

M-government: South African Approaches and Experiences

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Abstract: *This paper looks at the approaches and experiences of South Africa in advancing m-government. It features a number of efforts that demonstrate how mobile technology can be used to improve government operations and service delivery. A bias has been on looking at solutions that address developing country challenges.*

The ability to test and incubate solutions for developing country challenges is based on a number of South African realities. This includes:- extensive penetration of mobile phones across all incomes groups including rural and remote households, the ease of use of the technology, a proliferation of solutions from the commercial sector, licensing obligations to be met by the mobile network providers, and finally, the reality that for many a mobile phone represent the sole source of communication.

In less than three years, South Africa has made significant strides in advancing m-government. However, m-government is still in its infancy and will rapidly evolve over the next few years. There is increasing acknowledgment that there is a need to go beyond isolated pilots. This will require the development of an m-government strategy that can forge closer co-operation between industry and government, more effective mechanisms for enabling the rapid technological changes and advances to be translated into government solutions and importantly for solutions to be financially, institutionally and technologically sustainable.

Keywords: South Africa, applications, m-government strategy developing country

1. Introduction

Mobile government in South Africa is in its infancy. The current m-government landscape is one of isolated pilot projects and a handful of full-scale implementations. However, there is increasing interest and acknowledgement that m-government has potential value. Due to the existence of a number of enabling factors, South Africa is well positioned to be a pioneer in m-government, particularly with respect to applications and solutions that address the specific challenges faced by developing countries. This work-in-progress paper aims to share some of these applications.

In addition to sharing current m-government applications, this paper will attempt to look at the m-government trajectory likely to be followed in South Africa in the next few years. As such, it will:-

- Discuss the factors that facilitate m-government in South Africa,
- Present a conceptual framework guiding m-government solutions and application development
- Share some m-government applications being facilitated by the Centre for Public Service Innovation (CPSI),
- Analyse the challenges that confront the future of m-government

The South African experience highlight that taking m-government forward in South Africa will depend on resolution of subsidiary issues like a process for identifying applications that offer significant potential, development of suitable costing and financing models, and locating m-government within the broader improvement strategy of government.

2. Conditions facilitating m-government in South Africa

A recent report published by Vodafone, the Centre for Economic Policy Research and the Department for International Development entitled '*Africa: The Impact of Mobile Phones*' confirm the phenomenal growth of mobile phones in Africa. This includes South Africa, which has seen unprecedented growth since the introduction of mobile phones slightly more than a decade ago. Between 1998 and 2003, the number of mobile subscribers per 100 population rose from 7.92 to 36.36 in South Africa (Vodafone, 2005: 5). Although cellphone penetration is lower in rural and isolated communities, the proportion is still significant and far outstrips land-line connections. Two developments account for the significant penetration in rural communities. Firstly, the introduction of a pre-payment system for managing cellphone subscriptions and secondly, the licensing obligations placed on network operators to facilitate universal access to telecommunications.

The phenomenal growth in mobile subscribers has been coupled by a rapid increase in commercial and other solutions that take advantage of the ubiquitous nature of cellphones. These include:-

- confirmation of financial transactions as part of an internet banking solution,
- topping-up of pre-payments for the mobile phone bill,
- information downloads of every hue and shade,
- making contributions to charities via premium SMS,
- participating in television and magazine polls,
- Enabling the creation of an electronic blockwatch system to assist with crime prevention.

At the technology level, South Africa enjoys a number of advantages that facilitate commercial and government applications that use mobile technology. This includes the adoption of the GSM standard by all three mobile network operators and extensive cellphone coverage. For example, one of the network operators, MTN, covers 87% of the landmass in South Africa with 95% on the coverage grid. In addition, GPRS, EDGE, and 3G networks are gradually being rolled out in the country.

Furthermore, South Africa enjoys a fair degree of competition and innovation at the network level with three licenced mobile network operators. Each of the mobile operators have identified different niche areas for development in order to increase market share. However, all three operators view voice communications and business solutions as crucial, which is likely to facilitate m-government.

