and dissemination of information". Nine strategies are defined: (a) undertaking a feasibility study to determine information, software and hardware needs for all sectors of the economy; (b) installing a Wide Area Network at central and local government levels; (c) installing an electronic collaboration and communication system for the government; (d) developing ICT skills in government; (e) conducting an e-government readiness assessment; (f) developing sector/Ministry ICT policies; (g) developing websites and Intranet for government ministries and agencies; (h) improving and upgrading communications infrastructure; and (i) improving connectivity.

The Sixth National Development Plan, 2011-2015 (Government of Zambia, 2011), hereafter referred to as the Sixth Plan, appears to address some of the shortcomings of these earlier policy documents. Funding for e-government under the Sixth Plan is increased to ZMK96.6 billion (approximately USD21 million as at January 2011), or about 0.2% of the entire Sixth Plan budget. Additionally, the objective of e-government in the Sixth Plan is defined as: "to establish an integrated e-governance platform", a definite improvement over the e-government objectives defined in the earlier policy documents in terms of brevity, simplicity, clarity and specificity. Furthermore, the Sixth Plan defines three specific e-governance strategies: (a) develop guidelines on e-governance and implementation process; (b) develop the integration of government management information systems; and (c) promote the creation of multi-purpose community centres (banks, post offices, tele-centres, parks and kiosks).

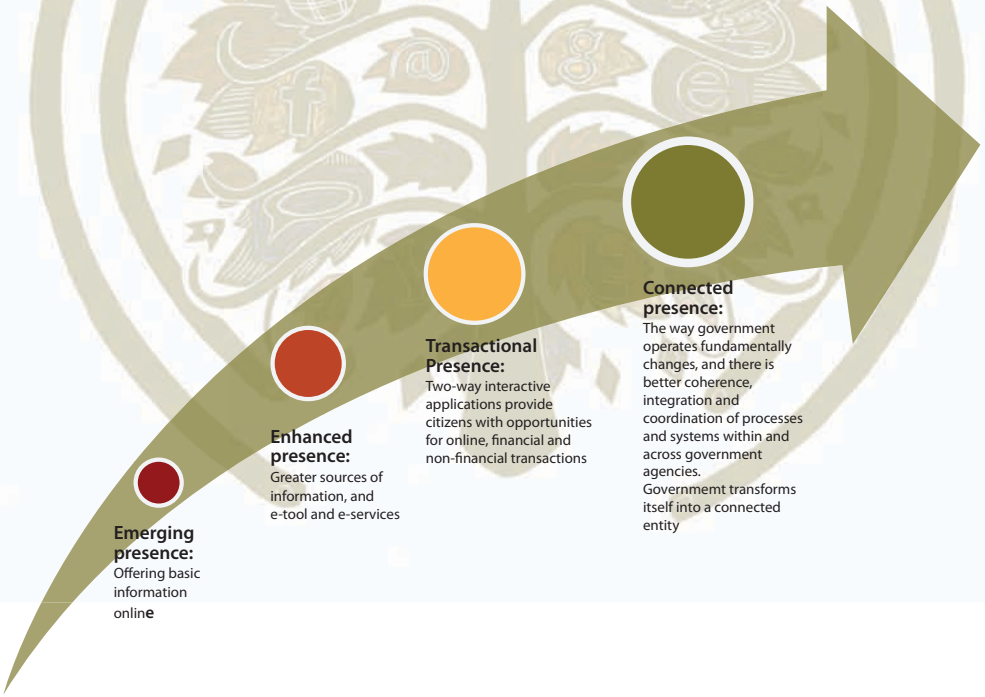
The first two strategies are linked to corresponding projects, deadlines, final outcomes and responsible institutions, although some of the specific details appear to be poorly thought out. For example, the target delivery date for the guidelines on e-governance and implementation process is 2015 (at the end of the five-year plan). Five years seems too long a period just to develop a set of guidelines. Furthermore, the Sixth Plan calls for the integration of government management information systems in the very first year, 2011. One year seems too short a period to implement such an exercise across multiple ministries and nationwide. Inexplicably, no projects are defined for the third strategy on community access.

The Sixth Plan defines key performance indicators (KPIs) in terms of the roll-out of online government services in five government institutions. However, there is no overall responsibility for the e-governance programme and a lack of an integrated view of e-governance in terms of objectives, strategies, projects, deadlines and final outcomes. So while the Sixth National Development Plan does represent progress compared with earlier policies, this is limited and qualified progress.

e-Government as set out in the national policy documents discussed above can be considered in the context of the following guiding documents issued by the regional, continental and global multilateral bodies of which Zambia is a member: the SADC Regional Indicative Strategic Development Plan (SADC, 2004), the NEPAD Framework Document (NEPAD, 2001) and the UN E-Government Survey (UN, 2010), respectively. These three documents recognise and prioritise the vital role of e-government and -governance and provide guidance for future national level policy.

The SADC Development Plan specifically identifies e-government as a priority intervention area: "[ICT] Applications to support e-government – The application of ICT in the public sector must go through a process of re-engineering to ensure that existing inefficiencies are eliminated and the citizens' interests are the focal point". The NEPAD Framework Document recognises that the "intensive use of ICTs can bring unprecedented comparative advantages to the [African] continent [… by giving] impetus to the democratisation process and good governance", and prioritises the application of ICT applications, skills and infrastructure to promote good governance. The UN E-Government Survey provides useful benchmarks for e-government in Zambia, which is currently ranked 143rd out of 192 member states in the UN e-government development index (UN, 2010). In discussing the 2010 UN E-Government Survey, Gupta (2011) proposes a four-stage "presence' model for e-government evolution" (Figure 2).

FIGURE 2: STAGES OF E-GOVERNMENT EVOLUTION



Source: Gupta, 2011

A major weakness of policy in Zambia is the limited consideration to increasing the presence of government in providing online information and e-services, in particular the lack of initiatives aimed at provincial and local government level, with limited opportunity to progress towards e-governance.

LEGAL FRAMEWORK FOR E-GOVERNMENT

The Constitution of the Republic of Zambia (Government of Zambia, 1996; Government of Zambia, 2009a) provides the overarching legal framework for e-government. Laws relating to e-government are subject to the Constitution. Since e-government involves the delivery of government services using ICT, all the laws and regulations directly or indirectly related to the ICT sector are also relevant to e-government. The specific legal framework for e-government can be divided into three broad categories: ICT-related, broadcasting-related, and competition and consumer protection-related laws.

CATEGORY A: ICT-RELATED LEGAL FRAMEWORK

THE INFORMATION AND COMMUNICATION TECHNOLOGIES ACT (2009) (GOVERNMENT OF ZAMBIA, 2009B)

The ICT Act establishes the Zambia Information and Communications Technology Authority (ZICTA) and defines the authority's role in economic and technical regulation: definition of retail and wholesale electronic communications markets subject to regulatory control; determination of dominant market players; regulation of interconnection, access and co-location agreements; regulation of tariffs; radio spectrum management; administration of electronic numbers, names and addresses; technical standards and type approvals for electronic communications equipment (Government of Zambia, 2009b). It stipulates licencing requirements for electronic communications and radio communications. It provides the foundation for the growth of the electronic communications infrastructure sector, which is necessary for e-government.

THE ELECTRONIC COMMUNICATIONS AND TRANSACTIONS ACT (2009) (GOVERNMENT OF ZAMBIA, 2009C)

The ECT Act defines the rules and regulations on electronic communications and transactions. It facilitates e-government interactions and transactions by enabling electronic signatures, secure communications, electronic payments and protection of personal information.

CATEGORY B: BROADCASTING-RELATED LEGAL FRAMEWORK

THE INDEPENDENT BROADCASTING AUTHORITY ACT (2002) (GOVERNMENT OF ZAMBIA, 2002A)

The IBA Act establishes the Independent Broadcasting Authority (IBA) as an independent regulator of the broadcasting sector. Although this Act was passed and assented to almost 10 years ago, the IBA has still not been established. Broadcasting is still regulated directly by the

Ministry of Information, Broadcasting and Tourism. Once the IBA is finally set-up, it is expected to regulate conventional television and radio broadcasting. However, the IBA Act is outdated in terms of advances in technology and service convergence, such as Internet broadcasting. Broadcasting plays an important role in e-government, eg for dissemination of important government alerts.

THE ZAMBIA NATIONAL BROADCASTING CORPORATION ACT (ACT NO. 16 OF 1987, ACT NO. 13 OF 1994, ACT NO. 20 OF 2002) (GOVERNMENT OF ZAMBIA, 2002B)

This set of Acts establishes the Zambia National Broadcasting Corporation (ZNBC), a wholly state-owned radio and TV broadcaster. ZNBC would almost certainly be part of a fully developed e-government. One reason for this is that it has the widest reach of any telecommunications network in Zambia.

CATEGORY C: COMPETITION AND CONSUMER PROTECTION-RELATED LEGAL FRAMEWORK

THE COMPETITION AND CONSUMER PROTECTION ACT (2010) (GOVERNMENT OF ZAMBIA 2010)

This Act continues the Zambia Competition Commission (ZCC) and renames it the Competition and Consumer Protection Commission (CCPC). The mandate of the CCPC is to safeguard and promote competition and to protect consumers from unfair trade practices. The scope of the CCPC covers all commercial sectors, including ICT. Since the ICT sector is inextricably linked to e-government, the Competition and Consumer Protection Act is also relevant to e-government.

ICT SECTOR STRUCTURE AND STATISTICS

The ICT sector includes a mix of privately, part-private/part-state-owned and wholly state-owned companies. The sector has four sub-sectors: broadcasting, fixed telephony, mobile telephony and Internet. The broadcasting sector is dominated by the state-owned ZNBC in both the radio and television segments. ZNBC's biggest rivals in the television segment are MUVI TV (private, terrestrial TV), TBN Zambia (private, terrestrial TV) and Multichoice (private, satellite TV). In the radio segment, however, Zambia has numerous privately owned independent radio stations.

Fixed telephony penetration has been on a downward trend over the past decade; it dropped from 0.8 fixed lines per 100 inhabitants in 2001 to 0.7 fixed lines per 100 inhabitants in 2009 (ZICTA, 2011), declining against population growth.

Zambia was one of the first African countries to be connected to the Internet in 1994 (CTO, 2009). However, growth has been extremely slow due to the high cost of equipment and Internet connectivity. Table 1 shows the statistics in Internet growth for the last decade, with a notable shift to broadband between 2008 and 2009.

TABLE 1: INTERNET SUBSCRIBER STATISTICS FOR ZAMBIA: 2001-2009

Year	Country population	Internet subscribers	Per 100 inhabitants	Type of Internet connectivity		Growth rate (%)
				dial -up	broadband	
2001	10 089 492	8 248	0.082	7 627	621	
2002	10 409 440	11 647	0.112	10 826	821	41
2003	10 774 382	12 000	0.111	10 857	1 143	3
2004	11 089 691	16 288	0.147	15 334	954	36
2005	11 441 469	10 882	0.095	10 179	703	-33
2006	11 574 190	11 996	0.104	10 067	1 929	10
2007	11 708 450	17 946	0.153	12 578	5 368	49.6
2008	11 900 000	18 078	0.152	12 484	5 671	0.73
2009	12 903 039	17 754	0.137	6 684	10 702	-2.9

Source: ZICTA, 2011

Table 2 shows the growth in mobile subscribers over the last decade, noting that mobile Internet access was introduced in 2007.

TABLE 2: MOBILE SUBSCRIBER STATISTICS FOR ZAMBIA: 2000-2009

Year	Country population	Mobile subscribers	Per 100 inhabitants	Mobile Internet	Growth rate (%)
2000	9 885 591	49 957	0.505	-	32.47
2001	10 089 492	97 900	0.97	-	95.97
2002	10 409 440	139 258	1.338	-	42.25
2003	10 774 382	204 150	1.895	-	46.6
2004	11 089 691	413 120	3.725	-	102.36
2005	11 441 469	949 558	8.299	-	129.85
2006	11 574 190	1 663 051	14.369	-	75.14
2007	11 708 450	2 639 026	22.539	215 472	58.68
2008	11 900 000	3 207 679	26.955	791 464	21.54
2009	12 903 039	4 165 101	32.28	No data	17.67

Source: ZICTA, 2011

By 2009, mobile operators had connected over four million subscribers, or about 32% of the population. Although conventional Internet penetration is still extremely low at 0.14% in 2009, mobile Internet penetration has shown strong growth from introduction in 2007 to 6.65% at the end of 2008. Although up-to-date statistics are not currently available, the mobile Internet market may continue its impressive growth. The growing base of mobile connected citizens presents a significant opportunity for the provision of mobile-based e-government in Zambia.

This completes the review of the policy, legal and ICT sector context of e-government in Zambia. We now turn to a brief overview of the governmental system followed by a review of e-government

STRUCTURE AND OPERATION OF GOVERNMENT

Zambia is a landlocked country located in south-central Africa, with a population of approximately 13 million people (CSO, 2011). It is a constitutional republic based on a multi-party democratic political system (Zambia, 1996; Zambia, 2009). Zambia has three tiers of government: national, provincial and local. The country observes a separation of powers at the national level among the Executive which exercises policymaking and executive power, the Parliament, which exercises lawmaking and oversight power; and the judiciary, which exercises judicial power. The 2011 Zambian cabinet, under newly elected President Sata, incorporates 17 ministries, including the ministries of Information, Broadcasting and Tourism, and Transport, Works, Supply and Communications. The civil service in each ministry is headed by a Permanent Secretary, a position which was originally designed to be professional and non-partisan (Larmer, 2010). After independence in 1964, these positions evolved into political appointments. However, the Sata administration appears intent on reversing this trend and depoliticising and re-professionalising the civil service. Provincial government in the 10 provinces of Zambia is headed by a provincial minister, who is not a member of cabinet. Local government operates at city, town or municipal level.

