

## Study of Some E-Government Activities in South Africa

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### ABSTRACT

This paper examines the nature and extent of e-government activities in South Africa. E-Government refers to the practice of leveraging ICT to deliver services to employees (G2E), to citizens (G2C), to business (G2B) and to other government departments (G2G). The research method used was through direct personal engagement through semi-structured interviews with 10 stakeholders at local, provincial and national government level. The sample comprised two senior provincial management, two senior municipal managers, two academic government researchers, one national government official and three businessmen connected with government. A literature review was also conducted with data sourced from journals, books, websites and popular media for evidence of e-Government not known to the respondent or a provincial (state) or national initiative. It finds although e-Government activities is being provided by, inter alia, government, citizens and business, the service is few, far between and expensive. Although government has committed to e-services, there are, with few exceptions, such services available. On the other hand citizens are rising in anger as they demand improved service levels. It determines some typically government-centric services have already perhaps out of necessity been usurped by citizen led initiatives. Business is also providing innovative e-services. This comes however with skewed costs that may agitate the digital divide. There is an increasingly pervasive broadband infrastructure from both public and private enterprise that represents an opportunity to roll e-services. The ubiquity of mobile devices and ICT may make-services possible. This is an enticing opportunity, particularly given the increasing and sometimes violent calls for service delivery. To achieve traction the authors argue a stronger advocacy role is needed to promote e-Government activities by all stakeholders namely government, business or civil society. This paper uses the Prossler-Krimmer Model to analyze e-government activities in South Africa including KwaZulu-Natal. It examines the technological, political, legislative and societal (sectors) respectively in South Africa and concludes e-Government is a major opportunities for all stakeholders through a combination or research, cross training, advocacy and a re-contextualization of e-government.

**Keywords-** Component; e-Government, e-Services, Civil Society, e-Readiness.

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### 1. INTRODUCTION

The objective of e-Government is to improve service delivery to citizen and in so doing improve the efficiency of the governments activities. The application of Information and Communications Technology (ICT) facilitated by the Internet and web technology is the primary tool to enable the objectives of e-Government. Attention has been given to e-Government since the 1990s when it was realized that the Internet and web technology was being used to transform business processes and practices.

In this paper we look at some aspect of e-Government, the paper will outline: business driven e-Government, government driven e-Government and civil society driven e-Government.

#### 1.1 Background

In recent years there has been growing pressure on government to deliver services in a more efficient accessible manner. These applications have been referred to as e-Government. It is difficult to define e-Government [1, 2] as it encompasses such a broad spectrum of activities. Currently, we have adopted the following working definition of e-Government as suggest by Grant and Chau [3]

"A broad-based transformation initiative, enabled by leveraging the capabilities [of] information and communication technology; to develop and deliver high quality, seamless, and integrated public services; to enable effective constituent relationship management; and to support the economic and social development goals of citizens, businesses, and civil society at local, state, national and international levels "

There appears to be a relatively low rate of awareness and successful use of computer applications or artifacts in the support of government services to the public. An example of improper usage of an e-Government application by stakeholders is the case of the Natural Resource Ministry's Scientific Information System where all decisions made by senior officials and senior committees did not take into account the information provided by the e-Government system [4].

Customer-orientation has been proposed as a way in which governments have attempted to improve the quality of services offered to business and citizens [5, 6]. There is a debate in the literature as to which is the most appropriate term to use in describing the individuals who obtain the direct benefits from ICT systems in the e-Government environment and the terms customer or citizen are used [7, 8]. The term customer suggests a number of issues, one of which has to do with the organization satisfying a particular need and service. The term customer also suggests the possibility of the person receiving the service having some degree of freedom to choose the service provider. In the majority of e-Government systems the person who utilizes the service does not have any choice.

The post-apartheid South Africa government using a customer-orientation philosophy coined the term Batho Pele. Batho Pele is a Zulu word which means 'people first'. This philosophy requires a transformation in delivery modality that is just, transparent, economic, realistic, reasonable, and transformative [9]

Batho Pele is supported by four pillars, namely:

- Re-engineering and improving the back-office operations of government;
- Re-engineering and improving the front-office operations of government;
- Internal communication; and
- External communication [10].

Further, in light of scarce resources and the global financial crisis, government departments are experiencing increasing fiscal, public and political pressure to increase return of investment from their e-Government applications [11-13]. This could be one reason why citizens and indeed business are setting up their own service related websites and portals.

Complexity in e-Government applications pose a particular challenge [14] to designers and developers of e-Government applications. For example, Lips [15] reports on the Kafkabrigade project in the Netherlands. This projects attempts to tackle, what she refers to as, the 'wicked' problems or excessive administrative burdens from a citizen-centric point of view. The Netherlands national government has launched a website ([www.kafkabrigade.nl](http://www.kafkabrigade.nl)) where Dutch citizens can post their problems concerning disjointed government departments. Relationships within e-Government structures are complex. Examples here are, government-to-citizen (G2C), citizen-to-government (C2G), government-to-government (G2G), government-to-business (G2B), business-to-government (B2G), government-to-employee (G2E), and employee-to-government (E2G)[16]. Government adopting other countries' e-Government systems poses a problem in implementation. Heeks [17] points out an e-Government system should be country specific and not an off-the-shelf system from another country.

Leadership and key stakeholders involvement affect the success of e-Government applications [18]. E-Government is about transforming government to be more citizen-centered. To achieve e-Government success requires active partnerships between government, citizens and the private sector [19]. There exists a complex set of dynamics with citizens and how they use e-Government services. Heeks [20] reports that citizen contact with government is relatively rare. Millard [21] found in Europe that e-Government citizens use government services on an average of 3.1 times a year compared with non-e-Government citizens who only tend to use government services 1.5 times a year. In Africa there appears to be no reliable statistics on the frequency of usage of e-Government systems by citizens.

Maumbe [22] argue e-Government applications can benefit from a comprehensive internal research program to address specific challenges to that application. Technological complexities, complex social processes and independent human agents according to Moodley [13] are not seriously factored into e-Government applications. Guanghai [23] in a similar light, contends e-Government applications are largely constrained within their social context. From a different perspective, the UK National Audit Office point out that "the ICT profession across both private and public sectors is immature in comparison to traditional professions such as medicine, law or accountancy. There is no core set of recognised qualifications and a very wide variety of entry points into the profession. This has made it harder for those in the senior civil service without ICT experience to understand the full value that the profession can deliver." [24]. The National Health System in the United Kingdom [25] illustrate the impact of the above mentioned problem on the success and failure of an e-Government system.