Other factors that account for the rapid take-up of mobile phones included innovative pricing strategies (including pre-paid use), marketing and packaging of the SMS functionality, creating small entrepreneurs who use cellphone technology to deliver telecommunication services to under-served areas, the ease of use of the technology, and finally, deficiencies in existing land-line infrastructure.

3. M-government Framework

Acknowledging the potential that mobile technologies offer, the CPSI initiated a research and information gathering process together with the State Information Technology Agency (SITA) and the Council for Scientific and Industrial Research (CSIR). The aim of the research was to identify the potential areas of application. The research also aim to provide a framework that can enhance decision-making on the kinds of initiatives that could be taken forward by government departments.

The results of the research effort are summarised in a FutureWatch report entitled '*Government Unplugged: Mobile and Wireless Technologies in the Public Sector*'. The report identifies six major areas of application. These cover both front-office applications (enhancing service delivery) as well as applications in the back-office (improving internal efficiencies).

They six major areas of application identified are connectivity, personal communications, information management, logistics, positioning and identification, and transactional. Each of these areas is discussed in more detail in the report. Connectivity was included as a focus area for two reasons. Firstly, it is the basic building block of all other forms of mobile and wireless communication and many of the potential

applications and benefits begin with connectivity (CPSI, 2002). In addition, as a developing country, basic connectivity is still a major challenge particularly for rural and isolated communities.

In terms of the remaining five areas of application, the areas of personal communication and information management were identified as areas that offered real possibilities over the short to medium-term (next 1-3 years). As such, they reflect the choice of pilots initiated by the CPSI and its project partners. For a variety of reasons, the possibilities for taking forward the remaining three areas (logistics, positioning and identification, and transactional) was significantly lower. The key findings in the areas of personal communication and information management will be briefly summarised¹.

3.1 Personal communications

From basic voice communications using mobile phones through to mass communication of text messages to individuals' phones or e-mail to their computers, communications has already been revolutionised by mobile and wireless technology. The challenge now is to identify the applications that will harness this revolution, using forms of personal communications to enhance the functioning of government departments and agencies. In the field of health, for example, experimental and practical uses have already proved the benefits of using SMS for health alerts, advising of pathology results, and providing reminders for taking lifesaving medicine.

Generic applications, such as informing people of the availability of documents via SMS, and then supplying requested documents via e-mail, are already in extensive use, but not on an institutional or strategic level. In most cases, the business case does not have to be proven – it becomes merely a case of using technology that is already rolled out, and simply taking advantage of underlying functionality. This has been successfully achieved by a number of private sector institutions.

3.2 Information management

The key to the usefulness of mobile and wireless technology lies in the quality of information that will be generated and accessed through the connectivity options made available. This quality will in turn depend on how well the applications that rely on connectivity have been integrated into back-end systems, and how user-friendly they have been made for the end-user, whether in government or members of the public. The better the applications can be used to access, input and manipulate data, the greater will be their efficiency, and hence the benefits they are likely to provide. This includes accessing information from back-end databases, inputting information into systems, either as part of a workflow process or simply data capture, and extracting data for wider distribution.

4. M-government Applications in South Africa

As highlighted above, personal communication and information management form the basis of experimental work initiated by the CPSI and its project partners. A public call for proposals for quick-win mobile technology demonstrator projects was issued in late 2003. The call for proposals was aimed at the private sector and other solution developers who were requested to forward proposals that could add value to government operations in the following areas:-

- Application and registration services
- Health care services
- Social services
- Justice
- E-democracy

A total of 22 proposals were received. Selection was based on a technical assessment (i.e. the robustness of the solution) as well as an organisational assessment (i.e. will the proposed solution add value to government operations and does it have a reasonable chance of success based on current organisational realities like legal frameworks, etc.). Of the 22 proposals received, four were selected for

¹ Discussions on the remaining area can be found in the research report entitled '*Government Unplugged*'.

implementation. Each of the for projects were resourced and implemented based on the peculiarities of each project. The four projects included two projects focused on health care management and two on registration services provided by the Department of Home Affairs. These projects are now discussed.