Key development challenges relate to providing jobs, education, healthcare and infrastructure to citizens. In theory, government is designed to operate in a decentralised manner, with delivery of services close to local populations. However, in practice service delivery tends to be centralised to national government. Not surprisingly, this creates many service delivery bottlenecks. Communication and coordination between local authorities and the two upper tiers of government can be fraught with inefficiency and political rivalry. The implementation of e-government has tremendous potential to circumvent such inefficiencies and rivalries when focused on citizens.

REVIEW OF E-GOVERNMENT EMERGENCE

RESEARCH DESIGN

In order to review e-government emergence over the decade 2000-2011, a selection of key respondents from a cross-section of organisations were interviewed. These organisations include ICT network operators, ICT solution providers, government ministries and non-governmental organisations (NGOs). The structured questionnaire asked respondents to comment on success and failure factors, positive and negative examples and recommendations for improved e-government. Despite a small sample size, the responses are valuable in that they draw on knowledgeable individuals, each with more than a decade of first-hand experience of the ICT sector, government and e-government.

KEY FINDINGS

The respondents highlighted some notable progress, but the perspective gained was that e-government is rudimentary in key services sectors, such as the health services. Table 3 sets out an overview of programmes, improvements and challenges at as 2011.

TABLE 3: E-GOVERNMENT PROGRAMMES IN PROGRESS

Department	e-Government programme	Improvements in services or administration	Challenges in services or administration
Government departments (with a few exceptions)	Email and Internet	Online presence facilitates communication between government and external parties. Greater citizen access to information as reports, government speeches and electoral results are published online.	Many ministry websites not regularly updated. Lack of content management system.
Provincial Headquarters and the relevant ministry (for most ministries)	Virtual Private Network (VPN) connectivity	Improved communication between provincial offices and the ministries. Real-time sharing of information.	Poor ICT infrastructure. Budgetary constraints, especially in the face of competing priorities such as roads, schools, hospitals, etc.
Ministry of Finance and National Planning	Integrated Financial Management Information System (IFMIS)	Auditor-General's report shows improved fiscal accountability across government, partly attributable to IFMIS.	Resistance to change from the "old guard".
Ministry of Health	Electronic health records system: SmartCare HIV-monitoring system Pilot projects: SMS-based system for Polymerase Chain Reaction (PCR) lab results, Tele-medicine system HR/payroll systems in several government hospitals	Improved records management. Improved HIV-monitoring. Improved distribution of scarce medical skills. Improved administration of salaries and other HR needs for healthcare workers	Lack of leadership buy-in. Lack of knowledge of potential benefits of ICTs. Fear of replacement by machines.
Ministry of Labour and Social Security	Employment website	Improved transparency and accountability.	Poor access in rural areas.
Ministry of Lands, Energy and Water Development	Lands Management System	Reduced corruption.	Poor accessibility of information to general public.
Ministry of Information, Broadcasting and Tourism	Zambia Tourism Board (ZTB) website	Good information availability and website management.	Lack of information on latest technology platforms such as smartphones and tablets.
Patents and Companies Registration Office (PACRO)	PACRO website	Time taken to register a company is reduced.	No online system to search for company details.
Road Transport and Safety Agency (RTSA)	RTSA Database System	Capacity to keep track of all motor vehicles in Zambia due to effective licensing and registration is said to have contributed to dramatic reduction in car theft.	Long-term sustainability and maintenance.
Zambia Revenue Authority (ZRA)	ZRA Database System	Now easier and faster to get a Tax Personal Identification Number (TPIN), hence easier to track tax contributions from many sources for the same person or company. VAT registration is simpler. Clearing of goods at border points has improved.	Extension of system to cover all ZRA processes and procedures. Improved public accessibility by providing mobile access.

In terms of e-government emergence in the decade 2000-2010, the general picture that emerges from the interview responses is that progress was very slow in the first five years, but improved gradually in the last five years. The respondents' views on the current-status of e-government in Zambia varied from "essentially non-existent", "grossly underdeveloped",

"just beginning for a lot of ministries" to "has really picked up in the last five years or so". This suggests that the overall situation is mixed at best (the optimistic view) or extremely patchy at worst (perhaps the more realistic view).

Particular success factors or drivers for e-government were consistently highlighted by the respondents, including: the need to provide improved transparency and accountability; cost savings and improved efficiencies; increased ICT spending by government; reduced cost of ICT equipment and services; new ICT technologies; the injection of fresh personnel who are ICT-savvy and open to new ways of doing things; and donor funding. A government respondent emphasised citizen engagement as a success factor, specifically, implementing effective public awareness campaigns and stakeholder collaboration processes in order to, for example, enforce citizens' rights to access information and participation in decision-making, pointing to the need to transition to e-governance.

While several successful initiatives were identified by the respondents (see Table 3), examples of failure were cited as: government websites that are online but seldom updated; well-written policies that have not been implemented; and projects that are initiated and launched but not adopted or sustained by their intended users. Overall, e-government in Zambia is beset by numerous weaknesses. The interviews revealed a number of common failure factors or inhibitors, including: lack of stakeholder engagement and involvement; lack of implementation of policies; resistance to change by the "old guard"; corruption leading to the deployment of low quality and ultimately useless ICT solutions; lack of appropriate skills and skilled personnel; lack of foresight and coordination; lack of supporting infrastructure; underfunding; bureaucracy; poor work culture; high import duties on ICTs; cost of ICTs; unsustainable funding.

The most commonly identified drivers in specifically cited e-government successes included donor funding, good local stakeholder involvement and motivated ICT support personnel. The most commonly identified inhibitors in specifically cited e-government failures included poor local stakeholder involvement, poor application design, poor and irregular content management, and demotivated ICT support personnel.

The single most important idea for improvements that emerged from the review was government prioritisation of, and increased investment in, e-government programmes, with appropriate justification and motivation highlighting cost savings and improved efficiencies. Other key ideas include: getting the engagement, involvement and buy-in of key local stakeholders; lowering the cost of ICTs by increased liberalisation and deregulation in the ICT sector; creating a more effective role for the private sector; and studying and emulating e-government successes of other countries.

An overall comparison of the responses reveals that respondents from ICT companies appear to have a fuller understanding of e-government in Zambia when compared with those in government and the NGOs. This is ironic, since government should be at the centre of e-government. The situation can be partly explained by the fact that the ICT companies are in the business of operating ICT networks and creating, deploying and selling ICT solutions to a

wide variety of clients, both inside and outside government. Still, it is worrying that the respondents from government and the NGOs are not well informed about e-government progress outside their individual sectors. This suggests a lack of information sharing and coordination in the e-government initiatives.

CRITICAL ANALYSIS OF E-GOVERNMENT IN ZAMBIA

The data reported here offers a view on a few aspects of e-government, thus providing a basis for understanding and analysis. Analysing the data leads to the interpretation that Zambia is operating between Stage 1: Emerging presence: Offering basic information online and Stage 2: Enhanced presence: Greater sources of information, and e-tools and e-services of the four-stage model of e-governance evolution proposed by Gupta (2011) (Figure 2). The majority of e-government services discussed above are at Stage 1, while a few are at Stage 2. There are no current manifestations of Stage 3: Transactional presence or Stage 4: Connected presence. Although the pace of development in the last decade has been slow and uneven, there are signs that the pace of development is increasing. According to the UN E-Government Survey, Zambia moved up 15 places between 2008 and 2010 (UN, 2010).

The success factors cited by respondents can be classified as internal and external. Internal factors are those within the direct influence or control of government, whereas external factors are not. The most significant internal factor has been Zambia's continuing move towards a more democratic system of government. This has, in turn, promoted increased transparency and accountability in government operations, which can be supported by e-government mechanisms. Donor-funding of projects appears to be the most significant external factor in building e-government. Such projects have provided vital initial stimulus, expertise and funding. However, they have also raised problems, such as poor long-term sustainability. The failure factors or inhibitors cited by the respondents can also be classified as internal (resistance to change) and external (cost of ICTs).

The most important recommendation put forward by the respondents is that government must prioritise e-government programmes. However, the various policy documents examined above indicate that the Zambian government already recognises the importance of e-government, at least on paper. This suggests that the key issue around the adoption and success of e-government in Zambia is not a lack of policy or priority per se, but rather a lack of effective and coordinated implementation of existing policies. The model proposed by Weerakkody et al (2007) (Figure 1) offers an implementation framework for e-government, which addresses many of the issues that emerged from the review. However, to achieve effective and coordinated policy implementation, the process must be supported by two essential elements: policy re-formulation and policy harmonisation.

Policy re-formulation refers to the formulation of new policies, or the reformulation of existing policies, in response to internal or external factors as revealed by research-based analysis. Policy harmonisation refers to mutual changes and adjustments to both e-government and other (related) government policies in order to eliminate inconsistencies and to enhance compatibility. This review indicates that there are numerous e-government programmes in Zambia, many of which are poorly implemented and coordinated and are therefore not achieving

the required effectiveness with respect to improving the quality and availability of public services. The source of the problem often lies in the absence of regular policy re-formulation and policy harmonisation, preferably every three years.

An example of the need for policy reformulation is the requirement to address the vital importance of private sector participation highlighted by respondents in this review and supported by research (Coates & Nikolaus 2010; UN, 2010). In order to stimulate the participation of the private sector, e-government policy must be formulated in such a way that private sector participation is meaningful, rather than an afterthought. Existing policy, such as the Sixth National Development Plan, generically promises to "promote private sector investment and Public Private Partnerships (PPPs)". However, the Sixth Plan does not specifically define any e-government initiatives involving or inviting private sector participation. This is in sharp contrast to other sectors, such as energy, housing, agriculture and transport infrastructure, where a large number of specific programmes and projects are clearly defined in the Sixth Plan.

The example of private sector participation can also be considered in relation to policy harmonisation. Current taxation policy, for instance, discourages the private sector from investing in e-government-related ICT skills and infrastructure, because of high import duties on new software and computing equipment. Another case in point is the current legal and regulatory framework, which is lagging behind the times with respect to technological convergence. In particular, the existing regulations on television broadcasting and Internet services do not permit Internet-based TV transmissions, even though such new technologies provide opportunities for the private sector to support e-government innovation. Furthermore, broadcast regulation is non-existent, whilst the ZNBC continues to enjoy certain monopoly rights in terrestrial television broadcasting. Thus, government policy in these related areas discourages private sector participation in e-government.

The data on the ICT sector indicates that 32% of inhabitants access services via their mobile phone, while approximately 0.14% access services via the Internet (Tables 1 and 2). However, an increasing number of citizens access the Internet via a mobile phone. Consequently, the mobile phone should be the primary e-government channel for Zambian citizens, with the Internet being developed as a secondary channel.

The e-government initiatives in Zambia that have achieved sustained success appear to share two main characteristics: they are government priorities and they have won the long-term support of local stakeholders. This raises two questions. The first question is: What causes government to prioritise certain e-government initiatives? External factors constitute one potential set of influences. Mwango (2004)[1] reported that the adoption of IFMIS under the IMF and World Bank's HIPC[2] programme encouraged the Zambian government to prioritise the implementation of IFMIS. Indeed, the data indicates that many initiatives begin as donor-initiated and donor-funded projects. Various internal factors are also influential in setting government priorities, including the relative power and interest of particular ministries.

1 Zambia's then Accountant-General

2 HIPC = Heavily indebted poor countries

The second question is: Why do certain e-government initiatives win the long-term support of local stakeholders? The data indicates that local stakeholders are won over by tangible benefits. Zambian citizens are, of course, the most important stakeholders. However, government employees and government leaders are equally essential stakeholders.

Discussion of both these questions points to leadership as a crucial factor in the success of e-government. The review reveals many failure factors, some internal and some external. However, leadership is the crucial factor, because it is leaders who decide how to drive initiatives or respond to internal and external factors. In the case of resistance to change (internal failure factor), government can introduce e-governance-related incentives and performance measures, whereas for cost of ICTs (external failure factor), government can introduce measures to reduce the total cost of ownership of ICTs.

The review indicates that Zambia's e-government strategy tends to be highly fragmented and lacking in focused and concerted leadership. A "lack of foresight [or vision] and coordination" is identified as a key weakness by some respondents. One of the root causes for this conspicuous lack of vision and coordination is that many e-governance projects are initiated and funded by donors. It is not surprising, therefore, that these projects do not appear to be part of any cohesive plan. Without effective national leadership and the vision it provides, policies are unlikely to be converted into results.

POLICY RECOMMENDATIONS

Zambia has the potential to enter a period of rapid and transformative economic development. Based on the increase in its gross national income (GNI) per capita, Zambia was recently reclassified by the World Bank from a low-income country to a lower middle-income country (World Bank, 2011). A recent study reported in The Economist forecasts that over the next five years (2011-2015), Zambia will be among the world's rapidly-growing economies (6.9% annual average GDP growth) (The Economist, 2011).

Improving the performance of government through e-government is an important way for government to help realise this economic potential. e-Government contributes to realising economic potential by improving the effectiveness and efficiency of delivering government services. An example of a potential economic benefit due to improved effectiveness is better government financial systems (the IFMIS and ZRA systems); these systems reduce financial malpractice and increase tax revenues, which in turn provide more financial resources to improve public health, education and infrastructure. An example of a potential economic benefit due to improved efficiency is better government licensing and registration systems (the PACRO and RTSA systems); these systems save valuable time and money for government, companies and individuals and thereby improve overall economic productivity.