From the perspective of security, data privacy and data security is a concern with intragovernment and intergovernment data-sharing and data-mining [26, 27]. The recent hacking of several Malaysian e-Government websites [28] highlight the need for data privacy and data security in e-Government systems. In government departments there appear to be internal inefficiencies in terms of ICT and human resources [19]. According to Abrahams [29] e-Government applications face further challenges because of the fragmented nature of government administration and its communications processes. Emery [30] and Maumbe [27] points out e-Government models are primarily developed within a western context. There appears to be a need for a more context-centric e-Government model.

Another challenge that e-Government applications face is that of adoption, getting the new e-Government system implemented and used by the target audience [31]. Further, e-Government solutions are not a 'One Size fits All' solution [32]. Each application must take into account the variable factors influencing that application. Abrahams [29] asserts a significant number of e-Government initiatives are information based and only a few include interactive content. This is confirmed by Naidoo [33] that, for example, the South African government is predominantly concerned with efficiency improvement through information dissemination, rather than adopting a more comprehensive e-Government system. e-Government applications are also affected by digital divide issues [5, 34, 35].

Yet another challenge faced by e-Government applications is the use of inappropriate project management techniques [36]. Kaisara and Pather [37] contend even a well designed and developed e-Government systems has a latent defect. If policy-makers do not incorporate access and adoption strategies which take into account the environment that the e-Government system is designed in, the project will be faced with challenges. Further, a private sector solution cannot be imposed as an e-Government solution [17]. The National Data Bank (NDB) project was planned to provide a broad range of data and information support to users inside and outside Bangladesh [38]. In attempting to satisfy multiple levels of stakeholders in different sectors the project did not meet user expectations.

## 2. THE SOUTH AFRICAN E-GOVERNMENT CHALLENGE

From an African perspective, Mutula [39] points out that providing an accurate status of e-Government applications in sub-Saharan Africa is not easy because major studies on e-Government do not fully cover all countries in the region. Specifically focusing on South Africa, the Internet user base is growing year by year at a very slow rate [40].

From this slow growth in the Internet user base we can conclude that there are several challenges facing the growth of the Internet in South Africa, despite South Africa being ranked fourth on the continent for Internet usage [41].

South African e-Government applications face various other challenges. Moodley [42] claims the exclusive emphasis being placed on ICT projects, "at the expense of careful analysis and consideration of the broader economic, social, and political elements that interact to improve the lives of individuals." Moodley [42] and Singh [43] further claim there are significant gaps in policy, understandings of ICT, understanding social process, bureaucratic incompetence and understanding "independent human agency". Put another way, if there is a problem in a system, the introduction of ICT will automate the problem.

Following on Agarwal's [9] evaluation of international e-Government applications, Moodley reiterates [42] South African ICT government programs are adopted and implemented in a top-down approach. This approach tends not to focus on the needs of the citizens. Singh [43] argues that ICT is a tool to achieve a particular desired objective, it is not the objective. This misunderstanding affects e-Government applications and may create further understanding gaps.

South African e-Government applications suffer further challenges. Some of these deal with the different dimensions of leadership, fragmentation of e-Government projects, the perceived value of e-Government projects, stakeholder involvement and project conflicts [44]. van Jaarsveldt [45] argues the next wave of South African e-Government projects should move away from pure information dissemination and move towards interactive service delivery projects. South Africa has to become more proactive rather than reactive to the development of e-Government applications. She further argues the South Africa government needs to consider the cost that is involved in further ICT developments; the sustainability of the application; the efficient utilisation of ICT goods and services especially in rural areas.

We have analyzed several United Nations e-Government surveys [46-50] with special focus on South Africa. In Table 1, we present South Africa's e-Government development ranking. This ranking encapsulates South Africa's performance in the field of e-Government.

**TABLE 1.**  
**South Africa's e-Government developments**

Year	Ranked	Trend
2003	45	
2004	55	↓
2005	58	↓
2008	61	↓
2010	97	↓

The overall trend is that South Africa is falling lower in the ranking. The development ranking is composed of three subcomponents:

- Online service - this is the number of e-services available on a government website,
- Infrastructure - this component is a summary of the ICT infrastructure of the country, and
- Human capital - this is an index of the literacy of the citizens in the country.

In Table 2 there is a closer analysis of these subcomponents.

**TABLE 2**  
**South Africa's e-Government developments**

Years	2003	2004	2005	2008	2010
<b>Rank</b>	45	55	58	61	97
<b>Online Services</b>	0.539	↓ 0.515	↑ 0.569 2	↓ 0.551 8	↓ 0.307 9
<b>Infrastructure</b>	0.126	↓ 0.125	↓ 0.123 4	↑ 0.175 2	↓ 0.047 6
<b>Human Capital</b>	0.88	↓ 0.83	↔ 0.83	↓ 0.806 1	↑ 0.843 2

Both online services and infrastructure are on a downward trend and human capital seems to be marginally increasing. Zuboff [51] indicated information systems could be used to automate, informate or transform processes and these concepts has influenced thinking in government [52]. From empirical evidence Zuboff's first notion of automate is well established in government, where computers have been performing routine tasks, such as updating records starting with the Bureau of the Census in the United States [53].

The idea of ICT for the purpose of providing information for managers has also been established in government for some time and applications such as those employed in the South African Revenue Service have been in use for the past 20 years. Data mining is used in the South African Revenue Service to identify anomalies in tax patterns and thereby identify individuals that are not fully complying with tax legislation in South Africa.

There is frequent yearly public government commitment by successive South African presidents to provide e-Government services in their state of the nation addresses [54]. This with few exceptions has simply not been adequately/met [55]. The notable exceptions are the national Department of Home Affairs projects which handle, inter alia, Identification and Passport application notification processes; and the successful, more substantive national South African Revenue Service (SARS) e-filing service.

It could be that government promises are propelled by citizens who appear to engage in violent, fatal protest demanding improved service delivery [56]. Examples here are Durban (July 2012); Umlazi (2012); Cape Town (2011); and Fiksborg (April 2011), during which civil activist Andries Tatene tragically died [56].

This paper, however, does not suggest that any e-Government initiative will be the panacea to these service delivery demands. It does appear that certainly more e-government applications are possible.

### 3. RESEARCH METHODOLOGY

The purpose of this exploratory research is to understand the nature and extent of e-Government activities in South Africa from the perspectives of business driven e-Government initiatives, government driven e-Government and civil society driven e-Government programs.

