M-government for developing countries: A readiness framework

Jean-Paul Van Belle

Mobile government, usually abbreviated to m-government, refers to the use of mobile information and communication technologies (ICTs) in operational and managerial public administration. Most see m-government as a particular modality, extension or natural progression of electronic government (e-government). Some tout its potential to elevate e-government service and delivery to a new level, or even to allow governments to *leapfrog* some intermediate levels of e-government maturity. The latter promise makes it a particularly attractive proposition for governments in least developed and developing countries that are often still struggling to implement more basic forms of e-governance, both internally and with external stakeholders (see Figure 1). The most visible driver for m-governance is the huge increase in penetration of mobile phones among the citizens of developing nations, providing them not only with a communication tool, but also a device with significant computing capabilities. The last few years have seen a strong move from feature phones to smart(er) phones capable of a huge array of custom applications.

However, the promises of m-government are often punted by eager would-be vendors with personal financial interests at heart, or by transnational government agencies or non-governmental organisations (NGOs) which may not fully appreciate the constraints, culture and other contextual factors at play in particular countries.

This article reports on the results from empirically based m-government research projects in Africa, which are hopefully of use to local and national government policy and decision-makers. The first part of this article is a framework for assessing m-government readiness while the second part considers some additional reflections.

A framework for m-government readiness in DCs and LDCs

Developing countries (DCs), in particular least developed countries (LDCs), not only face a number of unique economic-based constraints, which may include limited financial and human resources, technology reservoirs or infrastructure, but also have reduced political options, as well as unique social and cultural dynamics. Taking this into account, we attempted to create a framework for assessing m-government readiness, which was based on an extensive literature review but grounded in an empirical context (Malawi). However, most of the framework should be at least partially applicable to any developing context, even regional governments in developing regions within more developed countries.

The theoretical grounding of the framework derives from constructs such as culture readiness, leadership readiness, user/customer readiness, competency readiness, technology readiness, tasks, legal readiness and partnerships (Al-Omari and Al-Omari, 2006; Fasanghari et al., 2010; Tornatzky and Fleisher, 1990). Readiness should not be measured quantitatively but, rather, be assessed qualitatively.

We define m-readiness of government as the capacity to utilise mobile technologies (MTs), in relation to organisational objectives, and to migrate from traditional routine government business to new methodologies to conduct business. It is a combination of technology, organisational systems and processes, structures, culture, leadership and governance, which enhances organisational competence or capability (Meyer, 2010; Hernandez and Noruzi,

Figure 1: M-government interaction

Interaction	Description	Examples
G2G	Government-to-government: between government levels (national to local) or departments	Census taking, and mobile communications and applications used within medicine, policing and education
G2E	Government-to-employee: between government and its employees	Employee self-service applications
G2B and B2G	Government-to-business and business-to-government: between government and business	Tax-filing applications and tendering information
G2C and C2G	Government-to-citizen and citizen-to-government: between government and its citizens	Information services, service delivery, m-participation, m-health and information lines

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The most obvious driver for m-governance is the growing penetration of mobile phones in developing nations. Pictured: Maasai man in the Maasai Mara National Park, Kenya

2011). M-readiness is a key concept because it can be an indicator of how a country can perform using new technological tools (Shapiro and Varian, 1999). M-readiness indicators allow policy analysts to identify areas of strengths and weaknesses in guiding a country through the digital transformation with workable perspectives.

Theoretical model construction is dependent on a number of ICT mobile readiness models, including the Mobile Readiness Index (MRI) Model, which was developed to assess the readiness for mobile services for all countries (Jazic and Lundevall, 2003). The proposed m-readiness research model classified the prospective readiness determinants that established the three dimensions of readiness – technology, organisation and environment for m-readiness and tasks suitability.

Technology readiness refers to all essential technologies that influence m-government readiness. These include hardware and software, communication devices, mobile/wireless and internet networks, network infrastructure, application software, legacy systems, present technology and electronic systems (Fasanghari et al., 2010; Tornatzky and Fleisher, 1990; Al-Omari and Al-Omari, 2006).

The particular technology factors driving m-government readiness are postulated to be the interoperability of technologies; service accessibility; (perceived) connectivity of mobile tools and services; and privacy and security.

