

# Mobile Government in Saudi Arabia: Challenges and Opportunities

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## ABSTRACT

M-government has gained increasing global attention in recent years, especially among developed countries, as a mechanism to reduce costs, increase effectiveness and improve public access to governmental services. The concept is increasingly being adopted in developing countries, however it faces different challenges and opportunities. This study explores the opportunities and challenges for the deployment of mobile government (M-government) services in Saudi Arabia. Collecting data from 77 semi-structured interviews, this study found that there are many opportunities for M-government in the country, requiring increasing awareness amongst the people about the government initiatives of mobile government services and promoting willingness to use these services. This study also highlights different barriers faced by M-government in Saudi Arabia, including issues of internet quality and speed, customization of services and data security and privacy as well as infrastructural challenges and bureaucratic attitude of government departments.

## KEYWORDS

Customization of M-Government Services, Data Security and Safety, Developing Countries, GCC, Government Bureaucracy, Infrastructural Challenges, M-Government Barriers, M-Government Opportunities, Mobile-Government, Saudi Arabia

## INTRODUCTION

M-government is understood as an extension of, and complement to, E-government services and features accessed via mobile devices (Backhouse, 2007). M-government therefore is not a replacement for E-government, but a complement to E-government services. The main focus of M-government is to provide E-government services to the citizens anywhere and anytime through any type of mobile device (Tsai et al., 2009).

Previous studies suggest that there is a high level of mobile penetration among Saudi Arabian citizens, and that mobile users in Saudi Arabia, like elsewhere in the world, are increasingly expecting the provision of services regardless of time and location (Al-Gahtani et al., 2007; Mengistu et al., 2012; Oxford Business Group, 2008). Other than the need to fulfil a growing consumer demand from citizens, the provision of mobile government services is also likely to increase the level of visibility and transparency which characterises the nature of the relationship between the Saudi Arabian

government and its citizens. This consumer demand, in turn, increases the need for effective and efficient services delivered by the government.

Previous studies which explored the opportunities and challenges associated with mobile government were mainly set in the context of developed (particularly European) countries, where the mobile penetration rate is 100 percent (Haaker et al., 2007). Furthermore, a large proportion of the research has concentrated on countries where mobile government has already become an important part of the provision of services, in countries such as Hong Kong, Germany, Estonia and Singapore (Haaker et al., 2007).

With the growth and spread of the use of information technology in the society, changes may appear in government institution to improve services to the public. The government has realized that electronic service channels were not successful and move slowly, they are now searching for an ideal mix of channel to be able to fulfil citizens' needs and to give citizens choices to use as many channels as possible, including the cheapest and the fastest ones. Therefore, the government needs to meet the demand and transform their activities to increase the efficiency and effectiveness as well as decreasing cost of transaction and time used (Mengistu et al., 2009).

The development of e-Government has begun since many years ago in many countries, some are successful, and some are still being developed, while m-Government nowadays, is in the early stage of development and may define as a new strategy to utilize all kinds of mobile devices, applications and services (Alsenaidy and Ahmad, 2012). M-government provides the additional features for the integration and exchange data communication, especially for the countries that have made a lot of investment in e-Government implementation. The synergy between both of them may become a new method for the interaction and communication between governments and citizens (Alsenaidy and Ahmad, 2012).

World Bank (2012) reports that the use of internet and mobile is increasing rapidly in developing countries including Saudi Arabia. In some developing countries, m-Government has the potential of delivering information on demand and creating real time communications to satisfy public needs. Therefore, Saudi Arabian government has big opportunities to create synergy between e-Government and m-Government plans to accelerate and facilitate the citizen needs due to high penetration of mobile phone users within the country.

Besides the benefits of m-Government implementation, there are some challenges faced by the government in implementing m-Government. Major challenges of m-Government are mostly similar to the e-Government such as infrastructure, human resources and management. But there are some challenges specific to mobile technologies, such as security and privacy issues (Susanto and Goodwin, 2010). More specifically on these mobile issues, Alijerban described some challenges in m-Government implementations (Susanto and Goodwin, 2010).

However, very little research has been conducted concerning the potential opportunities and challenges faced by the implementation of mobile services in countries where it has not yet been introduced. Furthermore, a large proportion of these studies have focused on the introduction of mobile technologies within sectors including the banking industry and the healthcare industry, where such changes are predominantly driven by a desire to increase productivity and focus on the need to cater to consumers (Alshehri et al., 2012). Such examples do not adequately reflect the increased level of complexity which is associated with the introduction of mobile services by the government, where the stakeholders are citizens, government employees, public administrators, tourists and business partners (Bouwman et al., 2008). These issues represent a significant gap in the literature.