When undertaking research, it is essential to make use of a structured research methodology to ensure the research has integrity (i.e. that it is reliable, valid and can be "reproduced") [57]. According to Leedy and Ormrod [58], a research methodology is an operational framework in which the facts are placed so that their meaning may be seen more clearly. The region of interest for this study was South Africa. The parameter of interest is nature, perceived extent and perceived usage of e-Government artifacts<sup>1</sup>.

Some data was collected using direct personal engagement through semi-structured interviews with 10 stakeholders at local, provincial and national government level. The respondents comprised two senior provincial

<sup>1</sup>The words artefact is deliberately used over applications due to the convergent nature of e-government.

management, two senior municipal managers, two senior government academic researchers, One national researcher and three (businessmen who are involved in e-Government activities). A search was undertaken of the municipal websites for evidence of e-Government activities. A literature review was also conducted with data sourced from journals, books, websites and trade journals for evidence of e-Government activities at provincial (state) or national initiative.

### 3.1 Limitations of the study

This research is exploratory and therefore it is claimed the findings are merely indicative. It is not the intention of exploratory research of this nature to be generalized.

## 4. BUSINESS AND E-SERVICES

The most publicized impact of G2B has been the implementation of the SARS tax revenue management system. The system has high adoption from business. This is a vote of confidence as it demonstrates perceived value. In other areas business has been creating and simultaneously leveraging e-infrastructure to introduce e-services such as e-commerce and online interactive services. For example the KZN branch of Business against Crime, has leveraged mesh-network technologies in local geographical areas such as central town blocks to alert participants of imminent danger or challenges [59]. There is also an active and significant private armed response unit, that responds to connected alarm services and or silent activation [60].

South Africa has a well-developed banking infrastructure, with 2,698 bank branches, 8,785 automatic teller machines (ATMs) and no fewer than 109,454 point-of-sale (POS) devices [61]. South Africa has a third of all the ATMs in Africa [61]. South Africa has the most penetrative ICT infrastructure in Africa with a third of the continent installed ATM's. However, its e-services are amongst the most expensive in the world with a survey placing it most costly out of 27 countries surveyed. The fact that 18 of the 27 countries surveyed offer this as a free service implies this should perhaps also be considered in South Africa [62].

For e-commerce to grow there must be very advanced physical, secure, always-on encrypted e-infrastructure. The irony is this always-on service is provided at a premium [61]. This penalizes the poor who typically make very frequent low value withdrawals [61]. This penalty is both geographic and economic as rural folk travel distances to access an ATM. This infrastructure represents an opportunity to increase access and create e-services.

On the other hand, South Africa's communication telephone call rates mobile rates rank the country 32<sup>nd</sup> most-expensive out of 42 African countries surveyed [63]. This has not discouraged usage by the poor and may be viewed as further economic disempowerment. In other spheres business has (possibly opportunistically) been offering typical government-centric services such as private health, private education, private tolled roads and security. This service comes at a price and mitigates this class divide where the rich can afford "premium services". The adoption and growth of these offerings demonstrates that business will engage where there is a business case for a particular activity; e-Government will certainly be no exception.

This discussion implies there is sufficient infrastructure *in-place* for increased B2C, G2G, G2C and G2B activities. This opportunity may be leveraged to drive creation of artifacts (supply) and increase usage (demand). This is an important opportunity which will require engagement and analysis. This section shows that the e-services exist and that there is an opportunity to leverage the existing physical infrastructure and skills, created by business to produce e-services which will drive adoption.

### 4.1 Some e-government initiatives in at provincial level

KwaZulu-Natal launched an e-Government initiative in 2011 called KznOnline. It is perceived to be largely static. The website is not interactive only providing digital content at present. Nevertheless this is a necessary, though not necessarily sufficient step towards an interactive Gov 2.0 interface. In general, there is little evidence of Gov 2.0 engagement, on this or any other site. The site displayed a hotline number and two Social Media links namely: a FaceBook link ([www.FaceBook.com/KZNONLINE](http://www.FaceBook.com/KZNONLINE)) as of July 2012 and a Twitter link @KznGov as of October 2011. There were 30 Facebook posts, 33 tweets with 20 registered followers as at July 31 2012. The Online portal does not display a traffic counter, which makes number-of-hits difficult.

The Provincial Department of Economic Development also launched a website to facilitate job creation <http://www.kznunemployedgrads.gov.za/>. This site had two socialmedia links and a Facebook link: <http://www.facebook.com/pages/KZN-Unemployed-Graduates-Database/187978511243616> and a Twitter link @kznugrads. The FaceBook link is unfortunate and difficult to remember although it did have four posts and 204 likes on 5 August 2012 while the Twitter account had seven Tweets and 33 followers.

This low activity on both websites probably does not have to do with the lack of awareness as no public advertisement have been read by the authors in the media in the last year advertising the social media links nor has any government official informed the authors of the site. One of 10 respondents is aware of the website but did not know its location or its content. Current municipal website may be characterized as informate systems. There are ongoing efforts to create municipal systems in KZN with mixed success such as the eThekweni Revenue Management System (RMS). RMS also known as LogoSoft project (an acronym for Local Government Software) was touted to be the best municipal program. eThekweni created processes to market RMS to developing countries *before* it was even developed several years ago. The project started in 2003 with a projected cost of R250m [64]. The system has also missed several deadlines. The current costs are R474mandcity manager S'bu Sithole has stated the municipality will enlist the services of an independent risk assurer to test the controversial system as he cannot give a guarantee that the new billing system is watertight [65].

The Johannesburg City Council is experiencing similar challenges with both business and citizens engaging in legal action over perceived poor services such as inconsistent bills and disrupted services [65]. In a landmark hearing, government was given 14 days to deliver textbooks to 6000 schools in Limpopo province six months after the academic year started. They did not meet the deadline [92]. It is not unreasonable to assume that part of this failure relates to poor Government systems. This type of failures is not a South African aberration as Dada (2006) informs: "Specifically dealing with e-Government systems, there is an emerging body of research dealing with information systems failure." This is vindication of Bannister who in Jenner [66] asserted "Alas, the history of government computing is dotted with what, in the worst case can only be described as computer disasters, and in the best as poor investments". A conjecture, strongly supported by the authors is a lack of strong technically competent staff with strategic vision being appointed to run ICT or drive such e-Government projects.

Newcastle in KZN purchased 32 iPads for its councilors. The intent is to move towards 'paperless' council meetings. The council calculated the investment will repay itself in 24 months with the savings from photocopying and reprinting expenses. The councilors are involved in ongoing training [93]. The mayor also reflected that digital data will make information exaction and prevent simple (and sometimes) costly errors arising from illegible duplicate copies and or transcribing errors. This suggests an emerging green or carbon friendly value to e-Government solutions. Ladysmith also purchased 53 Notebooks for city councilors.