Based on the results of this study, the following six areas for policy reform towards enhancing e-government are recommended:

LEADERSHIP

The analysis indicates that the success and failure factors, whether internal or external in nature, are related to the exercise of leadership. This is particularly so since the transition from traditional government to e-government demands strong leaderships skills in terms of vision, communication and change management. To succeed, e-government must become a key performance area (KPA) for all three spheres of government and should not be relegated to being donor-funded projects. In particular, leadership should guide the process of selecting low-risk, high-value and high-risk, high-value projects (Weerakkody et al, 2007) and ensuring their success based on an understanding of internal and external success factors.

STAKEHOLDER ENGAGEMENT

Leadership can best be exercised by getting the buy-in, engagement and participation of key stakeholders. The critical "missing" stakeholders include the political leadership at national, provincial and local level, citizens and the private sector. A few segments of the civil service are most closely engaged with e-government initiatives, a necessary but far from sufficient state of affairs.

Another key group of stakeholders that tends to be neglected is the non-governmental (NGO) sector. In Zambia, NGOs are deeply involved with the provision of many basic services, such as health and education. Consequently, they too must be included in the implementation of e-government programmes.

Finally, Zambian universities and other local research institutions must be engaged. Much of what passes for "Zambian" e-government is merely imported from abroad. As a result, most existing e-government policies and technologies are not designed for local conditions. Local research institutions must be fully incorporated in the design of e-government policies and technology approaches.

PRIORITISATION

The review indicates that e-government is not a top priority for the Zambian government. Although good governance is recognised as a cross-cutting issue in both the Fifth and Sixth National Development Plans, e-governance is not. e-Government tends to be viewed as an expensive luxury, rather than a vital tool for significantly improving government performance. This view fails to recognise the significant benefits, economic and otherwise, that can be realised. Only when e-government is given priority throughout government can it be expected to consistently deliver significant results, instead of the few pockets of excellence that currently exist.

INCREASED FUNDING

National funding for e-government is woefully inadequate. As noted above, e-government only accounted for approximately USD1 million, or about 0.01% of the Fifth Plan (2006-2010) core programmes budget, and approximately USD21 million, or about 0.2% of the Sixth Plan (2011-2015) budget. Most of the existing funding for e-government projects comes from donors. Increased funding from government sources is required to move away from donor dependency.

One possible project management and funding model would incorporate centralised and decentralised elements. Each individual ministry would be responsible for the management and implementation of its own e-government projects, under the general oversight of a department tasked with national e-government policy, monitoring and evaluation. A measure of centralisation would enable the government to effectively coordinate and monitor e-government projects, as well as save money by exploiting economies of scale for purchases of services and equipment.

Funding for the e-government programme should be viewed as investments rather than merely as an expense. The aggregate "return" on these investments in terms of service delivery, operational efficiencies, cost savings and increased revenues could then be quantified in a well-defined index. The quality and quantity of funding should be monitored and measured. Alternative sources of funding include: re-allocated funds from existing budgets that would be more efficiently and effectively spent on e-education or e-health; cost savings realised from e-government initiatives; usage charges for e-government transactions; and private sector participation.

PRIVATE SECTOR PARTICIPATION

Private sector participation in e-governance should be promoted. This could take various forms ranging from simple client-vendor relationships to different forms of public private partnerships (PPPs). In simple client-vendor relationships, private companies can provide various e-governance services on behalf of government in return for user fees. A few examples of such client-vendor relationships in the area of e-government already exist, but there is considerable scope to develop them even further. PPPs can take different forms, including simple partnerships, joint ventures and special-purpose vehicles. The author is not aware of any existing PPPs in the area of e-government in Zambia. However, there are many examples of successful PPPs in other sectors such as mining, energy and real estate, from which lessons can be drawn for e-governance.

MOBILE CHANNELS

As they are the most widely used and available ICT devices in Zambia, mobile devices should be the platform of choice for e-services. The majority of existing applications appear to be targeted at Internet users, though fixed and mobile Internet connectivity is currently low. This current state presents opportunities for mobile-based e-governance applications to be developed. At the lower end, this includes SMS-based notifications on health test results or applications for government documents or licenses. At the higher end, electronic payments for government services could be designed via mobile phone.

CONCLUSION

This article presents a critical analysis of e-government in Zambia based on the results of a small sample study, conducted by interviews with key respondents representing multiple perspectives. The analysis indicates that, despite a few notable successes, e-government is highly fragmented and uncoordinated, mainly due to a lack of focused and concerted leadership. The policy recommendations that emerge from the study indicate the need to vigorously promote private sector participation and the development of locally-relevant, mobile phone-based applications.

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SEVEN: e-GOVERNMENT LESSONS FROM SOUTH AFRICA 2001 – 2011: INSTITUTIONS, STATE OF PROGRESS AND MEASUREMENT

Fanie Cloete,
Department of Public Governance, University of Johannesburg, South Africa

ABSTRACT: Electronic governance is the future of public governance globally. Governments that do not make the transition from paper-based systems of public administration to electronic platforms of public governance may swiftly undermine their chances of developing their societies as 21st century information societies. At the turn of the century, South Africa started out as a leader in e-government among developing countries. A decade later, it has been surpassed by states that were much less developed. Why did this happen? Can the competitive edge that South Africa had 10 years ago be regained, and if so, how? This article summarises the strategic importance of the shift from paper-based public administration to electronic governance. It uses the Rorissa, Demissie and Pardo (2011) model of e-government assessment to analyse progress in South Africa's migration to a digital state. It presents a perspective on institutional arrangements, the state of e-government and the e-barometer measurement approach. It discusses the reasons behind the decade-long stagnation in the South African migration to electronic platforms of governance and concludes by identifying the main policy and implementation lessons that can be learned. These lessons may have relevance to many developing countries, including those on the African continent.

KEYWORDS:
electronic governance, South Africa, stagnation, migration

THE INTERNATIONAL e-GOVERNANCE PARADIGM SHIFT

The 21st century has witnessed a noticeable shift away from the public administration paradigm that developed in the 19th and 20th centuries as a demand-side paper-based system of governmental recordkeeping and request-driven services to the public. The shift to an experimental supply-side system of digital or electronic government encompasses an increasing number of functions and services made available online via fixed or mobile electronic networks and devices. This shift is a direct consequence of the information revolution. In theory, electronic government has the potential to increase the effectiveness of government, as well as to transform the nature of public management and governance through electronic governance. In practice, though, this potential for better government and governance has not materialised to the extent that advocates of the new paradigm predicted, particularly in respect of developing countries.

In order to put the elements of e-governance in perspective, the following conceptual clarifications are made. Government is referred to here as the organs of state, as well as the governing functions, activities and operations. e-Government comprises the operations of government through the use of electronic technologies including computers, the Internet and mobile

and broadcasting technologies (UN–DPADM, 2003.) Governance is defined here as the style and outcomes of interaction between government and society (Kooiman, 1993; Cloete, 2000). Good governance is understood as:

> the achievement by a democratic government of the most appropriate developmental policy objectives to sustainably develop its society, by mobilising, applying and coordinating all available resources in the public, private and voluntary sectors, domestically and internationally, in the most effective, efficient and democratic way (Cloete, 2003, p. 15).

Different models of e-government share the following components and consecutive developmental stages, although the terminology used to identify these stages sometimes differs from author to author (Rorissa, Demissie & Pardo, 2011). All models identify a transition from traditional paper-based services to fully digital services, ranging from elementary information provision through digitally enhanced and supported offerings to full conclusion of a public service. Four separate stages are normally identified:

(1) Online information provision about the regulatory and policy frameworks that govern the country and availability of governmental services. Online provision of services runs parallel with walk-in service delivery centres and provides alternative electronic access to information.

(2) The second stage of e-government is a more dynamic, interactive and responsive digital communication capability between government and citizen, where interaction can take place via phone or Internet to obtain clarity about an issue, to submit documentation, or to schedule a service. At this stage of evolution, e-participation and e-democracy are approaches that advance the interaction between citizens and their elected political representatives (Missingham, 2011).

(3) The more advanced stage of e-government is the transaction completion stage, where payments can be made electronically and documents received via electronic means.

(4) The last stage is the transformation stage where e-government outputs are transformed into e-governance outcomes in that public services and governance interactions are exclusively electronically mediated. Government thus fully restructures both its back office management systems and its front office service delivery systems to reduce the number of physical interactions with the public and to conclude the business of government digitally (Weerakkody, Janssen & Dwivedi, 2011; Cloete, 2005). At this stage, government could become virtual in certain sectors.

Evidence of the benefits of electronic technologies in government has emerged over the last decade (EJISDC, 2011; Cloete, 2005; egov4dev, 2003; UN-DPADM, 2003; UNPAN, 2003). Indications exist that electronic services delivery is more cost-effective than traditional

delivery systems (Netherlands, 2004; Heeks, 1999). The Third Global Forum on Reinventing Government concluded as early as 2001 that e-government can consistently improve quality of life, reduce cost and time for service delivery and improve governance:

> e-Government must be given serious consideration also in the developing countries not only for its potential for stronger institutional capacity-building, for better service delivery for citizens and business (thus increasing local social and economic development), for reducing corruption by increasing transparency and social control, but also for "showing the way" to the civil society and business community … transforms governance like no previous reform or reinvention initiative. e-Government potentially empowers individual citizens by providing them with an alternative channel for accessing information and services and interacting with government (UN–DPEPA, 2001, pp. 5 and 6).

From this perspective, information technology (IT) is an important agent to induce citizens to become more literate in order to benefit from the advantages presented by technology (UN–HDR, 2001; Bhatnagar, 2000). This view is expressed with respect to lesser and more developed countries, for example, illustrations of successful knowledge management projects in developing countries (Wagner, Cheung & Fion Lee 2003) and the successful application of small-scale decision support technologies in Tanzania, which has an agriculture-based economy (Splettstoesser & Kimaro, 2000). However, in a recent article, Unwin (2011) casts doubt on the promotion of ICTs in developing countries, because of the potential for abuse of these technologies by governments, inter alia, to reduce citizens' rights to privacy and to strengthen government controls over the citizenry. This argument is also applicable to more developed states and would appear to be paternalistic, "Luddite-type" resistance to the use of innovative approaches in developing societies. Despite the few successes of IT projects in developing countries (EJISDC, 2011), many cases of failure have been recorded (EJISDC, 2011; Dada, 2006; egov4dev, 2003; UN–DPADM, 2003). In most cases, the reasons for failure can be attributed to one or more constraints.

International agencies like the UN and its sub-agencies, as well as other international agencies involved in development, have generally accepted electronic interaction as the standard international approach (Cloete, 2005; Heeks, 2002; Heeks, 2001), such that e-development has become common terminology in the development context. Digital exclusion (Cloete, 2005) has serious implications for poor countries with inadequate digital resources, as they may struggle to improve key aspects of good governance and survival of poor communities, given the absence of increasing sophistication in back office management and front office interaction with citizens. Yet the mass development impact of electronic technologies is evident in the increasing reliance on these tools in influencing democratic outcomes, such as in the successful Obama election campaign in the USA in 2008, and in the use of social networking technologies in the social uprisings and democratising transformations in North Africa, where they have been used effectively against authoritarian governments. These experiences further negate Unwin's (2011) argument.

READINESS FOR E-GOVERNMENT IN DEVELOPING COUNTRIES

In contrast to the successes of e-government and e-governance across the world, the results in developing countries are generally weak, with some small-scale successes. The reason for this state of affairs is that there are a number of favourable political, cultural, social, economic and technological conditions that need to exist for the e-government and later the e-governance paradigm shift to take hold (Cloete, 2005). These conditions include:

(a) the political insight of decision-makers that e-government is a necessity for progress, not a luxury;

(b) cultural and individual acceptance of e-government as necessary for progress (Harris & Harris, 2011; Khalil, 2011; Lin, Fofanah & Liang, 2011);

(c) the prioritisation of scarce resources to develop digital literacy among citizens and reliable electronic networks (Narayan, 2007); as well as

(d) effective programme and project management practices to ensure that measurable progress is made with development of the e-government system and appropriate electronic content (Reddick, 2011).

These conditions are difficult to establish in the short term in countries where electronic government is competing with other priorities, such as housing and health services, where unemployment is high, or where undemocratic governments syphon off scarce social resources.

INSTITUTIONAL ENVIRONMENT FOR E-GOVERNANCE IN SOUTH AFRICA 2001 – -2011

South African government accepted the imperative of e-government as a platform for public service delivery early on. e-Government in South Africa can be traced back to the recommendations by the Presidential Commission on the Transformation of the Public Service (PRC, 1998, Section 6.9), which required that the role of IT in government should be strengthened through the formulation of a national information management strategy, a Chief Information Officer (CIO) based in the Presidency, a policy committee and a technology forum comprising managers and users of the system. The PRC recommended that "… government gives serious consideration to migrating to completely electronic communication within the next five years" (PRC, 1998, section 6.9.9). The recommendations influenced establishment of the State Information Technology Agency (SITA), whose role is to rationalise information technology (IT) procurement, provide IT-related services and support effective use of IT in government. Since inception, however, SITA has suffered management problems and by 2011 has not played its role as envisaged by the PRC and its constituting legislation.

The Minister of Public Service and Administration (MPSA) is responsible for overall policymaking on electronic government and published a formal e-Government Policy in 2001 (DPSA, 2001). The e-government programme had commenced in 1999, after publication of the PRC report (1998), with the goal of transforming the interaction between government and society from the

paper-based modes to electronic interaction, in line with international practice. The aim was the improvement of public services, the improvement of the internal management of public services, focusing on improved productivity and cost-effectiveness, inter-operability, information technology security, economies of scale, and the elimination of duplication in the delivery cycle (DPSA, 2001). An integrated life-cycle approach to public services, to be completed by 2014, was adopted in principle in 2002.