## AIM AND OBJECTIVES

This research intends to explore different challenges and opportunities which are faced by mobile government within Saudi Arabia from the perspective of Saudi Arabian citizens.

This aim is met by fulfilling the following objectives:

1. To understand what kind of M-government services people want and how they would like to access them;
2. To identify whether users would prefer to have a general portal providing them with access to all of their required mobile government services;
3. To understand what citizens perceive to be the benefits and challenges of M-government.

## LITERATURE REVIEW

The advancement in information and communication technologies over recent decades has led to a revolution not only in the business world but also mechanisms for delivery of government and public services. Since the early 1990s, public sector companies across the globe have adopted internet technology to improve the delivery of services to stakeholders, which is commonly known as electronic government (E-government) (Trimi and Sheng, 2008). Increasing globalisation and economic integration enable the comparison of goods and services worldwide, particularly in developed countries. Such awareness and comparison stimulates consumer demand for more reliable and convenient services from the public and private sectors. Although E-government has been a key tool in providing effective services for both public and private sector firms in most of the developing countries, such organizations are looking for new ways to improve service quality and to cater for the escalating needs of society for more convenient and mobile services, leading governments to provide M-government as a feature of their E-government frameworks (Ntaliani et al., 2008).

Moreover, the advent of mobile tools such as personal digital assistants, laptops and mobile phones with wireless internet technology streamlines service provision for public agencies, removing physical and temporal barriers between government and citizens. M-government enables anytime-anywhere delivery of services in houses, streets, cars and during weekends, rather than people have to visit public offices to access facilities (Al Thunibat et al., 2011). Users of mobile technology can conveniently access real-time and personalized information, maximizing the benefits of using mobile technology (Al Thunibat et al., 2011). Mobile internet devices enable ubiquitous access to online services due to their portable physical features in so far as the internet infrastructure enables this to be done efficiently (Yu and Kushchu, 2004).

### Opportunities

According to some research, initial E-government initiatives have been relatively unsuccessful in fulfilling public expectations; however, M-government has the capability to rebuild people's trust through quicker communication with others and delivery of effective and efficient services (Song and Cornford, 2006). Steady interaction and well-managed and flexible public agencies can facilitate the acceptance of vertical and horizontal integration, providing an appropriate basis for M-government initiatives (Dada, 2006). In addition, mobile communication has become an integral part of mainstream society to communicate with public and private agencies which facilitate location-based services. In Saudi Arabia, a significant proportion of the population has no or limited access to the internet and computer systems. In this milieu, many people (particularly the younger age groups) consider mobile phones to be their primary internet device and the method by which they connect to the world.

As part of widespread investment in infrastructure and development, the Saudi government has engaged in E-government initiatives, but has faced difficulties in their applications. Efforts are underway to attempt to overcome these barriers (Alsenaidy and Ahmad, 2012), and the improvement

of the internet infrastructure and increasing mobile penetration mean that the conditions for the application of M-government are highly favourable in Saudi Arabia, engendered by infrastructural and public readiness for M-government (Alsenaidy and Ahmad, 2012). At present, effective mobile networks are not only available in cities but equally in the rural areas of Saudi Arabia. According to world development indicators (World Bank, 2012), mobile cellular subscriptions and internet users per 100 inhabitants in Saudi Arabia were 186 and 54 respectively for 2012. The increase in mobile cellular subscription till 2010 was around 10% annually, however it has stabilized since 2010. The increase in internet use from 2007 to 2013 was approximately 15% per year. Such indicators provide government with an opportunity to facilitate public access to M-government. Mobile communication has also emerged as a threatening competitor to landline operators in recent decades. Governments in developing countries are relieved from putting in place the heavy infrastructure necessary for provision of land-based communication facilities (particularly in rural areas) by the relatively inexpensive provision of mobile telecommunications infrastructure (e.g. mobile phone masts) and popular purchasing of mobile SIM cards and handsets. Moreover, with the availability of broadband and WiFi, people now enjoy mobile communication facilities that outstrip the performance of traditional land-based communication methods such as text messaging, map navigation, worldwide news not only in cities but in remote areas as well.