Organisational readiness refers to factors that are critical to m-government readiness in order for organisations to make decisions

to use their applications on MTs. The organisation, in this context, can include government ministries, departments and statutory bodies, and closely allied private organisations. Organisational readiness can be decomposed into the following constituent factors:

- **Competency** is the availability of qualified people in government and the private sector who would be responsible for the management of MTs (Al-Omari and Al-Omari, 2006)

- **User readiness** refers to citizens, businesses and employees who are the targets of m-government services. Customers' concerns, such as trust in new technology, need to be addressed (Al-Omari and Al-Omari, 2006)

- **Leadership** is required to provide full support to mobile technology usage for government service delivery. Leadership also co-ordinates and sustains the standards and rules surrounding the implementation of ICTs (Al-Omari and Al-Omari, 2006)

- **Cultural readiness** refers to the general behaviour, embedded in government organisational processes, which can promote m-readiness. The organisational user culture, if embedded into MTs, would facilitate m-government readiness (Fasanghari et al., 2010)

Environmental readiness is multifaceted, encompassing several distinct forms of readiness, including:

- **Legal readiness** refers to laws that regulate the usage of technologies in government and society. Laws for MTs are

important because they safeguard government information during processing and transmitting. Some legal issues include: conducting business electronically; electronic exchange of documents; electronic payments; and verifying identities (Fasanghari et al., 2010; Al-Omari and Al-Omari, 2006). A favourable regulatory and legal framework has a positive influence on m-government readiness

- **Partners' readiness** is concerned with the mobile readiness participation of all players in supporting m-government. These partners include private and public sectors, donors and central governments (Zhu et al., 2003; Tornatzky and Fleischer, 1990). Some partners are prepared to accept and embrace new technological innovations in their organisations and, as a result, technology infiltration in a society can increase (Zhu et al., 2003)

- **Economic and political readiness** refers to a favourable environment that enables m-government readiness (Tornatzky and Fleisher, 1990). Competitive economic and political pressure that embraces innovative technologies motivates organisations to be m-ready (Crook and Kumar, 1998), which results in m-government readiness

Finally, confidence in the availability of reliable mobile network providers to support mobile readiness and the establishment of m-government (Fasanghari et al., 2010) is required to provide users with confidence in their operations to meet the average levels of mobile technology services that are predictable and reliable (Jazic and Lundevall, 2003).

Task suitability and applications

The broad categories of the tasks are informational, transactional, operational and managerial processes (Norris and Moon, 2005). Sheng and Trimi (2008) describe these categories of transactions as follows:

- **Informational processes** include information publication, updates and alert communications through emails or SMS, online broadcasting and dissemination to end-consumers

- **Transactional processes** allow customers to interactively conduct transactions such as procurement, licence renewals, voter registration and online financial payments through mobile devices

- **Operational processes** are internal to government operations, such as co-ordination across government organisations while working in the field – for example, policemen could remotely access a database for information. The suggested tasks are quite comparable to most international, widely used applications of m-government (Mengitsu et al., 2006)

- **Managerial processes** are the internal and external links of government organisations, which are sustained with ICT devices to improve agility and co-ordination. An example would be the use of MTs for monitoring internal and external financial transactions and administrative processes (Gebauer and Shaw, 2002)

Typical tasks (or application spaces) for m-government in an LDC would include education, health, agriculture, disaster administration, security warnings, passport renewals, tax returns, inventory, procurement, tourism, management issues and financial transactions.

Control factor: Specific country context

In addition, specific or unique country contextual variables at the national level are stipulated to be independent factors that control theme variations that are likely to change from country to country. These include competency, access, awareness, culture and affordability at national (or local) level. Alternatively, some researchers may prefer to classify these under 'environmental factors'.

The framework outlined in this article lists themes found in the particular case of Malawi. The elementary themes for other national or local governments may well be different.

Decision-makers in government should be aware that readiness assessments do not ensure success, even when carried out with the best of intentions, full commitment and dedicated effort. Any

Key terms

M-government is the provision of electronic government (e-government) services by means of mobile technologies. Some view mobile technologies as just another access channel, thereby relegating m-government as a special instance of e-government. However, mobile technologies allow for significant additional contextual information (for example, location-based services) and thus offer unique opportunities for m-government applications. Additionally, in many developing countries where e-government has been hampered severely by the lack of a universal fixed-line communication infrastructure, m-government allows a leap-frogging of ICT maturity within government and can also serve as a catalyst to radically transform traditional government processes. These capabilities warrant m-government research as a separate area of investigation, even though it is closely related to general e-government research.

TOE framework is a research framework used in the analysis of (mainly information and communication) technology readiness, adoption or success/failure within an organisational context (Tornatzky and Fleischer, 1990). It looks at factors within three dimensions: technology-specific factors, such as the maturity of the technology and technology characteristics; organisational factors such as employee skills and organisational culture; and environment factors, such as the industry characteristics or the legal and regulatory framework.