Progress with e-government implementation beyond this policy statement has, however, been negligible (Abrahams, 2009). This crucial early lead was soon lost through weak political leadership and ineffective management of the e-government ministerial portfolio. e-Government was a small part of the responsible minister's mandate and a number of other political and administrative crises soon diverted attention to a seemingly more urgent need for the establishment of a system of contractual appointments for senior managers in the public service, the management of labour negotiations to reduce the detrimental impact of public sector wage strikes, and interventions in a number of provincial governments to address mismanagement of provincial resources and service delivery. This lack of committed leadership has continued under subsequent ministers. The leadership vacuum was aggravated by a policy framework that was vague and inadequate to deal with the emerging importance of ICTs in government. The 2001 policy was intended as an interim policy framework until a more comprehensive one could be adopted. The policy has been under revision since publication, but no update is available after 10 years. Weak leadership and a policy hiatus present a serious obstacle to the implementation of e-government, alongside other structural and operational constraints which have paralysed the advance of e-government.

Simultaneously with the adoption of the e-government policy in 2001, the Government Information Technology Council (GITOC), consisting of government information officers (GIOs) from all departments, was established as a third agency to monitor and coordinate government IT initiatives and give direction to SITA (GITOC, 2011a). GITOC reports to the MPSA, and the Government Chief Information Officer (GCIO) in the Department of Public Service and Administration acts as the Secretariat of GITOC. A decade after the establishment of GITOC, the forum has not fulfilled the expectations generated by its establishment. The relationship between the GCIO and the Council has been under continuous strain, partly because the Council elected one of the departmental GITOs as chairperson, while GITOs are seen as subordinate to the GCIO in terms of the GITOC structure. This structural–political defect in the operation of the Council has had a paralysing effect on the activities of the Council.

In June 2011, GITOC published a new draft framework for a government-wide ICT strategy, containing proposals to rationalise the approach of government to the use of ICTs (GITOC, 2011b). This framework updates the outdated 2001 policy and factors in a number of new priorities that have been identified by government since the publication of the policy. It is merely a revised general statement of commitment towards e-government, but does not contain concrete steps to take this initiative further. It may be incorporated into a revised policy which is sorely needed to focus attention on e-government in South Africa. A recent media report, however, concluded that the DPSA has so far failed to deliver on the promise

of an effective national ICT policy framework (Mawson & Rasool, 2012).

Another important player in this field is the Ministry of Communications, which is politically responsible for electronic communications policy, strategy and legislation. This political mandate overlaps with that of the MPSA, which is politically responsible for government information systems and electronic government, with both GITOC and SITA reporting to it. In 2002, the Presidential International Advisory Council on the Information Society and Development (PIAC on ISAD) and the Presidential National Council on Information Society and Development (PNC–ISAD) were created in the Presidency (PNC–ISAD, 2005). The PIAC was constituted of global industry leaders and the PNC of high profile national stakeholders and industry leaders in the IT and development sectors. The Secretariat of the PNC reports to the Department of Communications (DoC). This has exacerbated the lack of dedicated leadership with respect to e-government and has institutionalised competing power bases in this arena.

In a 2006 policy guideline, the PNC identified five priority focus areas for ICT applications. These focus areas are education; health; small, medium and micro enterprise (SMME) development; e-government and associated local content production (PNC–ISAD, 2006; PNC–ISAD, 2010). Government's stated principles on the information society are inclusivity and a developmental approach (PNC–ISAD, 2006). Specific strategies were to be devised to address public awareness and motivation, digital empowerment, accessibility, affordability and disability (PNC–ISAD, 2006; PNC–ISAD, 2009). However, little has come of these good intentions in the five years since publication of the document, as a result of weak management in the PNC Secretariat. The PNC operates in a vacuum, with little regular contact with the other main players in the sector. Given its theoretically pivotal position, it is ironic that the website of the PNC–ISAD is probably one of the less useful websites in the South African government's portal.

The Department of Science and Technology (DST), responsible for fostering research and innovation, is yet another department with overlapping functions that adds complexity to efficient and effective policy and operations in this sector. The diverse, wide-ranging regulatory frameworks operating in government divide control over e-government and e-development among different departments and agencies without specifying the power relationships among them clearly. The ICT-governance structures leave too much space for individual interpretations of who is responsible for what, leading to infighting, power struggles and paralysis within the decision-making and governance system. This problem partly explains the failure to capitalise on the country's early-adopter lead over the decade 2001-2011.

STATE OF E-GOVERNANCE IN SOUTH AFRICA 2001 – -2011

In 2011, 10 years after the adoption of the e-Government Policy, the e-government programme was still largely stuck at the stage of static information provision, although limited progress has been made in the various spheres of government towards the interactive and transactional stages. An example of the interactive phase is that of enabling land-owners who have submitted building plans to Johannesburg municipality to monitor progress on the approval of plans online and to interact with the responsible unit to address any obstacles in this process. Naidoo (2007) provides a useful summary and assessment of the major e-government programmes in the South

African public sector during the last decade. These include the e-Natis online vehicle and transport management system, which initially suffered from serious technical problems. These were resolved and the system is now operational. Other potentially beneficial e-governance programmes summarised by Naidoo (2007), which are currently in various stages of implementation, include the e-Justice programme to improve judicial processes, the e-Hanis programme to streamline and integrate personal identification data across government departments through the use of unique identifiers, and the National Automated Archival Information Retrieval System (NAAIRS) to facilitate access to public archived records. Probably the most successful example of a transactional e-government service is the electronic filing of tax returns which the South African Revenue Service (SARS) has implemented with great success over at least five years.

Other individual instances of successful e-government implementation include the national governmental gateway portal, South Africa Government Online available at www.gov.za which enables access to information on government and public services. However, a recent media report titled "Government IT fails SA", summarises the conclusion of the Auditor General that 92% of the 38 national departments did not fully comply with user–access management controls, while 81% did not have full security management systems in place and 79% did not have a complete IT governance framework (Mawson, 2012).

The provincial governments have their own portals, the best functioning of which are the Gauteng Provincial Government and the Western Cape Provincial Government. The Cape Gateway portal probably led the way (Cape Gateway, 2004; PGWC; 2005), although in a 2006 review, De Tolly, Maumbe and Alexander argued that more content was needed, there was a need for centralised content management, a stronger technology base, more specialist skills, the development of a more dedicated e-culture, better access and a systematic monitoring and evaluation programme. The authors also stressed the strategic importance of mobile government strategies to optimise the functionality of the system. However, in this author's personal discussions with the managers of the system, it became clear that they are finding it increasingly difficult to maintain and upgrade the portal to meet continuously emerging needs. Basic information like contact details and addresses are not updated on the portal, while important new documentation is not made available immediately after publication, or not added at all. The initial undertaking to increasingly provide content on the portal in English, Afrikaans and isiXhosa has also not materialised.

The Gauteng provincial portal has elicited explicit reports in the media of a failure of the system (Rasool, 2011), although it started off well with an attempt to create a one-stop-shop access channel to services provided by the Gauteng Provincial Government (Abrahams & Newton-Reid, 2008). The Gauteng Shared Services Centre (GSSC), responsible for providing IT services and introducing provincial broadband infrastructure (G-Link) to support educational and healthcare applications in schools and provincial hospitals, created high expectations, but it collapsed and the most viable of its core functions have been incorporated into the Gauteng Provincial Finance Department (Mahlong & Jones, 2010).

The South African e-government programme also extends to local government level, the best examples of which are programmes of the metropolitan municipalities of Cape Town, Johannesburg, Ekurhuleni, Tshwane and eThekwini. Cape Town has an integrated GIS-based application that has improved the efficiency and effectiveness of a number of its technical and financial operations significantly (Cloete & Needham, 2004). The Smart Cape Access project and the Digital Business Centres project were supplemented by the Khulisa Youth Development Programme focusing on equipping young people from previously disadvantaged communities with ICT technical skills to operate in the new economy. This programme is one of the largest learnership programmes in the country. Community empowerment was addressed through community computer literacy programmes and the establishment of computer workstations linked through electronic networks to the municipality and the provincial library and school systems.

Van den Berg, Van der Meer, Van Winden & Woets (2006) compare Cape Town and Johannesburg relatively favourably with what they regard as other good international practices of local e-government like Barcelona, Manchester, Tampere, The Hague and Venice, but concluded that it was still not possible for them to state unequivocally that e-government improved the total performance of municipalities, because of citizen dissatisfaction with many of these local governments. Abrahams & Newton-Reid (2008) concluded that the websites of Gauteng municipalities provided a mixed bag of effective and ineffective services across a number of sectors at that time, and that these services were mostly in the information provision and in a few cases in the interactive or transactional stages of the generic e-government transition model. They report a number of e-local government good practices for social and local economic development in the Gauteng metropolitan municipalities of Johannesburg, Ekurhuleni and Tshwane, in particular call centres for emergency and police services. The authors developed a useful strategic e-governance framework to achieve better results in these sectors, but it is not clear whether this model has been adopted by the provincial or municipal governments.

MONITORING, EVALUATION AND BENCHMARKING SOUTH AFRICA'S E-GOVERNANCE STATUS

In an era of evidence-based decision-making, systematic monitoring and evaluation of public sector interventions in society is becoming increasingly imperative. Rorissa, Demissie and Pardo (2011) report on their recent comparative international assessment of different e-government measuring scales. They summarise a number of indices developed by various United Nations (UN) agencies and the International Telecommunications Union (ITU), and point out the similarities and differences as well as the strong and weak points among them (Rorissa et al, 2011). They find all the existing indices defective and crude. Based on this assessment, they construct a composite e-government index, consisting of six dimensions, that measures the different levels of e-government progress among societies, to accommodate both well developed and lesser developed e-government systems. The composite index uses West's Global Survey (2007), based on the number of websites in a country sponsored by the government, as a departure point. Its weakness is that it ignores the quality and functionality of the sites it analysed (Rorissa et al, 2011; Kaisara & Pather, 2009; Visser & Twinomurinzi, 2009).

Rorissa, Demissie and Pardo (2011) developed the composite evaluation model by supplementing the West model in the following ways:

- weighting websites with greater levels of development higher than websites at lower developmental levels;
- weighting websites with executable services higher than websites without such services;
- weighting countries with a greater average e-government presence higher than countries with a lower average e-government presence;
- weighting websites with executable services higher by multiplying the number of executable services with the number of features per website instead of just adding the two; and lastly
- combining the last two calculations to remove the bias against websites that have no executable services.

The Rorissa et al (2011) evaluation index is an innovative and useful way of trying to measure the results of the transition to higher order e-governance outcomes, because it provides a more nuanced result than other existing indices. It is more complicated to populate and apply, especially in developing country contexts, but herein lies its value. The authors applied their measurement framework to African states and concluded that the best progress in e-government in Africa appears to be, in order of progress, Egypt, Tunisia, Morocco, Mauritius and South Africa (Rorissa et al, 2011). The weaknesses they find in the South African e-government system correlate with the qualitative assessments summarised above.

The South African Department of Communications recently introduced a measuring instrument, styled the e-barometer (DoC, 2011), which aims to measure:

a) electronic development progress in South Africa in the three dimensions of access, uptake and usage;

b) electronic development in nine segments (individuals, households, communities, business, government, health, education, digital local content and the ICT sector);

c) progress against government's policy objectives;

d) comparative progress of South Africa against the BRICS peer countries of Brazil, Russia, India and China; and

e) comparative progress against the broad international community.

The 2011 e-barometer report measured the changes in the South African e-government status between 2000 to 2010. It reported that in comparison with its peers in the BRICS, South Africa's ranking in 15 international indices has typically been in the second or third quartile, but its ranking over the last few years "… is stagnant or slipping", while its BRICS peers have generally improved their respective rankings (DoC, 2011, p. 17). The report states that South Africa

> … is currently advancing slower than it should be and instead of progressing towards the top quartile of countries it is slipping back towards the third quartile … tends to do better on indices that contain a number of non-ICT infrastructure indicators covering areas such as the business, legal or social environment … and does less well on the more infrastructure focused indices (DoC, 2011, p. 17).

The report identified the following bottlenecks that are pertinent to e-government (DoC, 2011, pp. 28-43):

- individual and household sector: limited access to and high cost of broadband Internet, high cost of mobile devices and services;
- community sector: low levels of public access to Internet and appropriate content;
- ICT sector: lack of specialised ICT skills;
- e-government sector: need for revised policy and implementation strategy, stakeholder role clarification, appropriate targets, outcomes and budgets;
- e-education sector: lack of clear strategy and goals;
- e-health sector: lacking monitoring and evaluation capacity aligned to ICT strategy;
- e-business and SMME sector: measurement indicators lacking; and
- digital local content sector: appropriate strategy and indicators lacking.

The report concludes that:

> Most economies of the world are making deliberate and sustained investments into transforming their societies into Information Societies. Belonging to the global Information Society is not a "nice to have" but an imperative for the future. South Africa's e-readiness has nearly ground to a halt. In many ways it is retrogressing – especially when evaluated against both big and small nations … the country's leadership has to continue to commit itself and the country to the ideal, and put effort and resources towards achievement of that mountain top (DoC, 2011, pp. 44-46).

The overall conclusion that can be drawn from the 2011 DoC e-barometer results is that although South Africa has built up a reasonably strong ICT backbone and local e-government content in a few sectors, initiatives to integrate e-government into mainstream public management processes have so far not been successful. Such integration is necessary to progress towards higher order transactional and transformational status.

ANALYTICAL COMMENTS

This discussion of e-government progress in South Africa has focused on three dimensions: the institutional environment of e-government, the current state of transition and the monitoring and evaluation of e-government progress. The e-government transition model of Rorissa, Demissie & Pardo (2011), summarised above, is a generic e-government maturity model that is globally applicable in different contexts. It explains how electronic technologies can be coherently and progressively integrated into public sector management processes to such an extent that public services can become more easily accessible to the public, and can potentially be provided more effectively, efficiently and affordably. It also predicts that the optimal use of these technologies has the potential to lead to a fundamental transformation in the nature of public management itself (see also Cloete, 2003).