In South Africa, medical institutions like hospitals and clinics all operate on different systems for gathering and maintaining patient information. In addition, many primary health care clinics located in rural areas do not have any electronic systems in place and rely on paper-based systems, resulting in patient records being kept by patients themselves. The impact of using multiple systems is that it is difficult and costly to develop a national overview of patient statistics. On a more basic level it is extremely difficult for individual institutions within the health care sector to share information between each other. One of the clearest examples of this is to be found in the sharing of blood test results. Currently this only takes place through manual exchange. The CPSI identified two pilot projects that could enable electronic data-sharing in a manner that enhances the ability of health care professionals to function effectively, and in this way to directly improve the service it delivers to citizens.

These are described below:

4.1 Real time mobile interaction for effective roll-out of anti-retroviral therapy (ART): Dokoza project

4.1.1 Background

The Dokoza solution offers a new innovative cost-effective advanced system for fast-tracking critical services to the national healthcare sector. This system has been patented and developed in South Africa for possible use initially in HIV/AIDS (specifically in respect of the roll-out of anti-retroviral therapy) and TB. The intention is to include the management of other diseases at a later stage. The Dokoza system uses mobile technologies for data and transaction exchange for medical services, in particular making accessible real time interactive confidential communication, authorisation and administration via the cell phone and SMS.

The aim of the system is to assist with fast-tracking the roll-out of ART, with emphasis on such roll-out in resource-poor settings (“resource-poor” in the sense of IT hardware and software).

Dokoza offered the South African Department of Health a cost-effective accessible national platform, with the capacity to collect and disseminate real time data and transaction information for all patients receiving ART and TB treatments. The system is able to process an ART and TB programme in the context of particular disease management protocols managed by a chosen group of Patient Management Clinicians. The Patient Management Clinician is not the treating healthcare practitioner, but rather the person responsible for the design and monitoring of treatment protocols.

In addition to this Dokoza is also able to offer existing hospital systems a common interface to the National Laboratory System enabling faster access to blood test results.

4.1.2 Focus of pilot

The pilot was implemented with the HIV/ Aids Adult Clinic at Helen Joseph hospital and the Paediatric Clinic at Johannesburg General Hospital, both of which are in the Gauteng Province. The pilot demonstrated some of the following applications:

Real time data and transaction exchange via cell phone: The system allows for real time interactive online information sharing and real time processing for cost of services and medication, to a particular cost centre for a specific patient.

Examples of areas for real time management by medical service providers include:

- Patient Registration

- Accessing HIV/AIDS patient status and blood test data from the National Laboratory
- Requesting a specific patient script for ARV
- Submitting a specific patient diagnosis
- Submitting the claim for patient medicine dispensed, for costing purposes etc
- Obtaining a history of medication provided to a patient, and an updated record of when medication was changed

Capacity building via cell phone: allowing healthcare practitioners to access records of their individual patients' treatment protocols via their cell phones, with the appropriate security built into the system. In other words, the practitioner's questions could be answered for a particular patient, taking into account his/ her full medical history, as captured initially and updated in real time on the back-end system. This assisted greatly with ensuring that medical decisions were made in accordance with the treatment protocols decided upon, and speeds up the training process, thereby allowing quicker roll-out.

Authorisation via cell phone: requests for authorisation of particular treatment may be made, should there be a need for such an authorisation system. This was done via the medical practitioner's cell phone. For instance, based on the latest pathology results of a patient, a new medication regimen may be authorised electronically. Authorisation may also be linked to practical administration, in the form of stock control and or delivery of medication.