The aim here was to reduce the cost of paper for meetings calculated at R2m per annum [55]. Although Moodley [40] may view these as top-down projects, the benefits of inculcating an e-culture, the resultant economic cost and paper saving should make this project popular. The metro of eThekweni has embraced digital communication. This has resulted in the creation of a call center that handles over 300,000 calls per month with a range of municipal services such as citizens reporting water and light faults, handling queries for rates and other municipal services, waste removal and tree-felling. The success of this innovation has resulted in this solution being sold to other cities in South Africa by the company Analog [67].

The State President also created a call center or hotline for citizens to log challenges. The launch led to a flood of calls, stimulating a denial-of-service attack. This represents empirical evidence of the scope and scale of frustrations experienced at a national level in South Africa. At a strategic level the province of KZN, proactively commissioned a research entitled "KwaZulu-Natal e-Government Roadmap." This is being circulated to a limited list for comment, before general release. This section suggests that e-Government can assist with e-transparency reduce errors.

#### 4.3 Civil society's initiatives to govern

The ubiquity of mobile telephony has displaced several government functions with citizen-led initiatives leveraging the web and social media to self-manage civic societal functions. At an international level, social media tools have been used for perceived positive crowd sourcing and perceived negative crowd sourcing. The Arab Spring in North Africa is a current example of a perceived positive case where ICT convergence and social media was used for information sharing to effect regime change [68]. On the other hand, the 2011 riots in the UK, was an example where riot sourcing was used for destructive criminal use.

A further case is the Ushahidi<sup>2</sup> website phenomenon in Kenya [69]. Here the website was used as a crowd sourcing source needed to assist during the carnage that took place in the 2007 elections [69]. A legacy of this innovative intervention is that the Kenyans recognise the strength of Ushahidi and now (re)use it to monitor government projects for success, failure and evidence of collusion or corruption. This introduced a form of e-transparency into the societal framework [69].

<sup>2</sup>Ushahidi means testimony

A negative consequence of social media communication services was the insidious use of Facebook and Twitter for *riot-sourcing* or the sourcing of fellow like-minded criminals in London in 2011 [70]. In order to avoid early police intervention, the location of the gathering of criminals was covertly planned by use of BlackBerry's Private Peer-to-Peer Messenger Service quaintly called BBM. eBlock is a South African community project striving to fight crime by providing the community with information about crime and to empower its members by using Geo-referencing [71]. The eBlockWatch incident map shows all crime related incidents reported by our members. The incidents are organised by geographical location used to see what is happening in your neighborhood [71].

In one South African incident, a carjacking hostage, stuck in the boot of his car, used Twitter to inform his girlfriend of his predicament. She used Twitter and posted the message "Be on the look for DSS041GP my boyfriend (sic) has just been hijacked and is in the boot please RT." The RT standing for ReTweet. This message went viral and the hostage was saved two hours later [72, 73]. Pigspotter, demonstrated the power of positive crowd-sourcing when it also joined and coordinated the hunt to find a carjacked hostage using its twitter account: <http://twitter.com/pigspotter> [72, 73].

There is anecdotal evidence from senior municipal officers to support the view that local rural folk in Ladysmith use SMS to alert fellow countrymen of closed roads, flooded rivers, veld fires and other impending disasters [55]. The authors suggest an initiative where emergency tweets or SMSs are broadcast free. This will expedite adoption and consequent usage, saving lives and time and return government to the moral high ground in a pragmatic fashion.

SMS and social media may also be used for less ethical reasons where for example the selfsame Pigspotter also claims that it is 'not about defeating the ends of justice' informs folk of where police are setting roadblock [72, 73], because 'police are corrupt as well'. On the other hand Social Media provides rich hunting grounds for perverse folk to prey on naïve youth. This has already happened when a bright young 14 year girl was persuaded to 'elope' by an older manipulator, who pretended to be younger. He carefully nurtured the young lady on a social network over an extended period of time to persuade the youngster to leave home. When saved she was relieved [74].

This civic-inventiveness has little corresponding match at local indeed any government level, even though there is increasing evidence of efforts to start this process. The above shows the power of communication (perceived positive and perceived negative) and shows how with creativity convergence can be positively leveraged to provide services in emergencies. The next section points an important counter-example.

## 5. TOWARDS AN INCREASED AND IMPROVED E-GOVERNMENT PARADIGM

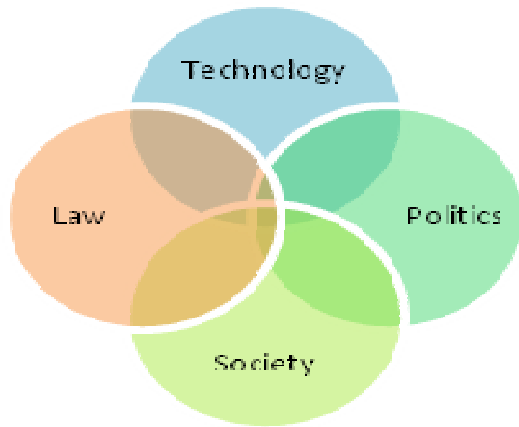
It is a reasonable conjecture e-Government usage and availability particularly in developing countries is not at desired level. South Africa is one of the most unequal societies in the world, with the gap between rich and poor increasing. e-Government represents an opportunity to leverage the infrastructure to develop artifacts that assist the marginalized by providing more accessible local services that save citizens transport time and costs. Here a simple entry level e-Government option will be to automate, highly interactive, time consuming, routine, non-contested services such as vehicle license queries and renewals; rate queries and so on. The benefit is compounded as the freed resources may be used for other local government services.

The ubiquity of mobiles provides a new opportunity. Many users experience the internet in a very different manner through this device. Cambell and Im [75] point e-Government was conceptualized when 'mobiles were not in existence.' The lack of fitness-for-purpose of mobiles for e-Government mitigates the creation and adoption of e-Government services, while paradoxically its ubiquity militate adoption. It may be that we need a new m-government strategy to leverage this opportunity. Intriguingly Cambell and Im [75] predict the majority of users will experience Internet for the first time on a mobile device. Consequently researchers leapfrog the e-Government argument and now support the Web 2.0 technology to the extent that we now have an established field known as Gov. 2.0. O' Reilly [76] refer to Web 2.0 as 'a platform that extends to all connected devices.' He further asserts that this is a mechanism for social cohesion and cooperation.

