m-Government Maturity Model: A Qualitative Investigation

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Abstract—Mobile government is gaining significant attention worldwide. Mobile phone penetration offers government a number of opportunities, including offering governments services to citizens via these ambiguous devices. This phenomenon called m-Government is a strategy which involves the use of all kinds of wireless and mobile technologies, applications and devices for improving service delivery to the parties involved in m-Government including citizens, businesses and all government divisions. The main aim of the study is to develop a mobile Government Maturity Model that can be used as an assessment tool to evaluate mobile services offered by government departments. This study examined the benefits offered by mobile government and also conducted an in-depth literature review on mobile government maturity models. Maturity models that have been developed by other researchers were translated, interpreted, compared and synthesized and a new mobile government maturity model is proposed. The new maturity model is contextualized for the Free State government in South Africa.

Keywords-E-government; ICT; Maturity Model; M-government

I. INTRODUCTION

Electronic-government (e-government) is one of the most rapidly evolving service domains in the contemporary information society. E-government refers to the use of Information and Communication Technologies (ICTs) for transforming the interactions among governments (G2G), governments and businesses (G2B), governments and employees (G2E) and governments to citizens (G2C) [1]. E-government contributes to the improvement of government services delivery to citizens, the facilitation of interactions with businesses and the empowerment of citizens through easy access to information and services [1].

Governments are making efforts to provide more services in alternative channels, to increase variety and quality of services as well as citizen's participation in order to achieve full transformation of government services. The eruption of the use of wireless devices is forcing governments to shift from e-government to m-government, as mobile phones are gaining significant attention worldwide. M-government can be considered as an extension to e-government platforms, it involves the use of all kinds of mobile and wireless technologies, applications and devices to improve service delivery among businesses, citizens and government units

[2]. m-Government is a new concept that is gradually gaining significant attention internationally [3].

Most countries have adopted m-Government, including South Africa (SA). To which extent are these m-Government services have proliferated? No one knows, more especially in the Free State province in SA. This paper aims to investigate how to measure and assess the m-Government services. The most well-known method to measure and assess m-Government services is to utilise a mobile government maturity model [4]. This study specifically analyzes well-known and accepted m-Government maturity models, which are mostly derived from e-Government maturity models. Then the study will synthesize the maturity models and present a contextualized model for the Free State province.

This paper comprises of five parts; Section 2 describes e-Government and m-Government in SA. Section 3 gives a brief overview of the methodology utilized in this study. Section 4 presents the findings. Section 5 discusses the findings and presents a new m-government Maturity Model and Section 6 concludes the paper.

II. LITERATURE REVIEW

A. E-government in South Africa

The South African government is making use of ICT to enhance work efficiency and improve service delivery to meet the needs of the public in a responsive and transparent mode [5]. This is due to the benefits that are provided by e-Government. However, e-Government has its own challenges and drawbacks including the digital divide which appears to be the major crippling factor in most e-Government initiatives [6]. Millions of less privileged individuals are without access to internet through the use of a computer and still there is no realistic chance that they might access government services provided electronically [7].

Other e-Government challenges faced by the South African government include: inadequate integration of poor citizens, privacy and security concerns, weak inter-agency information sharing, lack of proper infrastructure and inadequate empirical research to evaluate the impact of e-Government on citizen livelihoods [8]. The government has realized that electronic service conduits via computers were moving slowly and not successful. The growing concern

about the access inequality has led to consideration of new technologies as additional distribution channel for the services [9].

B. From E-government to M-government

E-government and m-Government are not two separate objects (entities). M-government is designed to build upon the already structured e-Government [10]. M-government is defined as the use of wireless technologies and mobile devices such as mobile phones, Personal Digital Assistant (PDA), smart phones, portable computers and Wireless Fidelity (Wi-Fi) enabled devices to deliver services anytime and anywhere [9], [11].

The statistics in South Africa show that the number of cellular subscriptions exceeds the number of population (105%) [13]. Also, statistics show that the rate of growth of mobile phone use now exceeds that of fixed-line [14]. In addition, the results of a survey conducted indicated that 22.4% of citizens who wish to use e-Government services prefer to use the SMS or the mobile Internet, compared to 12.5% who prefer the internet channel via a computer. The adoption and penetration of mobile phones have been on the rise in South Africa with the increased cellular network coverage being a key driver to this growth. M-government is an important tool needed particularly in S.A where half of its population resides in remote rural areas, informal settlements and townships and have a high risk of being by-passed by digital initiatives [15], [16].

Many government services can be made available on a 24 x 7 x 365 basis at any place in the world covered by mobile networks, which today means almost everywhere [7], [12]. Mobile adoption in South Africa marks a distinctive opportunity to capitalize on mobilizing e-Government projects inevitably making government more accountable in a sense. Mobile phones have a unique advantage of being able to reach areas where the infrastructure necessary for internet service or wired phone service is not a viable option, and the rapidly increasing number of mobile phone users in developing countries reflects the demand for connectivity in these areas [2], [4]. Low cost of mobile phone technology versus internet technology drastically lowered the entry barriers for citizens in developing countries to be connected to government services [11]. Mobile devices are easier to use, learn and offers various benefits [3], [5], [10].