The evidence presented here indicates that e-government in South Africa has made little progress beyond the information provision stage. A few pockets of excellence do exist, where electronic interaction between government and citizen, and transaction completion, is possible, but these cases are exceptions to the more dismal prevailing practice of static information provision.

The decade 2001-2011 has witnessed governments in many developing countries failing to meet the needs, expectations and demands of citizens through their service delivery programmes, as a result of traditional delivery weaknesses, including deficits in human knowledge and skills, financial resource constraints, lack of effective public management and good governance practices (Cloete, 2003). As is clear from the case of South Africa, the most significant obstacle to the optimal use of ICT in government is not necessarily resource-related. Rather, there are many design obstacles, including an inability or unwillingness to draw on the potential contained in the global technological revolution to support good governance, and the domino effect of inadequate resource prioritisation towards e-government (Cloete, 2005). Aggravating factors that have come to light since 2005 include inadequate levels of management diligence and productivity, and the absence or late introduction of monitoring and evaluation approaches.

The most important constraints on progress towards more mature e-governnance in South Africa are to be found in the institutional environment of e-government. These constraints include a lack of political will and support; a lack of strong and consistent leadership; a weak and contradictory IT governance framework; and continuous political and bureaucratic infighting. This is a recipe for impending disaster, the nature and scope of which are becoming increasingly obvious in the lack of results and management paralysis that prevails in the public sector, as highlighted in public reports and the media. The institutional problems have a negative impact on attempts to migrate to more mature levels of e-governance, as the constraints combine to cause a general stagnation in the governmental IT system.

There are a few sectors where strong leadership, based on an awareness of the strategic importance of electronic platforms of services delivery, have led to the prioritisation of investment in ICT infrastructure and the creation of user-friendly content that has seen a take-up by the intended recipients. The success of the SARS e-filing system and the exponential growth of the mobile phone market, especially in rural areas, provide evidence that the digital divide is less serious where the product is appropriate to the existing demand. Consistent attention to priorities, strong leadership and management can make a significant difference in the outcomes of public programmes, and the transition to mature e-governance can be fast-tracked.

The introduction of the South African e-barometer is a major step forward for the country. It is an ambitious project and the barometer framework has not yet been populated with all the necessary data to be able to draw coherent conclusions about the overall state of e-government and e-governance in the country. Much of the data must still be compiled and analysed. However, the preliminary findings, summarised in the first report, reinforce the Rorrissa et al (2011) findings on the current state of e-government. The rating of South Africa below Egypt, Tunisia, Morocco and Mauritius confirms the slippage that has occurred in e-government over the last decade.

LESSONS FROM THE SOUTH AFRICAN -E GOVERNMENT EXPERIENCE

A number of lessons can be drawn from the overview of a decade of e-government in South Africa. These lessons are also relevant for other countries in the developing world, especially in Africa. The most important lesson is that leadership, coordination and integration, the presence of a coherent e-government policy, as well as sectoral strategies for, among others, education, community libraries and other local government services, are essential.

The obstacles to governmental and societal transformation can be overcome by a transformation in value systems that lead to an organisational climate more conducive to successful implementation and sustainability of an e-governance paradigm. Technological development aid will not enable developing countries to advance to the level of better-endowed states. Progress can only be achieved if policy shifts are made and e-government programmes are placed under strong and competent leadership. For that to happen, a crucial paradigm shift is required in the minds of the ruling elite to enable acceptance of the strategic importance of public services delivery transformation towards an increasing digital platform of delivery. If such a commitment is accompanied by a dedicated focus on establishing the IT infrastructure, local content and higher levels of digital literacy for this purpose, conditions more conducive to better social access, uptake and usage will be created. The mixed results of national departmental and decentralised e-government programmes in provinces and municipalities illustrate the importance of appropriate IT strategies and good IT governance at those levels of government directly responsible for services delivery. The acceptance and implementation of the general principles of strategic IT management and good e-governance are imperative for success. If they are not adhered to, an early adopter of cutting edge technology can easily stagnate or even suffer a reversal, as has been seen in the case of South Africa.

The mega-project of the Department of Home Affairs smart card identification system is poised for launch in 2012. The success or failure of the smart card will hinge on precisely those capacities identifed here: leadership, cross-governmental cooperation and services integration, and coherent national policy and sectoral e-government strategies.

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EIGHT EIGHT:

e-ALEXANDRIA 2005-2010: A MULTI-PERSPECTIVE ANALYSIS

Hatem A. Elkadi,
Faculty of Engineering, Cairo University, and Ministerial Advisor for Strategic Projects, Ministry of State for Administrative Development, Egypt
Hisham M. Abdelsalam,
Director, Decision Support and Future Studies Center, Faculty of Computers and Information, Cairo University, Cairo, Egypt

ABSTRACT
The Egyptian local e-government programme was established in 2002 to enhance both the quality and efficiency of government systems. The e-Alexandria project, initiated in 2003 represents a milestone in this programme. The project incorporated seven councils that underwent technical, business and work-environment restructuring. This involved architectural remodelling, renovations, furnishing, technological infrastructure setup and back office preparations, as well as personnel training and backlog data entry. Later extensions included content development and an online services portal.

This article presents a brief review of the process of constructing e-government systems experienced through the e-Alexandria project, which has continued to evolve over a full decade. The article provides a view of three services, namely elevator installation permits, street occupation permits and retail shop licences, as these are very important local government services for communities. The article uses the Lenk and Traunmuller (2000) multiple perspectives to document the public service reforms that occurred in the introduction of e-government. It comments on continuation of the local e-government programme post the January 25th revolution.

KEY WORDS:
multi-perspective e-government, e-Alexandria, public service reform, Egyptian local government development programme (ELGDP)

ADMINISTRATION OF LOCAL GOVERNMENT IN EGYPT

Egypt is comprised of 27 administrative sections, or governorates, of various sizes, populations and resources. Governorates are further administratively divided into cities and districts, which are in turn divided into neighborhoods. The governorates have a certain degree of administrative freedom, but are financially and politically managed by central government. Central ministries have "antennas" at the governorates level, called directorates. Local government manages its operations based on rules, regulations and legal requirements created by the central government. However, it has autonomy in how it provides services to citizens and how these processes are managed. Generally, services are delegated to the cities and neighborhood councils. A limited number of services are sometimes concentrated in the governorate headquarters (HQ), particularly where they are of a strategic nature, such as financial investments.

The Egypt e-government programme focuses on service delivery at the level of cities and neighborhood councils. The major cities where the majority of the population resides are Aswan, Luxor, Sohag, Minya, Beni Suef, Medinat al-Fayoum and the capital city Cairo, all located along

the river Nile; Alexandria and Marsa Matruh located at the coast; and Suez and Sidi Abdel Rahman. The administrative functions within neighbourhood councils can be divided into four main categories:

1. Top management (Mayor or Council Head and Deputy Mayor/Head): Directs and monitors the progress of services and operations in the different departments as well as sets the targets and plans for the community.

2. Internal services departments: Provide services pertinent to the municipalities, covering, among others, housing, construction permits, commercial licences, and services that are directly managed by the mayor/district council director.

3. External services departments: Provide social and economic services such as education, health, social security, agricultural services; and report administratively to the Mayor, and technically to the relevant central government ministries.

4. Administrative departments: These are the supporting departments that perform the necessary administrative tasks required for the council, such as human resources, accounting and transportation, and do not provide services to the public.

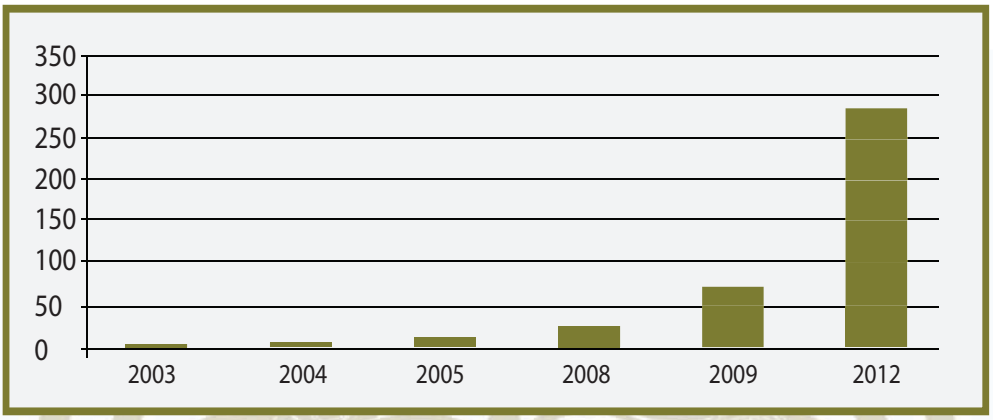
EGYPT LOCAL E-GOVERNMENT PROGRAMME

Egypt local e-government initiatives were introduced in 2002 at the purely administrative level, with steps taken towards automating the work systems and reorganising management. This is part of the Egyptian Local Government Development Programme (ELGDP), which employs information and communication technologies (ICT) and state-of-the-art management systems to enhance both the quality and efficiency of government systems, to reduce time and to overcome corruption at the workplace, thus contributing to the overall development of Egypt. However, as Egypt is a developing country, local government is a source of employment and salaries are not high, hence ELGDP projects do not aim to fully automate the services, but rather to enhance the operations using ICT to reduce delivery time and to establish a monitoring and control system that provides better transparency and equity. As regards the service improvement process, work in ELGDP projects involves three main stakeholders: governorate management and employees; an outsourced contractor who is responsible for systems analysis, design, development and deployment; and the Ministry of State for Administrative Development (MSAD), which acts as a mediator between the governorate and the contractor and is responsible for project management and quality.

The Egyptian LGDP has three main projects: The first project is related to service enhancement in municipalities and includes automation of services provided to citizens and the establishment of the smart “Citizen Service Centers”. The second project is concerned with the development

of web portals for the governorates. The third and most recent project is on Citizen Relationship Management (CRM), the government version of customer relationship management. CRM aims to provide citizens with a means to communicate their complaints and suggestions to the government entities. Figures 1 and 2 illustrate the general progress of implementation of the citizen service centres and portals/websites since the inception of the project in 2003 to 2009, according to the actual status of the implementation plan, and the proposed number of centres and websites for 2012. In 2009, more than 80 e-government citizen service centres were operational in 20 governorates, with more sites under development.

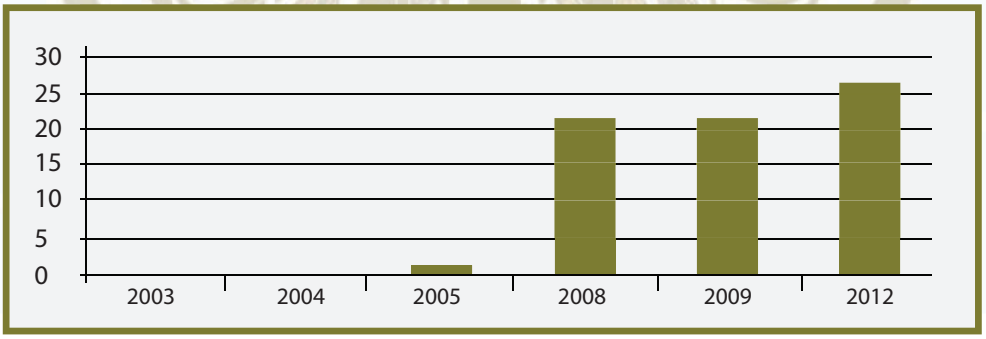
FIGURE 1: NUMBER OF SMART CITIZEN SERVICE CENTERS IN EGYPT



Source: MSAD, 2011

The 2012 target was to establish CSCs in approximately 290 cities and towns of Egypt, but this could require tripling the budget. The further objective was to have 27 portals/websites by 2012, one for each governorate.

FIGURE 2: GOVERNORATE PORTALS/WEBSITES



Source: MSAD, 2011

The programme team is designing a new model for Phase 2, using a more flexible workflow engine; running an applications service provider (ASP) model for the applications; and integrating the governorate portals, online services, complaints spaces (web and phone) together with the cities' and HQ backend workflow/tracking engine. Given this possible second project phase, it is important to look back at Phase 1 to understand key issues to inform future development of citizen services centres.

In 2002, a project was started for the automation of municipal services in the port city of Safaga on the Red Sea (population 30 000). It was followed by a larger project, the e-Alexandria initiative. The e-Alexandria initiative falls within the scope of the project on service automation and citizen service centres. Experiences gained from e-Alexandria have laid a platform to move towards multi-level e-government, that will include the national, governorate, city and neighbourhood levels. This article reviews the provision of three specific services through smart citizen service centers in the e-Alexandria implementation.

PREVIOUS E-GOVERNMENT RESEARCH TO GUIDE ANALYSIS OF E-ALEXANDRIA

Government departments and procedures are commonly held to be inefficient, because they have little motivation to please the citizen, and the citizen does not have an alternative provider available to him/her for these services (Kraemer & Dedrick, 1997). By the end of the 20th century, the emerging vast networks of interacting public, private and voluntary organisations could no longer be served using the traditional setup of single administrations for single services and specific functions (Lenk & Traunmuller, 2000). In fact, the necessity for modernisation and the introduction of enhanced business models for services and administration was realised by governments worldwide (Ho, 2002; Moon, 2002; West, 2002a; West, 2002b). In order to cost effectively deliver the increasing number of services in demand, governments introduced technologies to serve citizens in a timely, effective and efficient way (Aicholzer & Schmutzer, 2000; Kraemer & Dedrick, 1997).