The authors have found little direct literature or documentation alluding to direct spend of ICT for e-Government projects in South Africa. On the other hand, an analysis of local government Integrated Development Plans (IDPs) suggest that many municipalities are increasingly embarking on projects that leverage ICT for the provision of services. This represents a considerable opportunity; given this papers conjecture that e-Government is not well understood. The e-readiness of South Africa, in general, and KZN in particular to deliver e-Government is considered in the next section.

**5.1 e-Readiness of South African local government**

Prosser and Krimmer [77] proposed a model to evaluate a nation’s readiness to implement electronic voting (e-voting) (Fig 1.), which is a special form of participation to enable democracy. Thakur [78] used this model to evaluate e-democracy as a possibility for South Africa. The dimensions of this model are: technological, legislative, societal and political. The model affirms that many criteria must simultaneously be satisfied in order to implement e-voting.



**Figure 1: The Prosser-Krimmer e-Democracy Model [77]**

This model is now extended to evaluate the e-readiness of South Africa for e-government. This model is analytically used to briefly consider whether and how e-Government may be driven.

**5.1.1 Society**

One reason why services are not being developed or perhaps adopted could be a general lack of knowledge and awareness of e-Government possibilities and activities. The authors have been involved in the creation of an e-Government course to extend the knowledge of and influence the usage of e-government. They have been surprised that just one of the 11 respondents all involved in government was aware of the KZN Online Portal. The fact that we have competing and sometimes conflicting terms such as Gov 2.0, e-Governance, e-Government, m-Gov, Web 2.0 and Municipality in the Cloud appear to further obscure the issue<sup>3</sup>.

The National Department of Communication has through a grant established an e-Skills Hub in KZN to advocate e-government through interventions such as skills upliftment, research and development, which an author is part of. <sup>3</sup>Some of these terms are deliberately stated for completeness but not discussed in this paper.

To realise the potential of e-Government certain requisite technical and programming skills are needed to develop software artifacts. Skilled graduates are available given the high number of graduates, many of whom are unemployed and could be cross trained in ICT to produce artifacts. This represents an opportunity to create employment. Further, ‘a build it and they may use it’ principal is advocated to create the services which may drive demand. When one considers the SARS and Home Affairs examples it is clear that creating perceived useful artifacts will drive adoption and that strong advocacy through sustained advertising will sustain and may grow adoption.

This section suggests that South Africa needs a strategy to create awareness at all levels and that KZN has the people or? warmware to create artifacts with some intervention such as cross training.

**5.1.2 Technological role**

A strong supply of relevant artifacts is necessary though not sufficient to create demand. Once again one looks at *eBlockWatch*, SARS e-filing and PigSpotter as projects that garner support through high availability, up-to-date-relevance and advertisement. An e-Government ecosystem requires appropriate ICT infrastructure to provide location independent access to artifacts that provide services. It is already noted that South Africa has the best ICT infrastructure in Africa. There is empirical evidence the digital divide gap is diminishing as government is steadily increasing the number of access points in rural South Africa. This is reflected in Table 3. In KZN for example the Department of Rural Development installed 64 access points or i-centres between 2010/11 and 2011/12 and intends to deploy a further 70 i-centre in KZN. The Department of Economic Development installed 15 telecentres or inforcentres and wants to install a further 300. The Universal Services Agency (USAASA) installed 30 telecentres and intends to install 300 more [Table 3]. The table does not include public private partnerships (PPP) that resulted in access for rural or the unemployed which will probably grow the number of access points. From the data in Table 3it is reasonable to assume the increase in government investment in ICT infrastructure would contract the digital divide.

**TABLE 3. Government Commitment to ICT Infrastructure**

Year	Department of Rural Development [79]	Department of Economic Development [80]	USAASA [81]
2010/11	37	5	100
2011/12	27	10	44
2012/13	35	150	200
2013/14	35	150	150



At a national level, there is robust activity in rolling broadband across the country. The national coverage is at about 60% and growing with a steady decline in access cost. In addition the ubiquity of mobile devices provides instant mobile access and connectivity. This implies that the issue of access is becoming less of a challenge.

### 5.1.3 Legislative role

It is possible the legislative front may be used to create an e-Government act like the USA (2002) or the Austria (2005) acts respectively. This will set the terms of reference for future government projects to include an e-Government component. This is a good intervention that will reap medium term benefits.

There are several legislative acts that stakeholders who engage with citizens using ICT should be aware of. These are the Electronic Communication Act (ECA), the Promotion of Access to Information Act (PAIA) and the Independent Communications Authority of South Africa Act (ICASA) [82]. These are listed for completeness but not discussed further.

### 5.1.4 Political Role

The role of national, regional and local government is central to the promotion, creation, adoption and sustained usage of e-government. KZN has launched a portal, created social media links and developed a roadmap which shows government commitment to the process. The advocacy roll has been mooted. It is reasonable that the creation of an e-Government center will nurture an e-Government awareness and culture. However any innovation or 'disruptive change' needs strong strategic and political support by an appropriately influential champion [83]. In this case it is fitting the e-Government portal is being driven by the Provincial Premiers office. However advocacy without appropriate technology is doomed. This shows the intertwined multi-faceted nature of the model.

However current ICT initiatives are not geared towards *e-Government* – they are geared towards *access*. For this access points to deliver e-government, we argue that a national policy and champions to drive the advocacy needed. A mistaken belief by officials is that e-Government is the availability of speeches, policy and legislation on accessible media such as website. This is important for information dissemination and e-transparency and may even represent the first step towards an e-Government culture. This creates a static website that is not interactive. There is no white paper or policy for e-Government in South Africa at a national level. KZN is a provincial leader to drive and address this gap. At a national level, however, South Africa is evaluating e-democracy with an international study of electronic voting to neutrally evaluate the possibility of e-participation [78].

We leveraged the Prossler-Krimmer framework, to show there is ICT infrastructure (hardware) and IT savvy graduates (warmware) who can be cross trained to produce e-Government artifacts (software).

This section proposes that we need strategic and operational awareness, functionally technically competent people and relevant artifacts to drive demand.

## 6. OPPORTUNITIES AND FURTHER WORK

At an artifact level there is a developmental opportunity that may well assist in job creation through the cross training of underemployed or unemployed artisans. The benefit is compounded as freed resources may be used for other local government services. The opportunity to automate a service is an opportunity to evaluate how a service is delivered and what functionality may be added/removed to optimize such a service. Adding a computer to a problem with automate the problem not fix the problem.