Governments in most countries consider the basic needs, comfort and convenience of the public in their personal, family and professional life. In the modern world, this is facilitated by technological methods (Alsenaidy and Ahmad, 2012). A large amount of capital and time is being invested on technology to improve quality of life with respect to wealth creation, improving access to education, job skills, health care facilities, security and entertainment in a secure, reliable and comfortable way (Alsenaidy and Ahmad, 2012).

Mobile and wireless communication technology can have a vital role in enhancing all areas of life for Saudi citizens. Such technologies can expand on the existing notion of “anywhere at any time” to a novel pattern that will focus on transformation of management processes and delivery of services via mobile and communication technologies for the betterment of the quality of life of Saudi people by ensuring availability of services anywhere at any time. Such an improvement can also facilitate access to government content and information in an efficient and convenient way.

## Challenges

Provision of M-government services to the general public is not without challenges which hinder M-government performance, and these barriers must be handled carefully. These challenges include security and privacy issues; a variety of mobile platforms; and issues regarding usability (Mengistu et al., 2009). Privacy and security are major issues in wireless communication because one cannot connect to the wireless network anonymously (Al Thunibat et al., 2011). People want their government to ensure safety of their personal data so that it may be secured from unauthorized persons and hackers to prevent its misuse. For instance, payment through credit card is still not considered to be fully secure, and cases of credit card fraud can be seen in this digital world also. Wireless network operators transport their secured data through public airwaves, thus providing a chance for hackers to intercept and tamper with or misuse data (Mengistu et al., 2009). Therefore, government should address this challenge and take proper measures to ensure the safety of public data.

Lack of readiness is another key challenge Saudi government is facing in the application of mobile-government. Although 54% of the total population are internet users (World Bank, 2012), most people remain unaware about the complete usage of mobile devices in order to get benefits of mobile government. Government still needs to create awareness among the general public about mobile usage and about the benefits of mobile government and to ensure accessibility to whole public (Basamh et al., 2014). Government should also assure people that their data will not get into the hands of unauthorized persons, and that no one else can access it. Poor readiness is also the result of the lack of a comprehensive legislative framework concerning cyber crimes, data privacy, information

practices and laws that specify the rights of subjects (citizens) and responsibility of data holders (government) (Mengistu et al., 2009). Formulation of transparent regulations about online taxable and non-taxable transactions and online signature is need of time to improve the readiness of people to adapt mobile government practices. Mengistu et al. (2009) argue that lack of regulation creates issues of lack of trust amongst the users, which engenders non-acceptance (i.e. non-adoption) of M-government services. Al-Gahtani et al. (2007) suggest that lack of trust further halts the readiness of the people to accept and use mobile government services.

Mobile communication between public agencies and citizens needs compatibility across public agencies, such as financial and IT and communication ministries and mobile service providers, as well as global standardization of content, semantics and interoperability across agencies and networks (Ntaliani et al. 2008). The variety of mobile devices with their continuously changing technical capabilities needs to be considered, and the supply of standardized and sustainable technology should be ensured in order to address the critical issues regarding measurability and interoperability (Susanto and Goodwin, 2010).

Low bandwidth and poor download speed are also fundamental challenges governments face in the application of M-government. Compared to the cable network, wireless network offers lower band-width speed, which results in discomfort and inconvenience among users (Mengistu et al., 2009). Mobile applications have to be developed carefully to overcome the problem of download speed and bandwidth consumptions. Moreover, governments should ensure the availability of efficient wireless network for public usage. Mengistu et al. (2009) also suggest that without the proper download speed and bandwidth, the acceptance and effectiveness of the mobile government services is not possible as these are the fundamental features of any mobile service, without which the success of M-government is impossible. These are the key issues of hindering the success of the mobile government services provision and acceptance in many developing countries (Ntaliani et al., 2008).

The challenge for mobile government to be 'always on' in an 'always on' society with fluid personnel is even more difficult than E-government transformation (Al-Gahtani et al., 2007). Government should not only assure the availability of infrastructure and services for chosen regions, but also ensure its own mobility as well. Basamh et al (2014) reported that conventional E-government infrastructure is insufficient to deal with the mobility of government and society and to provide smooth mobile government services; government has to be mobile and responsive in an M-government situation. Although governmental agencies are primarily responsible for launching M-government and to face its challenges and opportunities, this does relate to a need for societal change and process re-engineering with mobile companies and mobile technologies. To be mobile, government should not only focus mobile technology, but government should also think about reshaping itself and society.