Mobile technologies refers to mobile ICTs such as notebook computers, tablet computers, handheld computers, personal digital assistants (PDAs) and different generations of mobile telephones. However, in least developed countries, the incidence of mobile computers is relatively low due to their cost, thus, the focus tends to be on mobile phones. To provide meaningful local (also known as client or end-user) processing capabilities, the mobile phone must be a feature phone or, ideally, a smartphone. However, most processing should be done on the server or the internet cloud. It is the authors' opinion that mobile phones will, for the foreseeable future, remain the primary information processing and computing devices accessible to the vast majority of citizens living in LDCs.

practitioner and researcher in the m-government space will have a reservoir of their own war stories to tell of unforeseen factors that torpedoed the success of m-government initiatives.

Unintended consequences

Any complex intervention is bound to have unintended consequences, sometimes resulting in effects that are quite the opposite of what was originally intended (this is sometimes referred to as 'the law of unintended consequences'). Particularly poignant, for instance, are efforts by governments in developing contexts to roll out electronic government-to-citizen (G2C) and citizen-to-government (C2G) initiatives in an attempt to bridge the digital divide. However, because access by the poor to information technology is often limited, these initiatives tend to benefit those who have access proportionally much more than those who do not, thereby increasing the digital divide. The rich now get a route to an additional channel to access government services, whereas the poor do not benefit at all and may find traditional channels becoming less resourced. Thus, in rolling out m-government services, special care should be taken in catering for low-end devices, shared phone use, rural areas with reduced or non-existent mobile coverage, low device penetration and low literacy rates.

Power and culture issues

Although all organisations have 'organisational politics', government institutions are by their very nature even more subject to power and organisational culture dynamics. In an e-government study in Kenya, we found that ostensibly well-intentioned efforts at streamlining internal operations through government to government (G2G) e-government initiatives by the central government were perceived by local government officials, rightly or wrongly, as further attempts to centralise power and were therefore boycotted or sabotaged by the latter (Ochara-Muganda and Van Belle, 2008; 2010a; 2010b). Similarly, in an environment where access to information is often seen as a way to achieve, maintain and exert power, any efforts to use ICTs to facilitate the flow and exchange of information between government departments is likely to result in significant overt or covert resistance.

Sustainability and scalability

Given the innovation and technical characteristics of m-government, it is not surprising that many initiatives are initiated and driven by commercial vendors or academics. However, vendors have little or no financial incentive to provide government with the technical and human capacities necessary to achieve long-term independence from them, preferring a dependency role which benefits them as long-term contractors or suppliers. On the other hand, academics and well-meaning NGOs arguably have no profit motivation but usually are interested only in a proof-of-concept demonstration for research or marketing purposes, and fail to take into account the huge extra demands posed by scalable solutions such as security, robustness, reliability and resilience.

Citizen attitudes and concerns

Although citizens arguably benefit the most from m-government, they can also become unexpected obstacles to the successful adoption of m-government initiatives. This surfaced in our own research into the willingness of citizens to engage in m-participation – the use of mobile technologies to allow citizens to contribute to democratic processes (Cupido and Van Belle, 2013). The lack of trust was found to be a recurring theme – distrust towards national and sometimes local government initiatives may seem irrational but is often grounded in misinformation patterns typical of many small communities; recent confrontational events with local government representatives; or even a national 'psyche' of distrust as a result of ineffective democratic governance and communal 'police state' memories. At the other extreme, the affordances of the mobile technologies may lead to unrealistic expectations, such as transferring the experience of popular television public polling contests into expectations of easy-to-use national m-voting services without realising the latter's rigorous pre-conditions of confidentiality, security and other governance issues.

Conclusion

This article hopes to provide decision-makers contemplating m-government initiatives with a practical tool to assess their department's readiness for such initiatives. In particular, the framework suggested above is not meant to be definitive but is intended as an aid to prompt further brainstorming and honest self-appraisal of on-the-ground issues that may present technological, organisational or contextual obstacles to m-government initiatives.

Additionally, we hoped to temper the claims of some proponents by opening the reader's mind through highlighting some typical issues which confront any m-government initiative. Readers should feel free to contact the author for the full research papers mentioned.

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JEAN-PAUL VAN BELLE is a professor in the Department of Information Systems at the University of Cape Town and director of the Centre for IT and National Development in Africa. His research areas are the adoption and use of emerging technologies in developing world contexts, including mobile, cloud computing and green information systems. He has more than 150 peer-reviewed publications and supervises 20 post-graduate students.