The key reasons for these major public sector reforms have been to increase the efficiency of government operations, strengthen democracy, enhance transparency, and provide better and more versatile services to citizens and businesses (Ho, 2002; Coe, Paquet & Roy, 2001; La Porte, Demchak & de Jong, 2002; Watson & Mundy, 2001). e-Government technologies can serve a variety of different ends: better delivery of government services to citizens (Choudrie, Weerakkody & Jones, 2005; Navarra & Cornford, 2003), improved interactions with business and industry (Davison, Wagner & Ma, 2005; Riemenschneider & Mykytyn, 2000), citizen empowerment through access to information (Marche & McNiven, 2003; Susman, 2001), or more efficient government management (Burn & Robins, 2001; Holiday & Yep, 2005). The resulting benefits can be less corruption (Wong & Welch, 2004), increased transparency (Davison et al, 2005; Wong & Welch, 2004), greater convenience (Ho, 2002; Carter & Belanger, 2005; Norris & Moon, 2005), and cost reductions (Carter & Belanger, 2005; Norris & Moon, 2005).

Aicholzer & Schmutzer (2000) identified three major organisational challenges faced by initiatives to implement e-government including: 1) guiding principles and problems of restructuring administrative functions and processes; 2) requirements of, and barriers to, coordination and cooperation within the public administration; and 3) the need to organise monitoring of performance in terms of e-government. The framework proposed by Lenk & Traunmuller (2000) sees e-government initiatives segmented into five perspectives: e-business, citizen, knowledge, (business, administrative, service) process, and tele-cooperation. This article takes an e-government view, in other words, building an understanding of the advances in government administration and services from a public service reform perspective, utilising the Lenk & Traunmuller (2000) framework and the specific issues of public sector reform discussed above.

E-ALEXANDRIA PROJECT DESCRIPTION

Alexandria is one of the main governorates of Egypt, located in the north of the country, and is one of the most important harbours in the Mediterranean. The capital of the governorate is the city of Alexandria with a surface area of 2 900 km^2 and a population of around 4.9 million inhabitants, as compared with Cairo's much larger population of 20 million. The overall goal of e-Alexandria was to improve the quality of public services while cutting administrative costs. A unique objective of e-Alexandria is that it was meant to be "productisable", in other words, product and experience were planned to be easily replicated in various cities and regions of Egypt. The scope of work for the pilot e-Alexandria project in seven districts incorporated administrative restructuring, civil works, renovations, furnishings, infrastructure building and back office preparation, including deployment of local area networks (LANs) and ICT equipment, business applications, employee training and capacity building. The project started in January 2003 in one district, "Hay Sharq", which was automated by July 2004. Between March and July 2005 the remaining six districts of Alexandria were automated, announcing the e-Alexandria initiative.

The project activities in each neighborhood cover four components: the Citizen Service Center (CSC); the local government departments; the Information Center (IC); and top management. The CSC consists of a reception hall, located on the ground floor for easy access, with a varying number of tellers. The tellers' area and the citizen reception area do not connect, in order to limit the possibility of corruption and friction between staff and citizens. Representatives of the different departments might be present in the tellers' area to receive or review application files. Tellers are not specialised, so that they can provide a range of services with the help of a computerised workflow system. One queue is dedicated to receiving citizens' applications; the other is dedicated to delivering licences and permits.

The administrative departments perform their duties as usual, as well as registering the progress of every transaction on a shared computer, connected to the central workflow application through the LAN.

The Information Center is the custodian of the information resources, including hardware, software, databases and applications. The IC staff provide the first level support to the CSC and

departments. They are also the database and applications administrators. They provide top management with reports on the operational and business levels. Top management has access to a simplified dashboard of information, indicating the current state of progress of all citizens' requests by type and by department. Top management has the responsibility of monitoring work progress from time to time, and of taking the necessary corrective actions.

The challenges faced at initiation can be summarised as including low levels of automation in government; low computer and internet literacy/penetration; unhealthy work environments (limited space and resources); limited or no control of work processes leading to less efficiency; deficiency in connectivity between various government entities; highly cash oriented society; exaggerated security issues; rigid financial systems; and exclusive use of paper documents.

E-BUSINESS SERVICES PERSPECTIVE ON E-ALEXANDRIA

An e-business perspective considers e-government in terms of commercial interactions and transactions within the government framework, the deployment of ICT to improve and enhance the performance of government (Schubert & Hausler, 2001) and to increase citizens' access to information (Csetenyi, 2000). Within this scope there are a range of possible web-enabled services opportunities, including government to citizen (G2C), government to business (G2B), government to government (G2G) and intra-government internal efficiency and effectiveness (IEE)(Evansal, David & Yenb, 2005). In G2C, the focus is on the ability of the government and citizen to communicate information to each other in an efficient and electronic manner. G2G strives to improve the efficiency of delivery when transacting information within a particular layer of government or between levels of government, eliminating redundancy and duplication.

The e-Alexandria project covers two services opportunities, namely G2C and G2G. Local government efforts focus on enhancing the living standard of the community, and simplifying government services provision to the public and business. Thus, single-stop-shop type centers and single window service centers were introduced. In addition to the administrative departments, three new entities were added: citizen service center, information center, and decision support unit, each complementing the other's contribution. The Citizen Service Center (CSC) receives citizens' applications, enquiries and complaints and keeps records of these. The CSC forwards documents to relevant departments for processing. The departments review application forms and required documents and complete and deliver the service. The Information Center provides technical support and facilitates service delivery. Finally, the Decision Support Unit follows-up services, and reports on implementation and performance rates and bottlenecks.

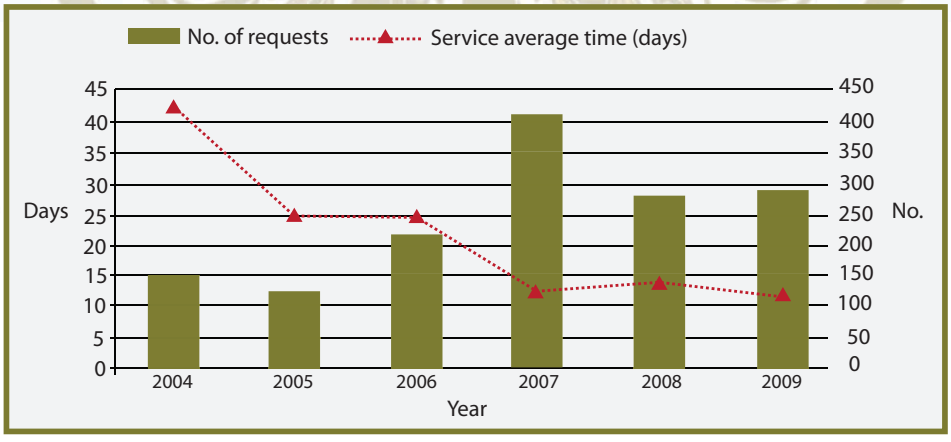
Before deploying the technical solutions, each site underwent massive transformation involving civil works, architectural designs, and building the physical and ICT infrastructure. Each site was equipped with LAN/WAN cabling and approximately 60 PCs and servers. The project addressed local capacity building and provided training on basic and soft skills training as well as on advanced technical training to 354 government employees.

In 2009, an analysis of the performance and impact of the e-Alexandria project on the performance of the councils was conducted, as the ELGDP had expanded to more than 70 sites and was planning to launch a second phase to cover all governorates. Improvements in three services were reported as representative of a business perspective of local e-government services, as these are important services for income generation in the small and micro business community: Elevator installation permit (hundreds of permits per year) (3); Street occupation permit (thousands of permits per year) (Figure 4); Retail shop licence (hundreds of permits per year) (Figure 5). Each graph presents the evolution of the number of transactions per year for each service (bar graph and right vertical scale) and the delivery time for the corresponding service in days (dotted line and left vertical scale).

Demand for these three services represents more than 50% of the total demand for all services provided by the city. While elevator installation permits affect the ordinary citizen and business, the street occupation permit and retail shop licence services concern the small and micro business community; however, these were a source for potential employees' corruption.

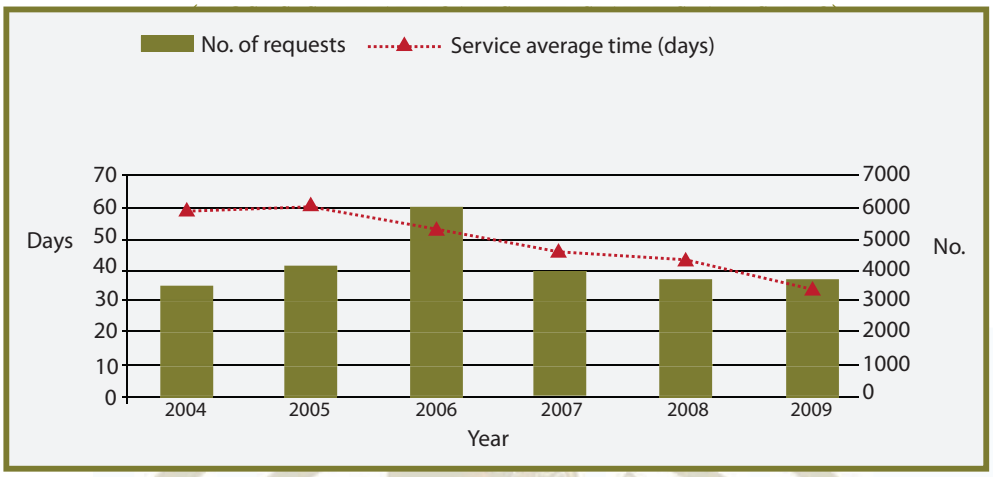
All three e-services show a growth in number of transactions per year during the first years of operation. In 2006, some governing regulations were altered, driving some services up. Between 2006 and 2008, the rate of transactions began to decrease, probably due to saturation of the market for such services: Alexandria is an old city, and few new businesses emerge. It is also to be noted that the service delivery time decreases each year, suggesting better adoption of the system. The final two years show stability of the service delivery time, which can be explained by the maximum limit of efficiency of the given process. For better performance, process improvement would need to take place. Generally, one direct benefit that can be noticed is the reduction of the average service time regardless of changes in service demand. Online monitoring of the progress of a service request (transaction) through the governorate portal/website has enhanced system governance by limiting the ability of employees to "blackmail" citizens to finish their transaction as, at any given time, the citizen or micro-business knows the status of his/her file.

FIGURE 3: ELEVATOR INSTALLATION PERMIT



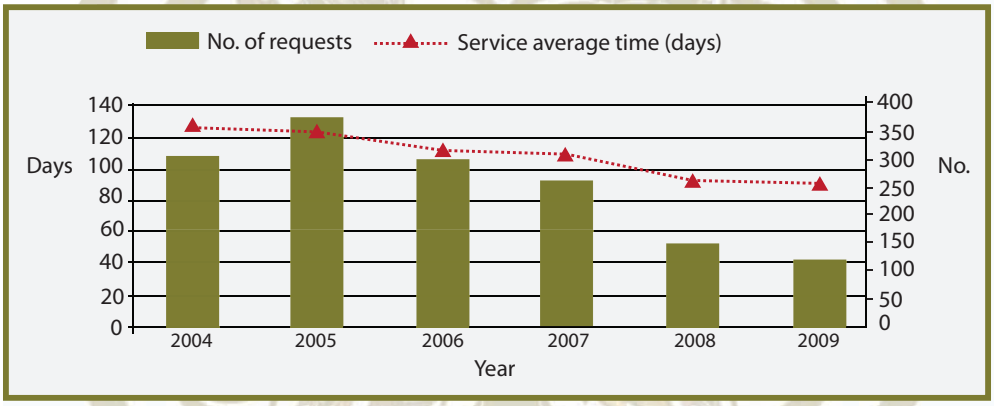
Source: MSAD, 2011

FIGURE 4: STREET OCCUPATION PERMIT



Source: MSAD, 2011

FIGURE 5: RETAIL SHOP LICENCE



Source: MSAD, 2011

STAKEHOLDERS' INVOLVEMENT: CITIZEN AND KNOWLEDGE PERSPECTIVES

The main stakeholders in the e-government projects discussed are citizens, employees and managers. The views of all stakeholders must be incorporated and accounted for throughout the life cycle of the project. It can be argued that the stakeholder perspective determines the chances of success or failure of the project. Lenk & Traunmuller (2000) used the citizen perspective to refer to end user concerns and expectations. The perspective encompasses the delivery mode and concerns in using electronic services. The knowledge perspective recognises workers' knowledge and its impact when redesigning the transactions for the e-government environment, with due attention to the continuity of knowledge that has been accumulated over time.

A review of stakeholder involvement reveals that, in the planning phase, the requirements and expectations of citizens must be well understood, while executive support must set clear expectations. With respect to deployment, the way citizens see results is important for continuous improvement. During the period under review, training and capacity building gained close attention, since employees came from a traditional public service experience and lacked the simplest proficiency in processing citizens' needs through operating the latest IT applications. Technical transformation was paralleled with basic and advanced training for all users, starting from typing, basic office application, application administration, OS/DBMS/LAN administration and extending to new business functions and CRM applications. Under the umbrella of the Government Services Development Program, local government projects were able to train several hundred employees on both soft communicative skills and technical skills. MSAD is striving to empower employees with advanced technology, data management tools and leading edge business practices to meet or exceed citizens' expectations.

From this perspective, the following challenges were faced: poor services delivered to citizens; low public confidence in government services; poor employee productivity; limited or no control over staff members; limited technical and employee communication skills, and a high percentage of illiteracy.