The perceptions of local senior municipality officials understanding of e-Government has not really been tested in any rigorous method to the knowledge of the authors. Olugbara [84] is undertaking a large scale analysis in South Africa. If there was such knowledge, we argue there will be considerably better e-services artifacts or directed efforts to produce such software. An analysis of local government Integrated Development Plans (IDPs) suggest many ICT projects may even be e-Government projects. This represents considerable scope for further systemic research and development.

At a cursory artifact level the following services are suggested. This is just a small sample. One, geo-referencing or tagging of potholes for speed address—these may even be sent to navigation software to assist drivers and prevent accidents. Two, the broadcast of particular local context sensitive information for example seasonal health alerts in particular geographic areas with malaria or TB. Three, a more just-in-time feature may be about a rabid dog loose in a particular area. The latter is a kind of highly localised 'breaking news' or 'news alert' feature.

## 7. CONCLUSION

This preliminary assessment of the e-Government activities in South Africa indicates while there is a digital divide, the ubiquity of the mobile represents an opportunity to be leveraged within a so called m-government framework to deliver e-government. This form of engagement dovetails with the availability of such devices through the youth increasing dependence and usage of selfsame.

The development of two portals, while not currently heavily used is a welcome nonverbal commitment towards e-Government. On the other hand, low uptake of these sites, validates some of the assertions that advocacy and perceived usefulness will drive usage. The establishment of an e-skills hub in KZN with a focus on e-Government will assist in both the advocacy pull and the technology and artifact push. Further the commissioning of the e-Government KZN roadmap is evidence of government taking a pragmatic route towards this genre of service delivery.

The high number of static websites presents both an opportunity and a platform to create interactive services. Web 2.0 represents an opportunity for the developing municipalities to leapfrog e-Government into Gov 2.0. Both Newcastle and Ladysmith are examples of good interventions, although top-down. This cultural shift may yet lead to good practice. However, the efficiency and effectiveness of these technological interventions should be methodologically assessed for their impact for translation to other environments. Municipalities should, in addition, develop bottom-up simple entry level projects to automate low level and non-contested civic activities. It is further recommended that the advocacy component be practiced inside-out to get staff geared towards e-government by educating them about business-led and citizen-led e-government activities. Can such outside-in innovations be leveraged in a developmentally?

An overarching national policy that informs strategy, promoted by champions, legislated by a legal framework demand ICT-enabled services that leverages human capital is the e-Government's quintessential quadruple. There appears to exist a need for a managed approach to the development of e-Government artifacts between business driven initiatives, government initiatives and civil societies initiatives. This may be in the form of production of technology such as Application Programmer Interface (API) for artifacts, facilitated engagement through advocacy, and research and development colloquiums. Finally this paper gravely points to the increasingly violent service delivery unrest. For South Africa to succeed and grow peacefully, e-Government potential must translate to credible, repeatedly reusable, accessible artifacts.

## REFERENCES

- [1] S. Kim and D. Kim, "South Korean Public Officials' Perception of Values, Failure, and Consequences of Failure in E-Government Leadership," *Public Performance & Management Review*, vol. 26, pp. 360-375, 2003.
- [2] L. A. Joia, "Building Government-to-Government Enterprise," in *Electronic Government: Concepts, Methodologies, Tools, and Applications*, A. Anttiroiko, Ed. Hershey: Information Science Reference, 2008, pp. 1761-1768
- [3] G. Grant and D. Chau, "Developing a Generic Framework for E-Government," *Journal of Global Information Management*, vol. 13, pp. 1-30, 2005.
- [4] R. Heeks, 2002, Success/Failure Case Study No.3: Problems for a Natural Resource Ministry's Scientific Information System, <http://www.egov4dev.org/success/case/fishsis.shtml>, 2011, 25 July
- [5] N. Helbig, J. R. Gil-García, and E. Ferro, "Understanding the complexity of electronic government: Implications from the digital divide literature," *Government Information Quarterly*, vol. 26, pp. 89-97, 2009.
- [6] F. Bannister, "Serving the Citizen: A proposed Model for IT value in Public Administration," *Southern African Business Review*, vol. 4, pp. 33-44, 2000.
- [7] H. Mintzberg, "Managing Government, Governing Management," *Harvard Business Review*, 1996.
- [8] B. Brewer, "Citizen or customer? Complaints handling in the public sector," *International Review of Administrative*, vol. 73, pp. 549-556, 2007.
- [9] M. A. Mofolo and W. Smith, "Making use of 'Batho Pele' principles to improve service-delivery in municipalities," *Journal of Contemporary Management*, pp. 430 - 440, 2009.
- [10] Anon, "TheBatho Pele Handbook.A Service Delivery Improvement Guide," Department of Public Service and Administration, 2003
- [11] M. P. Gupta, J. Bhattacharya, and A. Agarwal, "Evaluating e-government," in *e-Governance: Case Studies*, A. Agarwal, Ed. Hyderabad: Universities Press, 2007, pp. 1-56