National Patient tracking/ surveillance for all existing systems plus cell phone: Dokoza is able to update registered patients from interfacing with all existing local systems. Medical patient monitoring and evaluation would be done at a national level allowing patients, who are commonly mobile, to access services in any public facility countrywide, and also that patients may receive appropriate care as the health care practitioners in different facilities are aware of treatment already provided to patients. This is especially important with HIV/ AIDS and TB, where it is vital that patients comply with treatment protocols to avoid building up resistance. A loose relationship between the patient and health care practitioner, and lack of information about treatment already provided, may significantly hamper protocol compliance.

Common platform (compatibility) for all existing systems plus cell phone: Dokoza was able to interface with the local hospital computer system and interface with the National Laboratory system. This allowed both parties to exchange information efficiently in order to perform key functions more effectively.

Confidential communication with patients for all existing systems plus cell phone: for those patients with cell phones, the use of mobile technology will greatly enhance disease management capacity, to the extent that patients may be automatically reminded to take medication, or of appointments, or encouraged generally with short education messages.

It is clear from the above that the successful implementation will greatly enhance medical practitioners' access to relevant patient information, thereby allowing them to provide appropriate care and ease their administrative burden. In addition, the fact that every single Dokoza transaction will be recorded means that a very rich patient database would soon be built up, and this not only assists with measuring efficiency and effectiveness, but also allows accurate reporting on the medical programme under consideration.

4.1.3 Outcomes

The pilot demonstrated that the following benefits are achievable:

- Improved healthcare offerings to citizens, through quicker access to better quality information related to patient healthcare.
- Allowed all healthcare workers registered via Dokoza to perform real time 24-hour patient specific data and transaction exchange via his/her registered cell phone, thereby updating that specific hospital/clinic files and enhancing systems.

- Allowed all healthcare workers and patients (where applicable) registered via Dokoza to access in real time, 24 hours a day, general health information posted by Department of Health via his/her registered cell phone.
- Allowed for individual patient rules for easier drug management and stock control.
- Assisted with compliance regarding member disease management protocols, or deviation from approved treatment protocols.
- Provided healthcare workers and or patients with a unique, non-transferable and robust identification system that could link them to clinical data and ART (or other) prescription in real time, without compromising confidentiality.
- Allowed all existing hospital/ clinic systems to interact with the National Laboratory system.

In time the system could allow for other specific real time updates e.g., current number of available beds per ward. By Dokoza collecting specific files daily for updates, the system could allow all existing hospital systems to do a national search e.g., patient surveillance/ tracking to establish where the patient is registered for ART or TB and when the latest medication was dispensed. Dokoza could also provide instant feedback regarding possible duplication in services or issuing of drugs. Mobile patients are free to obtain services anywhere countrywide. This function would be available via the hospital clinic computer system or via healthcare worker cell phone.

4.2 Use of mobile technology to enable appointment scheduling: Mohwiti Technologies Access Health

The second health focused pilot projects seeks to introduce basic efficiencies through enabling primary health care clinics in a rural areas to schedule appointment for referred patients at the District Hospital. The current difficulty faced by district level institutions is that they are unable to manage patient numbers because there is no mechanism for anticipating demand on particular days. Many patients travel long distances to visit the district hospitals, only to be turned away.

Mohwiti Technologies is implementing a solution called AccessHealth, for the Department of Health. This involves the implementation of a new locally developed, innovative mobile technology solution to improve patient referrals between local clinics and district hospitals, resulting in the overall improvement of the quality of health-care provided.

4.2.1 Focus of pilot

The pilot project is being implemented in Brits Hospital in the North West Province of South Africa.

Brits Hospital, at any given time, has no more than 3 doctors that attend to patients referred to the hospital by the 22 local clinics in the district, estimated at approximately 150-200 patients per day. All of the local clinics have an electricity supply but many do not have telephone lines, fax machines, computers, etc. - all tools that could be used to improve the efficiency and quality of healthcare provided to patients.