Other challenges include the requirements of users relevant to the use of mobile applications. For example, according to Ivan and Zamfiroiu (2011), mobile applications often do not meet some important standards of usability including operability and attractiveness. The government needs to ensure that these standards are met along with meeting other functional and non-functional requirements of mobile applications (Ivan and Zamfiroiu, 2011). Previous studies suggest that features including ease of navigation, text source and colour rendering are amongst the key determinants of the usability (Shneiderman and Plaisant, 2010). Shneiderman and Plaisant (2010) argue that the long-term success of M-government services depend to a large extent on the provision of *personalised* services to the users instead of overloading them with unnecessary general information.

This relates to the provision of customized services (Susanto and Goodwin, 2010). Susanto and Goodwin (2010) observed that customization of mobile services is a key determinant of the success of the mobile government services, as otherwise customers will be loaded with the burden of unnecessary information. This suggests that personalisation is important to ensure that the effective provision of M-government services. According to Ntaliani et al. (2008), M-government is not just a label under which to provide traditional services; rather, it is the provision of facilities that simplify services for all parties, people, businesses and the government. Customization of services enhances

acceptance of M-government, offering users ease of using their required services and saving their time and effort to search for relevant information and services (Shneiderman and Plaisant, 2010). Susanto and Goodwin (2010) suggest that personalization of services results in enhancing the quality of the relationship between the country's citizens and its government.

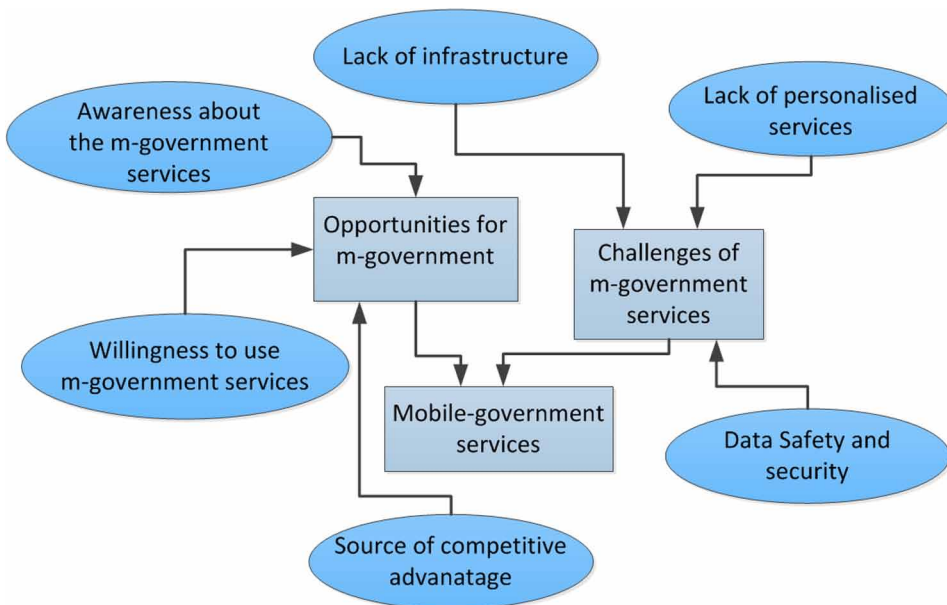
Alijeban and Saghafi (2010) identified a list of challenges facing M-government projects. One of these challenges is lack of mobile government laws, there are regulations, policy and rules that relevant to the use of mobile technologies, especially in the transaction stages, which using financial transactions. In some cases, legislative does not recognize a law in mobile documents and transaction at all (Shneiderman and Plaisant, 2010). Another challenge identified by Alijeban and Saghafi (2010) is lack of authentication and validity of mobile as well as other mobile devices. Moreover, for the specific mobile devices, such as mobile phones, user can easily changes their mobile phone number or mobile phones, which can cause the undeliverable information.

Similarly, integration technology for mobile accessing to government services, the communication channels in m-Government is not just about mobile phone, but also other mobile devices and wireless technologies. The higher the maturity stages, the more sophisticated tools needed. PDA, netbook, satellite, Wi-Fi enabled devices, Bluetooth, should also interact and possible to be integrated (Alijeban and Saghafi, 2010). Alijeban and Saghafi (2010) also noted that security of mobile government services, security in wireless network is quite vulnerable and has become a serious issue. This also includes the data protections, email security, access of wireless tools, security management tools, etc.