- [12] R. Naidoo and W. Palk, "Are e-Government Investments Delivering Against Expected Payoffs? Evidence from the United Kingdom and South Africa," presented at IST-Africa 2010 Conference, Durban, 2010
- [13] S. Moodley, "Deconstructing the South African Government's Information and Communication Technologies for Development Discourse," *Africa Insight*, vol. 35, pp. 3-12, 2005.
- [14] S. Puro and K. Desouza, "Looking for Clues to Failures in Large-Scale, Public Sector Projects: A Case Study," presented at 44th Hawaii International Conference on System Sciences, Hawaii, 2011
- [15] M. Lips, "Before, After or During the Reforms? Towards Information-Age Government in New Zealand," *Policy Quarterly*, vol. 4, pp. 21-26, 2008.
- [16] A.-V. Anntiroiko, "A Brief Introduction to the Field of E-Government," in *Electronic Government: Concepts, Methodologies, Tools, and Applications*, vol. 1, M. Khosrow-Pour, Ed. Hershey: Information Science Reference, 2008, pp. xii-lxxv
- [17] R. Heeks, 2003, Most eGovernment-for-Development Projects Fail: How Can Risks be Reduced?, <http://idpm.man.ac.uk/publications/wp/igov/index.shtml>, 2 May, 2011
- [18] S. C. Y. Luk, "The impact of leadership and stakeholders on the success/failure of e-government service: Using the case study of e-stamping service in Hong Kong," *Government Information Quarterly*, vol. 26, pp. 594-604, 2009.
- [19] M. Farelo and C. Morris, "The Status of E-government in South Africa," presented at IST Africa Conference, Pretoria, South Africa, 2006. <http://hdl.handle.net/10204/966>
- [20] R. Heeks, 2006, Benchmarking eGovernment: Improving the National and International Measurement, Evaluation and Comparison of eGovernment, <http://www.sed.manchester.ac.uk/idpm/publications/wp/igov/index.htm>, 2 May, 2011
- [21] J. Millard, "eGovernance and eParticipation: lessons from Europe in promoting inclusion and empowerment," presented at United Nations (UNDESA) multi-stakeholder advisory group workshop "eParticipation and eGovernment: understanding the present and creating the future", part of the "International eParticipation and Local Democracy Symposium: promoting social inclusion via eParticipation", Budapest, Hungary, 2006
- [22] B. M. Maumbe, W. J. Taylor, H. Wesso, and G. Erwin, "E-Value Creation in a Government Web Portal in South Africa," in *Encyclopaedia of Portal Technologies and Applications*, A. Tatnall, Ed. Hershey: IGI Global, 2007, pp. 384-390
- [23] L. Guanghua, "E-Government, People And Social Change: A Case Study In China," *The Electronic Journal on Information Systems in Developing Countries*, vol. 38, pp. 1-23, 2009.
- [24] National Audit Office, "Cross-government: Information and Communications Technology in government Landscape Review," Comptroller and auditor General, London 14 February 2011
- [25] R. Brooks, "System failure!," in *Private Eye*, 2007, pp. 17-24
- [26] J. Fedorowicz, J. L. Gogan, and M. J. Culnan, "Barriers to Interorganizational Information Sharing in e-Government: A Stakeholder Analysis," *The Information Society*, vol. 26, pp. 315-329, 2010.
- [27] B. M. Maumbe, V. Owei, and H. Alexander, "Questioning the pace and pathway of e-government development in Africa: A case study of South Africa's Cape Gateway project," *Government Information Quarterly*, vol. 25, pp. 757-777, 2008.
- [28] J. Ribeiro, 2011, Many Malaysian Government Sites Hacked, [http://www.pcworld.com/businesscenter/article/230421/many\\_malaysian\\_government\\_sites\\_hacked.html](http://www.pcworld.com/businesscenter/article/230421/many_malaysian_government_sites_hacked.html), 24 July
- [29] L. Abrahams, "E-Governance Policy 1999-2009: Paths And Limitations To Progress," *Journal of Public Administration*, vol. 44, pp. 1011-1026, 2009.
- [30] L. Emery, A. Gordon, G. Krieshok, and A. Pompe, 2009, Information Policy Country Report: South Africa, <http://hdl.handle.net/2027.42/64841>, 22 July, 2011
- [31] R. Heeks and R. Santos, 2009, Understanding Adoption of e-Government: Principals, Agents and Institutional Dualism, <http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/index.htm>, 2 May, 2011
- [32] A. Y. Al-Eryani, "E-Government Services In Yemen: Success and Failure Factors," in *Faculty of Science Bulletin*, vol. 22: Sana'a University, 2009, pp. 61-74

- [33] G. Naidoo, S. Singh, and N. Levine, "An Overview of Internet Developments and their Impact on E-Government in South Africa," in Handbook of Research on E-Services in the Public Sector: E-Government Strategies and Advancements, A. T. A. Ajeeli and Y. A. L. Al-Bastaki, Eds. Hershey: IGI Global, 2011, pp. 63-77
- [34] G. B. Guomundsdottir, "Approaching the Digital Divide in South Africa," presented at NETREED Conference, Beitostolen, Norway, 2005
- [35] C. G. Hossan, M. W. Habib, and I. Kushchu, 2006, Success and Failure Factors for e-Government projects implementation in developing countries: A study on the perception of government officials of Bangladesh, <http://www.mgovernment.org/resources/euromgvo2006/index.html>, 10 June, 2011
- [36] D. Sarantis, D. Askounis, and S. Smithson, "Critical Appraisal on Project Management Approaches in e-Government," presented at 7th International Conference on ICT and Knowledge Engineering, Bangkok, 2009
- [37] G. Kaisara and S. Pather, "e-Government in South Africa: e-service quality access and adoption factors," presented at 11th Annual Conference On World Wide Web Applications, Port Elizabeth, 2009. (<http://www.zaw3.co.za>)
- [38] R. Heeks, 2002, Success/Failure Case Study No.24: The National Data Bank Project: An Expensive Lesson for Bangladesh, <http://www.egov4dev.org/success/case/ndb.shtml>, 25 July, 2011
- [39] S. M. Mutula, "Comparison of sub-Saharan Africa's e-government status with developed and transitional nations," Information Management & Computer Security, vol. 16, pp. 235-250, 2008.
- [40] S. Singh, "Towards Understanding e-Government Application Development," in E-Governance Policies & Practices, N. Bhatt and A. Aggarwal, Eds. New Delhi: Excel India Publishers, 2011
- [41] Internet World Stats, 2011, Africa Top Internet Countries, <http://www.internetworldstats.com/stats1.htm>, 23 July, 2011
- [42] S. Moodley, "The Promise of E-Development? A Critical Assessment of the State ICT for Poverty Reduction Discourse in South Africa," Perspectives on Global Development and Technology, vol. 4, pp. 1-26, 2005.
- [43] S. Singh, "The South African 'Information Society', 1994–2008: Problems with Policy, Legislation, Rhetoric and Implementation," Journal of Southern African Studies, vol. 36, pp. 209-227, 2010.
- [44] R. Matavire, W. Chigona, D. Roode, E. Sewchurran, Z. Davids, A. Mukudu, and C. Boamah-Abu, "Challenges of eGovernment Project Implementation in a South African Context," The Electronic Journal of Information Systems Evaluation, vol. 13, pp. 153-164, 2010.
- [45] L. C. van Jaarsveldt, "Advances in ICT beneficial to government and education in a post-apartheid South Africa, Adopting E-Governance," in Adopting E-governance, G. P. Sahu, Ed. New Delhi, India: GIFT publishers, 2008. <http://www.iceg.net/2007/books/book3.html>
- [46] R. Kerby, R. S. Kim, M. Mimicopoulos, J. Rabinovitch, P. Spearing, and K. Yao, "United Nations E-Government Survey 2010: Leveraging e-government at a time of financial and economic crisis," United Nations, New York ST/ESA/PAD/SER.E/131, 2010. [http://www.unpan.org/egovkb/global\\_reports/08report.htm](http://www.unpan.org/egovkb/global_reports/08report.htm)
- [47] S. Hafeez, R. Kerby, and J. Roy, "United Nations e-Government Survey 2008: From e-Government to Connected Governance," United Nations, New York ST/ESA/PAD/SER.E/112, 2008. [http://www.unpan.org/egovkb/global\\_reports/08report.htm](http://www.unpan.org/egovkb/global_reports/08report.htm)
- [48] S. Hafeez, "UN Global E-government Readiness Report 2005: From E-government to E-inclusion," United Nations, New York UNPAN/2005/14, 2005. [http://www.unpan.org/egovkb/global\\_reports/08report.htm](http://www.unpan.org/egovkb/global_reports/08report.htm)
- [49] S. Hafeez, "UN Global E-government Survey 2003," United Nations, New York 2003. [http://www.unpan.org/egovkb/global\\_reports/08report.htm](http://www.unpan.org/egovkb/global_reports/08report.htm)
- [50] S. Hafeez, "Un Global E-Government Readiness Report 2004: Towards Access For Opportunity," United Nations, New York UNPAN/2004/11, 2004. [http://www.unpan.org/egovkb/global\\_reports/08report.htm](http://www.unpan.org/egovkb/global_reports/08report.htm)
- [51] S. Zuboff, In the age of the smart machine. New York: Basic Books, 1988
- [52] K. G. Nygren, "'Monotonized administrators' and 'personalized bureaucrats' in the everyday practice of e-government Ideal-typical occupations and processes of closure and stabilization in a Swedish municipality," Transforming Government: People, Process and Policy, vol. 4, pp. 322-337, 2010.
- [53] J. Agar, The Government Machine: A Revolutionary History of the Computer. Cambridge: MIT Press, 2003