C. Benefits on M-government

M-government offers the promise to improve internal performance, enhance efficiency and allow broad-based civil community in the information age. To achieve better performance services are ought to be modernized in such a way that those that cannot be offered through e-government are directed to m-government. Benefits comprises of:

- easy and low cost [3], [7],
- less corruption [2], [14],
- increased revenue growth [3], [5],
- increased transparency [7], [14],

- greater convenience [5], [9] and
- cost reductions [3].

Mobile networks can be easily installed due to the simple architecture of mobile telephony. Very useful in developing countries, where infrastructure is an important issue [16], [27].

D. mGovernment Maturity Model

Maturity Models (MMs) are designed to evaluate the development of the processes, people and objects/technology based on a set of principles [17]. m-Government implementation is a continuing process and its development is conceptualized into stages (maturity levels) [4], [18]. A maturity model allows governments and researchers to measure and assess the performance of m-government implementations. Maturity Models assist governments to prevent from practicing ineffectively, evaluate if they are on the right track and direct governments on the next step of maturity in delivering m-government services where necessary [18], [19].

Maturity models play a crucial role in governments as they provide a roadmap that guides governments in their future plans, guideline on essential requirements in each maturity stage that enables employees to understand the government activities and can be used as communication tools to illustrate government potential capabilities [20]. The public will also get an opportunity to understand at which level are the government currently positioned and ways in which the government can improve to be able to move to the next level of maturity [4], [20]. The following section describes the methodology used.

III. METHODOLOGY

An in-depth literature study was conducted to have a fundamental understanding of the research problem. The creation of the stage maturity model is based on literature study, which made use of a qualitative meta-synthesis methodology to synthesize different m-Government maturity models. This process follows the steps in the meta-ethnography approach [17], [21]. Qualitative meta-synthesis is a technique for synthesizing the findings of qualitative research. The methods aim to explain the findings of a similar qualitative studies. The result is used as the basis for the design of the construct of m-Government maturity model.

The primary sources of data were derived based on published articles, reviews, books and the government reports to gain the essential data that helped us formulate a suitable mGovernment maturity model. After comprehensive and iterative literature search, several models of e-Government and m-Government were identified. Some similar models were developed by individual researchers and were confirmed in the academic literature. Others came from the reports and white papers from government, consulting firms and international organizations. The models have been published within last ten years, from 2005 to 2010 and are based on different perspectives.
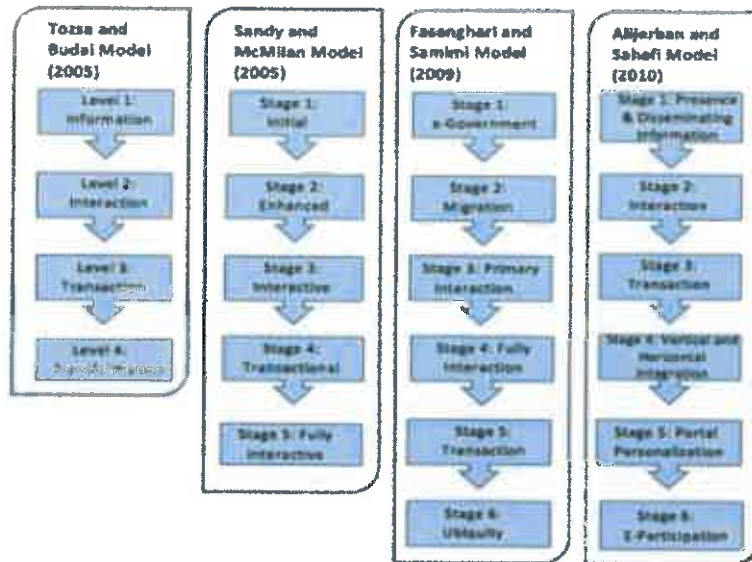
Figure 1. Mobile Government Maturity Models

IV. FINDINGS

Numerous studies were found relating to e-Government maturity models but diminutive studies were found on m-Government maturity models. Only four studies were found and they are presented in Figure 1 above. In m-Government development, there are two general phases to help develop the services [18], [22]. The first phase is to provide what is already available in a computer-based application through mobile devices. The second phase is to provide those services and applications, which are only possible through wireless and mobile infrastructure [18], [23].

As aforementioned, there are limited studies on m-Government maturity models. Most of the researchers developed their maturity models based on review of e-Government models [1], [8]. Models reviewed looked similar because all these models were constructed based on the development of e-Government, m-government made use of mobile technologies to help the growth because of the rapid development it brings [7], [11].