## THEORETICAL FRAMEWORK

Figure 1 presents theoretical framework which is based on the literature reviewed in the previous sections. This framework guides data collection as well as data analysis and findings of this study.

Figure 1. Theoretical framework: Factors affecting m-government



## SUMMARY OF LITERATURE REVIEW

There is a high level of mobile penetration among Saudi Arabian citizens and the mobile users in Saudi Arabia, like elsewhere in the world, are increasingly expecting provision of services regardless of time and space. At present, effective mobile networks are not only available in cities but equally in the rural areas of Saudi Arabia. Such indicators provide government with an opportunity to facilitate public access to M-government. However, there are many challenges facing M-government in developing countries including Saudi Arabia. These challenges include security and privacy issues; a variety of mobile platforms; and issues regarding usability. Lack of readiness of population is another key challenge Saudi government is facing in the application of mobile-government. Most people remain unaware about the complete usage of mobile devices in order to get benefits of mobile government. Poor readiness is also the result of the lack of a comprehensive legislative framework concerning cybercrimes, data privacy, information practices and laws that specify the rights of subjects (citizens) and responsibility of data holders (government). Low bandwidth and poor download speed are also fundamental challenges governments face in the application of M-government. Given the opportunities and challenges facing mobile government in developing countries, this research intends to explore different challenges and opportunities which are faced by mobile government within Saudi Arabia from the perspective of Saudi Arabian citizens.

## RESEARCH METHODS AND SAMPLE

Interviews are widely used as a fundamental data collection tool in qualitative research in education (Creswell, 2003; Saunders et al., 2007). Interviews are extensively used to gain in-depth perspectives on phenomena from participants and thus enable researchers to develop rich, thick description and a more comprehensive understanding (Creswell, 2003). Interviews are conducted in many different formats (e.g. face-to-face, by telephone, online, via email) and forms (e.g. structured, semi-structured, unstructured, and informal). As stated above, main aim of the research reported in this paper is to explore different challenges and opportunities faced by M-government within Saudi Arabia.

In the current inquiry, semi-structured interviews were used. Berg (2007) describes semi-structured interviews as “the implementation of a number of predetermined questions and special topics....typically asked of each interviewee in a systematic and consistent order” (p.95). Creswell (2003) observed that semi-structured interviews are particularly useful in providing a diverse set of opportunities for interviewee and interviewer to negotiate their perspectives in a more contextualized and non-standardized fashion. In fact, while conducting semi-structured interviews, “the interviewers are permitted (in fact expected) to probe far beyond the answers to their prepared and standardized questions” (Berg, 2007, p. 95). The set of semi-structured interview questions was derived from previous studies (e.g., Mengistu et al., 2009; Tsai et al., 2009):

*What are the main challenges you are facing in using M-government services? Are you willing to use M-government services? Are there any issues relevant to security and privacy? Do you have access to internet on your mobile? Do you face any issues related to low band width or speed of internet on your mobile device?*

The interview guide was developed by the researcher to focus on every aspect of the interview without missing any important points, while allowing participants to make individual, in-depth contributions. In this way, the use of semi-structured interviews enabled the researcher to be responsive to the situation and discussion, and helped to explore the challenges and opportunities of M-government in Saudi Arabia.

For the purpose of data collection, respondents were contacted through social media websites and once they agreed to participate in the research they were interviewed online (digitally). The set

of semi-structured questions was sent to them, and the time of the interview was decided. Before starting every interview, the respondents were informed that their contributions would be handled confidentially and anonymously, and that any data they disclosed would be used only for the purposes of educational research. Interviews were held with 77 Saudi citizens using the semi-structured interview guide. The selection of 77 respondents for interviews was considered to be enough and justified considering the depth of study, as other studies focusing on M-government and its aspects like Al-Hujran (2012) utilized considerably fewer respondents to answer similar research questions. The demographics of research participants are summarized in Table 1.

The interviews were digitally audio-recorded and immediately transcribed verbatim subsequently, in accordance with transcription conventions and preparation for data analysis elaborated by Saunders et al. (2007), to enable subsequent data immersion through techniques such as transcription, reading, reflecting, evaluating and elaborating (Creswell, 2003). Additionally, field notes were made during the interviews both to inform the contemporaneous flow of the interview and to facilitate post-interview analysis.