The challenge for the hospital is to attend to as many patients as possible, whilst also ensuring that the quality of healthcare provided to the patients is not compromised, i.e. consultations are optimally used to uncover and resolve patients' medical problems and needs.

The hospital's challenge is compounded by not being able to effectively plan for the number of cases that will be referred by the local clinics, to ensure that all resources are aimed at meeting the patients' demands. The ideal situation for Brits Hospital would be to reduce patient numbers to 25-30 per doctor, i.e. 75 –100 patients per day.

The local clinics in the Brits District also send all their medical test samples to Brits Hospital for testing via a courier/delivery service and given that distances between some of the clinics and the hospital can be 45-60km, time delays of between 6 -10 days may be experienced before test results are returned to the clinic and/or patient.

4.2.2 Outcomes

The pilot project, still underway will result in a number of important outcomes:

Improve Health care access and delivery: The pilot aims to allow North West health care facilities, especially at District Hospitals to efficiently handle and manage patient referrals and to improve access to health care for patients from surrounding areas, via Local Clinics.

Remove Barriers to IT Systems Procurement: At present, the procurement of health care IT solutions is a priority for the Department of Health. However, certain barriers exist, which largely include cost efficiencies and time delays to implement solutions (as a result of procurement procedures within government departments and agencies). Integrating new systems with existing legacy systems presents further barriers in procuring “off-the-shelf” proprietary health care solutions. This project aims to remove some of the indicated barriers by using Open Source Software (OSS) principles in developing the AccessHealth solution. The software system being piloted will provide a basis for further developments and/or enhancements to pilot and implement other mobile applications, thereby facilitating the introduction of new systems capabilities within the public Healthcare arena.

Maximize the Use of Mobile Technology: For purposes of conducting a comprehensive pilot, two devices (hardware options) are being used to investigate the most practical and user-friendly model. A range of options have been identified for investigation, including, palm-top computing devices, new computing devices like mini laptops (e.g. similar to the Sony Viao) with integrated GPRS and other widely used micro devices such as cell phones. As the bandwidth of the existing systems is likely to be saturated due to the natural growth in the current patient population, mobile technology presents a real opportunity for South Africa’s health care system.

Maximize and improve the Usage of Existing Patient Management Systems: Usage of patient management systems has largely been limited to Hospitals with IT infrastructure and hardware. Local clinics, which provide primary health care to patients, mostly have little or no IT infrastructure and in some instances, have no electricity and/or telephone systems. The AccessHealth systems seeks to address this divide.

Demonstrate the benefits of Open Source Software (OSS) in South Africa: The system, developed entirely using OSS technologies, will present South Africa with a system that can be shared with other African countries with similar needs to improve health care, at a fraction of the cost of proprietary solutions. OSS will also make it possible for the system to be customised to meet specific requirements of SADC and/or those countries affiliated to NEPAD.

One of the most important areas of government administration in South Africa requiring systems improvements is in the area of ID and passport production and dissemination, managed locally by the Department of Home Affairs. Currently citizens are required to go through onerous paper-based processes of physically applying for new documents, and having to periodically check when it is ready for collection. It is a highly inefficient system that delivers poor customer service to citizens.

The CPSI identified two pilot projects to support in this regard. These are described below:

4.3 *SMS Notification and Querying Facility for the Department of Home Affairs - BCIT*

4.3.1 Background

An information and people intensive department such as Home Affairs always has a backlog of unresolved citizen queries regarding the status of diverse applications for ID, birth certificates, and travel documents. There have also been fraudulent activities on citizens’ marriage and death statuses on record.

Notwithstanding momentous efforts by government to improve service delivery on all fronts such as increasing capacity of staff to resolve queries, bigger and better offices and call centres, a problem and perception still exist that government service delivery is poor when it comes to resolving mostly simple queries.