- [54] State of the Nation addresses 2010 2011 2012. [www.dpsa.gov.za](http://www.dpsa.gov.za)
- [55] G. Reddy, 2012, Interview with Ladysmith Municipal Manager,
- [56] P. Alexander, "Rebellion of the poor: South Africa's service delivery protests - a preliminary analysis," *Review of African Political Economy*, vol. 37, pp. 25-40, 2010.
- [57] D. Remenyi and B. Williams, "Some Aspects of Methodology for Research in Information Systems," *Journal of Information Technology*, vol. 10, pp. 191-201, 1995.
- [58] P. D. Leedy and J. E. Ormrod, *Practical Research: Planning and Design*, 9th ed. Boston: Pearson, 2010
- [59] Business Against Crime, "Interview with KZN CEO," 2012
- [60] J. Nair, 2012, Business against crime Interview and discussion of e-business and KZN e-government,
- [61] W5, 2010, Update on Regulation of Branchless Banking in South Africa, [http://www.cgap.org/gm/document-1.9.42404/Updated\\_Notes\\_On\\_Regulating\\_Branchless\\_Banking\\_South\\_Africa.pdf](http://www.cgap.org/gm/document-1.9.42404/Updated_Notes_On_Regulating_Branchless_Banking_South_Africa.pdf), 5 August, 2012
- [62] E. Pickworth, 2012, SA's ATM fees 'highest of 27 countries', <http://www.businessday.co.za/article/s/Content.aspx?id=174253>, 15 June, 2012
- [63] E. Calandro, A. Gillwald, and C. Stork, 2012, Africa Prepaid Mobile Price Index 2012: South Africa, [www.researchictafrica.net/docs/SA\\_Mobile\\_Prepaid\\_policy\\_brief.pdf](http://www.researchictafrica.net/docs/SA_Mobile_Prepaid_policy_brief.pdf), 2012, 5 August
- [64] O. M. Suthcliff, 2005, The value of the RIMS project,
- [65] W4, 2012, Doubt plagues new Durban billing system, [http://www.iolproperty.co.za/roller/news/entry/doubt\\_plagues\\_new\\_durban\\_billing](http://www.iolproperty.co.za/roller/news/entry/doubt_plagues_new_durban_billing), 5 August, 2012
- [66] S. Jenner, *Realising benefits from Government ICT investment - a fool's errand?* Reading, UK.: Academic Books Publishing International Limited, 2009
- [67] L. Naidoo, 2012, Interview with e-Government company: Analog,
- [68] L. Anderson, 2011, Demystifying the Arab Spring parsing the differences between Tunisia, Egypt, and Libya, <http://www.ssresourcecentre.org/wp-content/uploads/2011/06/Anderson-Demystifying-the-Arab-Spring.pdf>, 1 June, 2012
- [69] Ushahidi Website, 2012, Ushahidi: Kenya monitoring function, <http://ushahidi.com>
- [70] S. Makri, E. G. Toms, L. McCay-Peet, and A. Blandford, "Encouraging Serendipity in Interactive Systems: An Introduction." UCL Interaction Centre: University College London, Gower Street, London, 2012
- [71] W5, 2012, eBlock website, [www.eblockwatch.co.za](http://www.eblockwatch.co.za), 5 August, 2012
- [72] PigSpotter website, 2012, [www.pigspotter.co.za](http://www.pigspotter.co.za),
- [73] PigSpotter Tweets, <http://twitter.com/pigspotter>,
- [74] W6, 2012, Missing teenager Kaylene Lewis has been found, <http://www.jbaynews.com/missing-teenager-kaylene-lewis-has-been-found/>,
- [75] J. Cambell and T. Im, "Beyond ubiquity: Mobile government theory and practice," presented at 2012 KAPA conference, Soul National University., 2012
- [76] <http://ssrn.com/abstract=1008839T>. O'Reilly, "What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software," *Communications & Strategies*, vol. 1, pp. 17, 2005.
- [77] A. Prosser and R. Krimmer, "The Dimensions of Electronic Voting Technology, Law, Politics and Society," *Electronic Voting in Europe Technology, Law, Politics and Society*, 2004.
- [78] S. Thakur, "Commissioned research. E-voting: A cross border experience. Unpublished at time of writing," IEC. South Africa 2012
- [79] "Comprehensive Rural Development Programme: ICT," Department of rural development and land reform, 2012
- [80] L. Nadasen, 2012, KZN ICT Summary. Department of Economic Development and Tourism,
- [81] K. Mahlangu, 2012, Universal Service and Access Agency of South Africa (USAASA). Business Development Officer,
- [82] Independent Communications Authority of South Africa Act (ICASA), [www.icasa.org.za](http://www.icasa.org.za),
- [83] E. Roger, *Diffusion of Innovations*, 4th ed. New York: The Free Press, 1995
- [84] O. O. Olugbara, "An analysis of the extent of e-government services in South Africa - unpublished research," KZN e-government e-skills hub, South Africa 2012

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