Data was analysed using thematic (Braun and Clarke, 2006) and content analysis (Creswell, 2003), to focus on examining, identifying and recording emergent themes (different patterns emerging from data relevant to the research aim and describing the phenomena under exploration). This analysis is based on six different but connected steps for the purpose of creating meaningful patterns: familiarisation with the data, creating preliminary codes, looking for patterns amongst the generated codes, revisiting themes, naming and defining themes and preparing a report on the basis of meaningful themes which are relevant to the research aim and objectives. Themes which emerged from the data are availability of internet, quality of internet, security and safety issues, customized M-government services, awareness and intention to use the M-government services and lack of required infrastructure.

## RESULTS AND DISCUSSION: CHALLENGES AND OPPORTUNITIES OF M-GOVERNMENT

Before analysing the challenges and opportunities of M-government, it was important to analyse the perception of respondents regarding M-government services and the impact they have in their lives, the kind of services people want, their accessibility and preferences regarding service provision.

### Perceptions Regarding M-Government Services

The majority of participants linked the M-government services and their use with internet availability. While they acknowledged the convenience of M-government applications, they felt that the lack of infrastructure and low internet penetration, along with the related factor of high mobile internet costs,

Table 1. Demographics of respondents for the study

Total	77
Gender	Male = 41, female = 36
Average age	Male = 27 and female = 24
Education	Bachelor degree = 39 Master degree = 33 Diploma = 1 High school or less = 3
Employment status	Employed = 68 Unemployed = 9



would prevent widespread use. However, as a method to communicate government information and services promptly through mobile technology, many respondents thought that though M-government brings the public closer to the government, but the cost factor was perceived as insurmountable at the current juncture:

*M-Government technology is at an early stage in Saudi Arabia and only SMS service is inexpensive these days due to which most of the public is only reliant on this source to access information available from Government. Only information like high-school exam notifications, occasional messages for congratulations and weather notifications is available at a mass level. (Respondent 22)*

### **Service Preferences and Availability**

The overwhelming majority of the respondents (over 96%) have internet access, and more than 93% have the availability of internet access on their mobile devices. This presents an opportunity for M-government service provision. However, access and internet needs varied among participants. Albeit the majority of participants needed fast and constantly available internet service provision, they felt the current availability is too slow, unavailable or prohibitively expensive. Many respondents expressed that they face difficulties in accessing the internet on their mobiles:

*Yes I can access the internet on my mobile; however accessing the internet outdoors is hard because Wi-Fi is often not available. Additionally, accessing the internet indoors sometimes is not easy because of low speed. (Respondent 12)*

Almost half the size of respondents suggested that the speed of the internet depends on the mobile internet package (i.e. that quality and speed depend on how much money a user pays to get a package):

*I'm using a monthly package from Zain [a telecommunication company in Saudi Arabia] - it doesn't cost me a lot but the speed of the internet depends on the amount of money; you pay extra to get a higher speed. (Respondent 25)*

Participants used various internet packages, but most were unsatisfied with these packages due to the lack of quality service. Even the most expensive mobile packages do not deliver the required speed and consistency of service:

*I use Volume-Based Data Packages from Aljawal Telecom. I'm not satisfied using most of the internet packages because the speed and performance is not that good. Also, these packages are slightly expensive. I'm using a Blackberry bundle, but it is very bad to connect the internet, as well as it is a very slow connection. (Respondent 53)*

Thus, although the internet is ubiquitously available on mobile phones, users are not satisfied with the quality of internet access provided. Therefore, although there is an opportunity for the government to take M-government initiatives, this is dependent on addressing the disparity in speed and quality of service on different internet packages and in different areas. This comes under the auspices of internet providing companies, who currently charge premium rates for faster internet speeds. Slow internet speed means issues of download speed and problems in navigation for the users. This is one of the main obstacles for the users and this will impede the effectiveness of any M-government plan.

This finding is in keeping with previous studies which suggested that slow internet, limited download speed, and poor navigation are key barriers to m-Government adoption (Mengistu et al., 2009). Basamh et al. (2014) found that lack of required internet speed impedes the proper download and

bandwidth and ultimately results in hindering the acceptance and effectiveness of the M-government services.