This study has examined four m-Government maturity models that are available in scientific and practical fields. Tosza and Budai's [24] model made use of Gartner Group four-stage model for their m-Government maturity model, through different phases of development it is intended to help progress m-Government. Sandy and McMilan's [25] model compromises of five stages of functionality in electronic service delivery referring to both web and mobile. They propose a success factor model that presents the critical factors necessary for the success of any m-government project. Whereas, Fasanghari and Samimi [26] offers a six stage m-Government model based on the general perspective of technology, security and infrastructure.

On the other hand, Alijerban and Sahafi [21] propose a six stage m-Government model based on general perspective with technological feasibility. Our proposed maturity model insinuates that governments in developing countries when developing m-Government initiatives, they should consider the use of social media to reach out to the citizens even those in deep rural areas.

V. DISCUSSIONS

Social media is one of the most growing trends in ICT more especially amongst the youth [16], [29]. Social media is using applications or websites that allow operators to create, share instant content and real-time access on social network from their devices [10], [28]. This technology can be undiscovered for the proliferation of m-Government in the Free State. None of the other m-Government maturity models considers social media as an important phase in m-Government proliferation [5], [14]. This section discusses the proposed m-Government maturity model [21], [26].
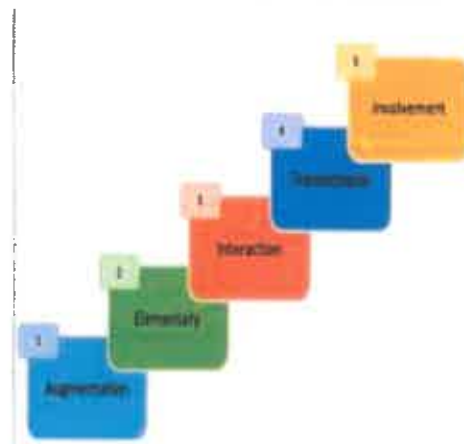

Figure 2. Example Proposed m-Government Maturity Model

In this study we propose a five stage model by adapting and integrating critical factors that have been mentioned by other authors. Figure 2 above, presents the new model higher level. The addressed model contains the intention to use E-government services and E-Readiness.

- First phase **augmentation**: given that mobile devices offers greater penetration it is vital to deliver government services via these ambiguous devices; this phase prepares for extension of services from e-Government to m-Government. In this step with the use of mobile devices, access to government information is granted e.g. a user is able to do clinic appointment using a mobile phone.

- Second phase **elementary**: this phase allows citizens to browse government web sites on their mobile devices. All sites should be designed in such a way that the citizens are able to access them via mobile devices, low sized software is compulsory. Services such as news, weather can be presented and can also be offered by Short Message Service (SMS) and email other than the web sites (Sending SMS to request available information for specific illnesses). Interactive responses are not yet available in this stage.

- Third phase **interaction**: this phase allows governments to offer electronic services in a more advanced manner compared to previous phase. Interactions are made available for the citizens to network with government service providers, and a two-way communication is enabled. Users have the opportunity to download, fill in forms and submit them using their mobile device and wireless connection also an option of completing the form online and submitting immediately. For example, at this stage a user is able to get confirmation back and if need be can also cancel the appointment.

- Fourth phase **transactional**: this phase provides financial interaction relations through online communication between the society and government for enforcement of the public services. Essentially, security at this stage is of utmost importance. In order to ensure that security is taken into consideration, information provided should remain confidential and user's privacy is also preserved safely. The most common examples here include the payment of government tax, traffic fines and others.

- Fifth phase **involvement**: this phase provides greater convenience of mobile integration. Social media is incorporated in this phase and offers a 24 x 7 x 365 communication, increasing open partaking, anytime and anywhere access to accommodate all the citizens even those in rural areas. This will enable citizens to access information, ask questions, and get instant feedback using forums within web sites, Facebook and twitter.

VI. CONCLUSION

Nowadays, wireless technologies are becoming more and more popular in all ranges of network access, i.e. personal, local, metropolitan and wide. Such technologies have been widely acknowledged as complementary channels for two-way transactions between governments, citizens and businesses. As the mobile devices, networks and application evolve, m-Government services will have to be provided through flexible and adjustable systems which can support different kinds of connections and terminals. In this paper, we have discussed e-Government and its challenges. We have also discussed an additional channel of providing government services through m-Government.

A careful review of the e-Government and m-Government maturity models shows that a large portion of the published research was conducted in developed countries. In consequence, little is written about the m-Government deployment in developing countries, like South Africa. In order to develop the m-Government maturity model, a qualitative meta-synthesis methodology was used to compare, interpret, translate and synthesize different existing maturity models.

Therefore, filling this gap in the literature is one of the main objectives for conducting this study in a country such as South Africa with various cultures and values. The outcome of this research revealed a new m-Government maturity model as part of improving public services delivery. Our next step involves conducting a survey which will explore m-Government adoption barriers from the citizens' perspective.

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