The key problem that is crippling government service delivery today is the rate in which enquiries are resolved. Surprisingly, most of these enquiries are fairly simple in nature and they require very simple responses that would take less than three minutes to resolve. Call centres have proven not to be adequate to address these problems since:

- Most people don't have access to land based telephony services
- Cost factor because of prolonged waiting periods
- Lack of knowledge about the existence and usage of call centres
- The limitation to office hours of call centres
- The availability of sufficient resources to deal with the number of calls coming in.

The widely used solution is the enquiries desk at most government offices such as the local Home Affairs office where citizens can enquire about their application status of their IDs and passports. Citizens have long expressed dissatisfaction with the enquiries desks because of the problems that exist at these offices which are:

- Long queues which sometimes require citizens to take prolonged breaks from their workplaces, sometimes resulting in loss of a day's income
- Inadequate staff to attend to queries expeditiously
- Poor customer service etiquette by staff
- Limited office hours
- Inaccessibility, especially in rural areas where citizens have to travel distances to reach to local office

The problems highlighted above, which are application and registration services problems, are endemic in the Department of Home Affairs

4.3.2 Focus of pilot

BCIT is piloting a mobile system that will assist the Home Affairs department to resolve queries in a self-service manner, using mobile technologies.

The system allows citizens to receive SMS notifications on their cell phones regarding the status of their applications for unabridged birth certificates, ID Book, and passports. The service can be extended to any change in the database record of the citizen, the citizen receives an SMS. That is, citizens are encouraged to register their cell phone numbers on the Home Affairs website, and any change in the record on the citizen will automatically result in a notification message sent back to the citizen informing them about such a change.

Citizens have an option to query the status of their applications at any point. The system also allows citizens to query or verify of their statuses such as death and marriage via SMS.

The service is available 24x7 and is not restricted to office hours.

4.3.3 Outcomes

The citizens and the Department of Home Affairs are deriving the following benefits from the project:

- Reduced undetected fraudulent activities on people's records as a result of people being notified every time there is a change in details of the citizen's record.
- Reduced numbers of calls at call centres. This will improve service delivery and efficiencies at the call centres as agents will now focus on real queries

- Reduced queues at enquiries desks. This will help reduce the perception of associating queues with Home Affairs
- Improved citizen's expectations management, as information will be available to citizens at any point in time.
- Availability of a 24 x 7 service from government

4.4 USSD Appointment and Notification System: Council for Scientific and Industrial Research (CSIR) Consortium

4.4.1 Background

The second pilot project in this sector focuses on addressing key service delivery challenges, namely:

Knowledge by citizens of where to go and what to bring - Many citizens do not know where the nearest Home Affairs offices or service provision outlets (e.g. mobile outlets) are and are not sure of their hours of operation (especially the case with mobile outlets). In addition, they do not know what documents are necessary as part of their application (either for a passport or an ID document).

Management of long queues in Home Affairs offices - Home Affairs offices deal with a high number of applicants on a daily basis. The management of queues is not adequately addressed and citizens spend a considerable amount of time in queues sometimes finding that they have not waited in the right one. A more efficient system that ensures that the citizen is always in the right queue for the minimum amount of time would significantly improve the quality of service offered by Home Affairs.

Notification of the status of an application - It is not uncommon for a particular citizen to undertake several trips to a Home Affairs office for the purpose of enquiring on the status of a particular application (ID, passport, etc.). The cost of travelling and time spent at the Home Affairs office constitute an inconvenience to the citizen. It would be preferable if a citizen engages face to face with a Home Affairs official only if and when absolutely necessary.

The pilot project addresses each of these issues.

4.4.2 Focus of the pilot

The pilot is targeted at the Pretoria office of the Department of Home Affairs and technologies used include SMS, USSD and text-to-speech, using Open Source Software and tools wherever these are available.

4.4.3 Outcomes

The pilot project addresses four categories of services:

- An information dissemination service (location of local Home Affairs offices, available hours, application processes, size of photos, documentation needed);
- A scheduling/queuing facility to enable citizens to book available dates and time slots to streamline their application process; and
- An alerting service to notify citizens when their documents are available
- A system which will enable blind or visually-impaired citizens to make use of the alerting service as well

A number of applications are currently being piloted and implemented in South Africa. A brief description of these would assist in giving a more fuller sense of m-government initiatives in South Africa.