PROCESS PERSPECTIVE

The process perspective is about the utilisation of IT to enhance service delivery efficiency (Lenk & Traunmuller, 2000; Kraemer & Dedrick, 1997; Watson & Mundy, 2001). Within this perspective, the project covered three main streams: 1) process re-engineering, 2) automation, and 3) process monitoring. There are around 62-87 processes in operation at each site of the e-Alexandria project, depending on the nature of the site, which have undergone verification and documentation. MSAD re-engineered some of these processes to facilitate the work flow, to remove bottlenecks and to reduce the overall time of service delivery. Such transformation involved better documentation of processes, providing more accurate indicators for monitoring and evaluation. Furthermore, efforts are well-directed to follow certain steps and utilise best practice offered by leading countries. However, efforts in process re-engineering to solve congestion at the services provision outlets have been limited.

The automation of processes is the technical aspect of the project. In the practice of modernising services, needs assessments for transactional workflows and work processes were conducted for each service outlet, and the back office requirements for each location were identified to satisfy customers' needs and meet their expectations. This process monitoring provides an explicit, structured representation of what has been completed in the work flow and what approvals or decisions are still pending. This information can trigger a variety of activities to advise managers and staff of completed, pending or overdue processes.

The major challenges faced in the e-Alexandria project were: difficulty in measuring the impact of modernisation due to inconsistency in performance indicators, lack of business process documentation; and inaccuracy in data processing based on manual records.

TELE-COOPERATION

The tele-cooperation perspective deals with the interaction of the various agencies and trading partners involved in a work process. In particular, in the initial stage of any e-government project having a tele-cooperation perspective would be useful, as it provides a holistic view, focusing on the support of computer-mediated cooperation in a comprehensive sense (Lenk & Traunmuller, 2000). The proposed model considers two main issues: 1) solution integration, and 2) links to business areas.

In the first phase of ELGDP, tele-cooperation was not addressed, due to the difficulty of coordination between different agencies while the project was still in its inception phases, and ICT readiness was weak in different agencies. However, the system design later took into consideration the preparation and inclusion of communications among these agencies. ELGDP did not engage in multi-agency types of transactions until the relevant government agencies linked to a particular permit or service had demonstrated better readiness.

USE OF PILOT PROJECTS

The implementation of pilots prior to large-scale projects is an important but tricky task. In developmental projects, not all factors are known ahead of time, and a limited experiment is required to reveal the hidden parameters. The first pilot was implemented in the small, remote city of Safaga. The population is small and the requirements of citizens and local businesses are simple, hence a failure there would not tarnish the reputation of the project. The Safaga pilot revealed the importance of the architectural design of the service center and the business process re-engineering (BPR), as well as the type of personnel that should be selected to ensure project success.

The first Alexandria pilot in the Sharq district was important to acquire the information necessary to develop workflow software to cover all the business requirements and test it in a realistic environment with a large number of citizens served. Business processes there turned out to be different from those in Safaga. This alerted management that project empowerment from the governor was necessary to promote unification of the processes within the governorate. This was then the first step taken during the deployment phase: confirmation of the unified business processes. Also, the presence of a fully operational citizen service centre site that could be visited by the personnel from other targeted sites, and having equivalent personnel explaining the benefits of the system, helped reduce resistance to change. Finally, the exact timing required for the implementation of the different phases of the project was precisely determined, so that the parallel implementation of the project in six more sites could be implanted in around seven months.

REFLECTIONS ON E-GOVERNMENT LEADERSHIP

The political support of the governor of Alexandria and the sponsorship of the Minister of ICT at the time of project implementation were of the utmost importance, making it possible to obtain contributions from the business association of Alexandria to fund the renovation of the sites; to make available the required human resources for the pilot phase and the full project

deployment; to encourage the governorate team responsible for the pilot phase;and to ensure the necessary political and administrative support for the replication of the project in six sites, thus enforcing the unification of the business processes through all the sites.

However, only a few business processes were modified, and no major changes were adopted at the early stages. This was intentional so as to avoid major resistance to administrative change, in order that the introduction of IT, the single-window service model and the business process changes did not yield failure. Further business process modifications were intended, following assimilation of the initial changes and requests for enhancements. Replication and enhancement required political support, as, for example, in the governorate of Ismailia where the project was introduced in parallel at all seven sites. Less successful implementations occurred in governorates where there was limited conviction and support, meaning that insufficient resources were made available.

STATUS OF LOCAL E-GOVERNMENT PROJECTS AFTER THE JANUARY 25TH REVOLUTION

The spirit of the revolution of January 25th 2011 aimed at achieving the social equality and a healthy political environment for the better economic performance of Egypt. The ELGDP coincides with this objective through the elimination of corruption in public administration. So in principle the revolution should be supportive of the programme. Nevertheless, due to the psychological refusal of all that was brought by the previous regime, e-government projects are considered as a low priority, are branded as part of the previous regime and are emotionally refused. Also, the sudden changes in key positions in public administration and the departure of most of those who were appointed by the previous regime resulted in a rupture of the programme. Several sites were damaged during the actions that accompanied the revolution.

Most of the post-revolution government officials are not aware of the project introducing e-government, and those who are aware lack the required resources to take action. The management of the ELGDP is consistently working with the current public administration and decision makers to resume implementation of the project, but given the successive changes in positions, there is limited implementation on the ground. Only some of the previous commitments have been resumed, as have some repairs to the damaged sites. Advances are expected in the project following the introduction of a new technology solution yielding enhanced performance at the level of citizen service, as well as demonstrating the benefit for corruption fighting and strategic decision support. However, no major uptake can be expected before the establishment of an elected democratic government.

CONCLUSIONS

Implementing e-government projects can be complicated and difficult because of the vast size and political-bureaucratic nature of government. Hence, some of the main challenges, as pointed out by Wimmer and Traunmuller (2000), are finding successful ways of re-engineering and distributing the administration's knowledge, and the democratic empowerment of citizens. When the term e-government is mentioned, one would typically think of online (web based) government services. The case presented in the article, however, tackled an e-government

application that did not replace physical face-to-face interaction between citizens and public servants by an online application, but rather deployed ICT to improve the way citizens' services are being administered. The objectives here were different. As citizens are still needed to submit hard copies of their documentation to the city, a full online solution was not advocated. Instead, technology was used to help empower citizens by minimising the interaction between citizens and employees. In the past, as the process was neither automated nor monitored effectively, citizens had to follow with their file from one employee to the other to assure service completion. During this follow-up, of course, citizens had to pay employees to prevent their file being halted at that point. With the e-government solution deployed, citizens interact only with the service center, not with the back office employees, cutting this line of abuse. Citizens now can follow the status of their file online, hindering potential corruption.

Egypt has achieved some progress in modernising local government and municipal services delivery. In its approach, it relied on locally designed solutions and local resources, using high end technology. This article presented the case of the e-Alexandria project through a multi-perspective model that captures many aspects of an e-government project innovation. The solutions adopted took into consideration local culture and were meant to be simple and easily accepted by governmental employees. Enhancement of the service delivery and work environment affected both citizens and staff, generating an atmosphere of acceptance. Uptake by citizens and feedback from employees has demonstrated the value of the solution. Further improvement is required, but while buy-in from beneficiaries exists, further changes and the transition to e-governance will need democratic change and future political support.

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SECTION III

CASE NOTES

NINE:

e-GOVERNMENT AND THE CAMEROON CYBERSECURITY LEGISLATION 2010: OPPORTUNITIES AND CHALLENGES

Patricia Ngeminang Asongwe
Lecturer, Faculty of Laws and Political Sciences, University of Yaounde II, Cameroon

ABSTRACT: The EGOV.CM programme, led by the National Agency for ICT (ANTIC) aims to promote access to government information and services, provide IT support to the public administration reform programme, promote the objectives of national policies and provide an appropriate legal and regulatory environment. However, government and citizen reliance on ICTs presents a security challenge, given the emergence of cybercrime across the globe. This requires changes to legislation drafted before the electronic age. Outdated laws result in impunity, with the country a safe haven for cybercriminals, while e-government transactions may be unprotected and may therefore be discouraged. Cameroon's e-laws of 2010 (cybersecurity and electronic communications) provide a legal framework for the protection of ICT networks and critical infrastructures, creating an enabling environment for e-government services. These research notes highlight the importance of the e-laws for effective Cameroonian public administration, and discuss the challenges for implementation of e-government.

KEYWORDS:
Cameroon e-laws 2010, e-government in Cameroon, cybersecurity

BACKGROUND TO E-GOVERNMENT IN CAMEROON

The last 13 years have witnessed an era of initiatives to develop and harness the benefits of ICT for the nation's development. Mokube (2010) sketches a brief history of movement towards e-government, noting the following events. The 1998 laws (Telecommunications Law No 98/014 of 13 July 1998 and Telecommunications Law No 98/014 of 14 July 1998) provide the legal backing for ICT evolution in Cameroon. These laws brought an end to monopoly control in the telecommunication sector in Cameroon. They gave birth to telecom liberalisation and privatisation, ushering in new players in telecommunications and encouraging investment in ICT. Further progress in legislation was made in 2001, instituting minimum service standards in the telecommunications sector through a series of decrees laying down the modalities for the operation of telecommunications networks and the provision of telecommunications services (Law No 2001/0130 of 23 July 2001). These developments led to an opening up of citizens' and business demand for ICT availability.

The finalization of the National Programme for Governance and Strategic Management of the State (Cadre National d'Objectifs Strategiques) provided the foundation for e-government strategies. A draft e-government strategy, EGOV.CM was formulated as a collaborative exercise between ANTIC and the United Nations University (UNU) and presented for adoption in 2011.

A range of public institutions provide the foundation for development of ICT in government. The Telecommunications Regulatory Board (TRB) under the auspices of MINPOSTEL, the National Agency for ICT (ANTIC), the computer divisions in government departments and the National Centre for the Development of Computer Services (CENADI) are the relevant organisations and are all available online. Furthermore, major e-government initiatives were taken in relation to the computerisation of records, including state personnel and salaries (SIGIPES), public finances (SIGEFI), customs transactions (SYDONIA), transport titles (driving licence, car ownership) (SYSTAC) and electoral documents (ELECAM). The PRIMO project provides online tender documents (Mokube 2010; Kamga, 2011). Each of these e-administration programmes requires network security and ways of preventing or reducing cybercrime.

Equally important are initiatives in ICT infrastructure development, including establishment of RASCOM, to provide access to satellite resources and investment in access to the SAT3 undersea cable system for access to international bandwidth. There is ongoing deployment of approximately 3 200km of fibre optic cable nationwide, in partnership with Huawei.

The emerging reality is that the country's public administration is in transition to e-processes. If digital government is dawning for Cameroon's population of approximately 18 million people, then online security is important for resilience, continuity, sustainability and further development (Pollifroni, 2006; Asongwe, 2010).

Security is a challenge in all e-government processes. With the growing number of personal data devices and other sophisticated technology, criminals are becoming better able to conceal their actions. Protecting critical network infrastructures requires a comprehensive view of security that combines physical, digital and procedural components. These components provide the level of cybersecurity necessary to guard against the many known and unknown threats in cyberspace. Cameroon's businesses, government administration and society depend to a high degree on the efficiency and security of ICT. Cybercrime can affect service providers, banks, petroleum data insurances, the stock exchange and the communication sector. Compromise on one network can allow an intruder either direct access to a partner's private data or indirect access by allowing a back door into the partner's network. Thus, cybersecurity law covers the ICT sector as a whole, not only the e-government component.

The virtualisation of services creates a number of challenges in respect of security and confidence. Specific threats to cybersecurity include use of unsecured networks; misconfiguration of computer systems; poor user and administrator education; poor software design; network and system design issues; substandard operational procedures and protocols; weak passwords; and lack of awareness or indifference (Schechter, 2004).

HIGHLIGHTS OF CAMEROON'S E-LAWS

The 2010 e-laws regulate activities in Cameroon's cyberspace, dealing with cybersecurity and cybercrime in electronic communication, electronic commerce and electronic government (Republic of Cameroon, 2010a; Republic of Cameroon, 2010b). For development of Cameroon's e-government and information society, the protection of network infrastructure and e-services

is of paramount importance to cybercitizens. In the ongoing debate on cyberlaw, enhanced cybersecurity and governing regulations are not a luxury, but a necessity for Cameroon's e-government applications (Asongwe, 2011). Hence the laws are geared towards enhancing trust and confidence in the use of ICTs, encouraging e-commerce and e-government, and protecting the security of transactions and the privacy of citizens.

The e-laws encompass a variety of legal issues related to use of the communicative, transactional and distributive aspects of network information devices and technologies. The legislation secures commercial activities online, proscribing and spelling out sanctions for unwanted activities in cyberspace. The key themes include the jurisdiction of the legislation and judicial cooperation agreements with foreign countries, security of networks, intellectual property, freedom of expression, e-commerce, business ethics and individual privacy. For the purposes of this discussion, only a few issues relevant to e-government are discussed, noting that e-government is understood to incorporate forms of e-commerce.

1. CYBERSECURITY AUDITS

The cybersecurity law (Law No 2010/012) provides that ICT infrastructure and information systems of operators, access providers and Internet service providers (ISPs) must undergo an obligatory security audit. The scope and conditions for rating cybersecurity, according to a severity scale, are determined by MINPOSTEL. Security audits and severity scale ratings are to be undertaken each year, or more often if necessary, and reports presented to the Minister.

2. BUILDING TRUST AND CONFIDENCE IN THE USE OF ICT

The provision for electronic certificates (for authentication), electronic signatures (for integrity), and public/private keys (for privacy) establishes the legal regime of digital evidence, security, cryptography and electronic certification activities. This has the effect of protecting human rights and privacy and also personal data. This is intended to enhance the use of ICT by citizens[1].

3. APPROPRIATE LAWS FOR A DIGITAL CAMEROON

The electronic communications law (Law No 2010/013) aims principally at harmonising the domestic criminal substantive law elements of offences, with connected provisions in the area of cybercrime, providing for domestic criminal procedural law powers necessary for the investigation and prosecution of such offences, as well as other offences committed by means of a computer system.

4. SUPPORTING A DEMOCRATIC ENVIRONMENT

The law provides for freedom, privacy and protection of human rights, which enhances democracy. Appropriate implementation would enhance an individual's possibilities of communication and interaction, for example where there is participation in public service processes by way of electronic polls, or e-voting [2].

1 See generally Part II of the 2010 security frameworks for cybersecurity and electronic communications, Laws No 2010/012 and 2010/013.

2 Law No 2011/013 of 13 July 2011 relating to voting by Cameroonian citizens

Together the laws can play a key role in improving service quality, as well as achieving the economic objectives of the country and region by securing information and transaction systems.

Law and regulation provides the basis for educating the public on how cybersecurity can help foster a good environment for a more secure Internet, thus building confidence in using e-government websites and conducting online transactions. The 2010 laws provide a framework for the protection of transactions with respect to various e-government models:

- Government to Business model (G2B): This model concerns the activities carried out by public institutions with external suppliers, for example, e-procurement activities and e-auctions online. In Cameroon, these activities are conducted by institutions like the Department of Public Contracts.

- Government to Citizen model (G2C): This model concerns the activities carried out by public institutions with respect to citizens, for example, utilising institutional web portals to provide online services, such as the presentation of individual tax returns or the application for electronic documents from the Registry Offices. This is also relevant to the provision of e-medicine, e-education and other services to the citizens, where privacy may be infringed. The digital revolution multiplies the individual's possibilities of communication and interaction in an exponential fashion, making it possible to re-launch the classic idea of the individual at the center of the democratic e-society, where privacy and security are protected.

- Business to Government model (B2G): Online activities such as the submission of tax returns online.

- Government to Employees model (G2E): This model concerns the activities carried out by public institutions in relation to employees, for example, providing online services such as e-learning activities and refresher courses for employees through institutions such as the Advanced School of Public Administration.

- Government to Government model (G2G): This model concerns the activities carried out by public institutions with respect to each other, including electronic integration between several departments, or between central and local public institutions, or with other foreign public institutions, for example intelligence activities or international co-operation actions.

The laws aim to build trust in the online relationship between citizens and government, provide a legal framework for a public service that is efficient, a judicial system that is reliable, and an administration that is accountable to the public[3]. There is a predictable legal framework with rules known in advance and therefore protection of the independence of the judiciary. There is available information and transparency that enhances policy analysis, promotes public debate and reduces risks of corruption. Securing cyberspace can assist in achieving public sector reforms or desired transformation, but implementation of these laws has many challenges.

CHALLENGES FOR THE EFFECTIVENESS OF THE E-LAWS

The advantages of the e-laws for e-government are yet to be effectively harnessed, due to the lack of appropriate enforcement. The reasons for weak implementation include:

LACK OF WILLINGNESS TO CHANGE THE STATUS QUO

The reality of stakeholder collaboration and concerted action is not yet achieved as implementation is in the hands of a highly centralised government, which is interested in regulating cybercrime, while the law enforcement cadre is unfamiliar with approaches to cybercrime detection and gathering digital evidence.

LANGUAGE BARRIERS

The bilingual nature of the country (French and English) and multiple local languages based on the more than 250 language groups in Cameroon make the sensitisation and education of the population especially difficult at the local level.

LACK OF ADEQUATE FUNDS

Network connectivity and security requires a significant financial investment.

THE EXISTENCE OF NEIGHBOURING COUNTRIES WITH NO CYBERLAWS

While local limitations of resources and expertise present hurdles to effective law enforcement, one of the transnational challenges of a legal nature that should be considered is that states like Chad, Central African Republic, Nigeria, Equatorial Guinea do not have cyberlaws, making it difficult to sign judicial cooperation agreements. These countries would potentially serve as safe havens for cybercriminals.

THE EVOLVING AND COMPLEX NATURE OF THE PHENOMENON

Computers and the Internet present new ways to engage in old crimes, such as fraud and piracy. It has also become possible for criminals to perpetrate new harmful acts, like Internet scamming, notably high in Cameroon (Akuta, Ong'oa & Jones, 2011). Considerable difficulties also exist with respect to the coercive powers of investigative agencies, especially with respect to encrypted data and investigations in international networks, the range of jurisdiction in criminal matters, and the liability of intermediary service providers on the one hand and content providers on the other. The country is taking measures to combat computer-based crime;

3. See generally Part II of the laws.
4. These are important elements of good governance according to the World Bank.

however, national laws alone are not sufficient to address the global nature of cybercrime because online crimes are inherently international.

LACK OF IMPLEMENTATION OF LOCAL LEGISLATION

Local legislation for the sector is not supported by implementation. For example, the May 2009 law on the identification of mobile telephone subscribers in the country has yet to provide any effective impact on crimes like online harassment, defamation and threats. The reason for this unfortunate situation is that there is no effective control on the sales of SIM-cards and no recognised sales points. Subscribing is therefore clandestine and a fertile for crimes.

RECOMMENDATIONS: GENERAL ACTIONS FOR THE WAY FORWARD

Governments must comply with a combination of legislative guidelines and standards that cover areas relevant to e-government. Bearing in mind that archaic laws, old regulatory regimes and overlapping and conflicting authorities can all greatly complicate or halt the implementation of government projects, the development of a new regulatory framework building on the 2010 e-laws should be seen as a priority. Specifically the following actions are recommended:

COLLABORATION AND CONCERTED ACTION

Telecom stakeholders, including government, citizens, the private sector, civil society, academia, media and international organisations based in Cameroon should collaborate in the search for crime-free cyberspace.

STRUCTURING NATIONAL RESPONSE STRATEGIES

Anti-cybercrime strategies should be introduced, in order to offer advantages of reduced cost and time for development of e-government and e-commerce. While international cooperation is necessary, Cameroon will have to develop its own national cybersecurity strategy, authorities and capabilities, adequate for the needs of governmental entities on the national and sub-national levels, as well as for the needs of the private sector and civil society. Strategy should include establishing reporting mechanisms through setting up an online cybercrime complaint center; enhancing digital forensic technology research; adopting standardised investigation procedures; improving technology support through cooperating with academic and research institutes, information technology enterprises, Internet service providers and other organisations; and training regularly (Asongwe, 2011).

LOCAL EXPERTISE

The optimal solutions that might be adopted depend on the resources and capabilities of the country. Therefore there is the need to produce effective security processes and master the ICT related risks; collaborate with legal, law enforcement and technical professionals; and scan best practices globally to create local processes. In April 2010, the Cameroon government spent XAF174 billion on cybersecurity equipment and expertise obtained from the South Korean government. This is an exorbitant amount given the economic standing of the country, which has a GNP per capita of USD2 300. It is necessary to create local knowledge based on well recognised standards, to answer specific local needs by integrating local cultural values in national standards, which may be derived from international standards.

TRAINING OF LAW ENFORCEMENT OFFICERS

It is further necessary to introduce training initiatives to help combat cybercrime in order to deliver secure and effective e-government processes. Training should be conducted on a regular basis and private-public partnerships in training should form the basis for capacity building. In order to continue the development and delivery of effective cybercrime training to law enforcement officers at a regional level, it is necessary for them to partner with organisations and industry to create a network to take responsibility for the training programmes and offer appropriate academic qualifications. Academic institutions are in a position to use their considerable pool of research and education expertise to support both government and industry in the development of education programmes designed to facilitate the enhancement of skills and qualifications relevant to the area of cybercrime. This will help cut down the cost of implementing security measures.

The e-laws (cybersecurity and cryber crime; electronic commerce) deal with key economic, legal and social issues that will enable Cameroon to take a quantum leap to effectiveness in its public service delivery. The 2010 e-laws, if appropriately implemented, can enhance effectiveness of e-applications. It is possible to conclude that these laws are vital for the enhancement, continuity and sustainability of digital government. Therefore the cybersecurity legal framework must be appropriately enforced for a secure, resilient, sustainable and continuous Cameroon network as critical infrastructures on which e-government processes repose.

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SECTION IV

BOOK REVIEW

HANNA, N. & KNIGHT, P. (EDS) (2011). *SEEKING TRANSFORMATION THROUGH INFORMATION TECHNOLOGY: STRATEGIES FOR BRAZIL, CHINA, CANADA AND SRI LANKA*. SPRINGER, BERLIN

HANNA, N. & KNIGHT, P. (EDS) (2012). *NATIONAL STRATEGIES TO HARNESS INFORMATION TECHNOLOGY: SEEKING TRANSFORMATION IN SINGAPORE, FINLAND, THE PHILIPPINES, AND SOUTH AFRICA*. SPRINGER, BERLIN

Nicolau Reinhard,
University of Sao Paulo, Brazil

These two books, compiled and edited by Nagy Hanna and Peter Knight, represent a welcome contribution to the ICT and development literature. The editors, seasoned executives of international development aid programmes, with the help of associated authors more familiar with individual countries' specificities, propose a comprehensive and practical framework for the analysis and management of e-transformation programmes. The unfortunately still-growing number of large, unsuccessful national ICT initiatives only increases the need for this type of book.

According to the authors' definition, "e-transformation is about the effective diffusion and use of ICT and about the deep structural and capability changes in the economy and society that accompany ICT use and diffusion" (Hanna & Knight, 2012, p25), and comprises several key, interdependent elements:

- an enabling policy and institutional environment, shaped by a shared vision, long-term strategy, and institutional leadership;
- an affordable and competitive information infrastructure;
- a dynamic ICT industry and innovation system that can adapt the technology to local needs and capture export opportunities;
- a broad ICT literacy and technical education, as well as techno-entrepreneurship to harness and master ICT potential;

- a coherent investment program to apply ICT to modernising the public sector;

- and incentives to promote the effective use of ICT for developing the private sector and empowering civil society [Hanna & Knight, 2012, p29].

Institutions leading long-term e-transformation strategies are, therefore, at the heart of orchestrating and implementing all elements of the transformation process.

This framework, which is defined in greater detail in the first book, is used as a guideline for describing each of the cases, and provides the means for the comparative analysis and evidence for the conclusions.

The authors propose an "integrated framework for understanding the holistic nature of e-transformation and for designing strategies to take account of key interdependencies among its elements" (Hanna & Knight, 2012, p4). This integrated framework can be summarised under the following core components:

- Integrating into development strategy
- Coverage, coherence, synergy
- Leading, institutionalising and engaging
- Balancing central direction with local
- Balancing long-term and short-term objectives
- Innovating, adapting and learning
- Balancing ICDT as enabler and (economic) sector
- Emphasising digital inclusion (Hanna & Knight, 2011, p231)

This rich framework of analysis refrains from trying to identify simple causal relations between ICT strategy and its implementation and the countries' e-transformation, and therefore eschews the pursuit of simplistic "quick-fix" solutions.

The fact that the authors present their conclusions in the form of lists of factors should not distract from their basic concern with the social and political processes that shape the outcomes. These processes are highly contextualised, depending on specific country (even regional) economic and historical conditions, institutions and political leadership.

The orientation towards such long-term processes also saves the authors from the pitfall of proposing a normative factor model, but rather leads them to present their conclusions in the form of enabling conditions that have to be considered in the rich and varied context of the countries studied.

This is why these books could not have been written without the detailed analysis of the individual countries' ICT histories. It is also why it could have come only from authors with such long and extensive international development experience.

Given the comprehensive character of the framework, the authors are able to apply it to a diverse group of countries, both in terms of social and economic development and in ICT history and e-readiness, allowing them to compare developed countries (Finland, Canada, Singapore) with emerging economies (Brazil, China, South Africa) and developing countries (Sri Lanka and the Philippines).

The proposition of a comprehensive framework – and the demonstration of its applicability to such a diverse group of countries in terms of their availability and use of ICT resources and social and economic development – is one of the major contributions of these two collections. The same model also allows the consideration of the sometimes huge in-country diversities.

Recognising the countries' efforts, and producing a frank and critical assessment of the outcomes and effects of the process, is a challenging goal, made less subjective only by having a consistent and comprehensive framework.

The chapters demonstrate thorough research, drawing on multiple sources and informed by the knowledge that could only come from someone very familiar with the idiosyncrasies of each country.

In their chapters on the individual countries, the authors stress the importance and the effects of integrating the ICT strategy into the national e-transformation or development strategy, and therefore make their contribution to the ongoing debate on the effectiveness of ICT investments.

Although the fundamental lessons seem to be rather simplistic and straightforward:

- committing to long-term objectives, coherence and continuity;
- promoting leadership, institutions, shared vision and human resource development;
- pursuing diffusion and inclusion;

it is not the "what" or the "why" that matters most to the authors (and obviously also to the practitioners) but the model-driven discussion of the "how" – which this reviewer sees as the main and distinctive contribution of the books.

That is where context enters the discussion: the political and institutional aspects, national and global issues, technological infrastructure, economic resources, and human resources.

By analysing the relationship between the countries' situations, and by stressing the need for integration of the ICT strategies, the authors avoid the pitfall of "one size fits all" normative prescriptions, and allow for the variety of economic, political and institutional situations.

This approach goes beyond the usual static assessments and e-readiness measures and allows capturing the political context and institutional dynamics, with ongoing formation of coalitions, negotiation of priorities, leadership and implementation trade-offs within real-life human, financial and institutional constraints. These are critical aspects of strategy design, implementation and sustainability.

The books' concluding chapters show the authors' concern with demonstrating the usefulness of their framework, in addition to the description of each country's approach and results.

In this sense the books also contribute to theory building. They therefore extend their usefulness beyond the reader's interest in specific countries, and lead to a deeper understanding of the complexities of the subject. ICT and development policymakers, government officials in charge of implementation, development programme sponsors and evaluators alike should find in these books useful conceptual frameworks and actionable guidelines for their activities.


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