In addition to the four pilot projects being facilitated by the CPSI, a number of other m-government applications have emerged in the last two years. These include:-

- An Integrated Information Management System by the Johannesburg Metropolitan Police Department that improves the effectiveness of the Johannesburg Metro Police Department (JMPD) by creating a highly accessible and flexible information repository that is maintained on a real-time basis. In this manner, the in-field officer is empowered with up-to-the-minute information, such as identification verification and outstanding warrants of arrest, enabling him/her to take relevant action at any scene. One of the major technological breakthroughs forming part of the system was the use of cellular telephones to interface with officers. These devices can be used to capture data at scenes as well as to feed back essential information to the officers and empower them with relevant additional facts (CPSI, 2005 (a)).
- Remote monitoring of traffic lights in the Nelson Mandela Metropolitan Council.
- Sending reminders via SMS to patients who are on specific treatment regimens. This simple intervention is playing a significant role in TB management as the requirement to take their medication on a daily basis is crucial in the success of the treatment (CPSI, 2003).
- Students accessing their final school year results by SMS as part of a service offered by the Department of Education.

5. Conclusions

The number and range of pilot projects underway confirm the increasing focus on m-government in South Africa. Clear immediate benefits have been demonstrated but whether these pilots can be effectively scaled-up as well as copied but customised remains to be seen. Beyond the scope of the individual pilots, the projects demonstrate the wider applicability of mobile technologies to function as an integrator between diverse systems using a range of platforms and technologies.

The future importance of m-government in the service delivery agenda will be dependent on resolving a range of range of technical and non-technical issues, which will only be done through closer co-operation between industry and government. The issues include:-

- Finding financing and costing models that ensure that the long-run costs of solutions do not outweigh the benefit of that solution. In addition, there is a need for cost-benefits analysis that can assess the return-on-investment that is possible and how this can be enhanced. The CPSI is currently in the process of evaluating the current pilots with this in mind.
- ICT systems that assist national and provincial responsibilities operate off a common Government Common Core Network (GCCN). On this basis, security of m-government solutions have been raised as an issue. This issue still needs to be investigated and assessed. In addition, the availability of the GCCN provides opportunities for achieving economies of scale where solutions can easily be customised to address other needs,
- Developing a better understanding of the legal and institutional issues that facilitate m-government deployment and addressing weaknesses that may exist.

In order for m-government to further develop and grow, there is a need to take discussion and action on m-government to a more strategic level. In addition, since the mobile technology space is characterised by high levels of development and improvement, there is a need to introduce an appropriate partnership between network operators, public sector institutions, and application developers that would allow for the identification of possibilities of the technology for government where this is cost effective and efficient.

Currently, South Africa public sector institutions largely engage with mobile solutions in an isolated and case-specific manner. There is no comprehensive strategy guiding choice around the use of mobile technology. This leads to limited full-scale implementations. The development of an m-government strategy together with the establishment of a Centre of Excellence on m-government is currently being explored in South Africa to address these weaknesses. The m-government strategy will ensure that the public sector can use its spending power and leverage far more strategically, and hence extend access to

services whilst the Centre of Excellence will provide a meeting place where government and the private sector can, on an ongoing basis, identify and test m-government solutions as well as to look at how these solutions can positively contribute to improved operations and service delivery.

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Glenda White has led the Centre for Public Service Innovation (CPSI) since its establishment in September 2001. Prior to joining the CPSI, she was a senior consultant and later a partner in Simeka Management Consulting. During her time at Simeka she provided support in strategic planning, institutional re-design, organisational development, performance management, and human resource management for a range of government and other agencies. She has been responsible for managing the process of selecting the four mobile technology pilot projects discussed in this paper and providing strategic guidance to these projects during the pilot period.