As Mengistu et al. (2009) suggest, lower speed and bandwidth result in inconvenience and discomfort amongst the service users. Lack of download speed can result in slow navigation, long waits for the users and can result in hindering the success of the M-government service provision and acceptance in many developing countries. The slow speed issue of the wireless internet in developing countries has also been observed by Al Thunibat et al. (2010) as a key obstacle in the development of the M-government services in developing countries. Our data suggests that even the most expensive mobile internet service packages in Saudi Arabia do not offer sufficient speed for comfortable mobile internet use, and users are constantly discomforted by the knowledge that even the slow-speed internet access provided can be disconnected at any time and its availability will be very limited (or nil) in many areas of the country. Therefore, it is suggested that without good internet along with the proper download features, the effective and successful provision and acceptance of M-government service is not possible. These challenges need to be kept in mind to enable the provision of M-government service.

### Security and Safety Issues

Data security and privacy is a serious challenge. Most interviewees suggested that they are unsatisfied with data security in mobile internet. This presents a challenge for M-government, as data involved in citizens' interaction with the government requires particularly high security. Obviously potential users will be hesitant to use M-government services if they fear certain personal information and details they disclose (or indeed access) from M-government applications is not secure. Users related their data security concerns to particular operating systems:

*There are a lot of issues of securities especially with those who are using Android systems. (Respondent 53)*

*I faced many problems with data security and safety despite the fact that I am using the internet behind firewalls as well as antivirus software. However, as an Apple user; I am totally protected because of their security systems. In brief, yes there is an issue with the data security, but I am out of it. (Respondent 64)*

Hence, respondents are of the opinion that data security and safety is a critical issue and this is a challenge that needs to be addressed so that people can make use of and benefit from the M-government initiatives. On the other hand, smart phone users do not perceive security threats to the same extent. However, since not all mobile internet users have smart phones, and not all smart phones provide the same security to customers, security concerns remain important (even if not perceived as such). Moreover, as implicit in the previous quote, there is confusion between security and viruses; the more pertinent concern with regard to mobile internet security is data security, not viruses.

Hence, the provision of M-governmental services to general public is not without security challenges, as affirmed by Mengistu et al. (2009), who found evidence about such challenges resulting from the limitations of the mobile devices as well as from the departments providing the mobile services. Al Thunibat et al. (2010) also suggested that privacy and security are amongst the key issues affecting mobile communication, because other people can also get connected to the network anonymously. Thus governments must ensure secure M-government services that provide safety of personal data and protection from unauthorized persons and hackers. This suggests the need for the formulation of clear regulations about the safety and security of data of the users; otherwise, as suggested by Mengistu et al. (2009), lack of trust would fundamentally block M-government adoption and impede the readiness of the people to use such services (Ivan and Zamfiroiu, 2011). A similar conclusion was reached by Mengistu et al. (2009), who argued that the lack of legislation relating to

cybercrimes, data privacy, fair information practices and laws that specify the rights of citizens and responsibility of data holders impede the adoption and use of online services.

Security lapses in mobile internet applications present an opportunity for malevolent cyber attackers. Conventional security software such as encryption firewalls and antivirus used in PCs which can prevent hackers from their malicious activities are not similarly effective in smart phones. Mobile phones, including smart phones, are more vulnerable compared to PCs as mobile phones are being used for many personal and private tasks. People use phones to exchange emails, social networking, download third-party applications and use them for making payments for online shopping. These transactions and activities can be tracked and personal data can be attacked by the hackers. Money transactions including redemption of tickets and coupons, point of sale monetary transactions and banking transactions are usually the target of the cyber criminals. Thus, mobile phones require much more security than they currently do if online provision of M-government services is to be effected in Saudi Arabia. Thus, in addition to the development of legislation for data protection (which must be effected by the government), mobile devices must evolve more secure protections for users (which must arise from the electronics industry).

Another vulnerability which mobile phones users are facing is that mobile phones can be stolen more easily than personal computers. Mobile users carry the phones with them and there is always a chance that they can be lost and their personal data can be accessed by others, thus making the mobile phone users susceptible to huge losses. These security issues are a key challenge to fully fledged use of M-government services in Saudi Arabia.

### **Lack of Required Infrastructure**

As intimated with regard to the availability and quality of internet access, a key obstacle to M-government adoption is the lack of suitable infrastructure, including applications and mobile networks not supporting all devices. As already stated, data security issues are a key challenge. Moreover, the bureaucratic attitude of the government departments has also been cited as a significant barrier to M-government deployment and use:

*1- Availability of suitable infrastructure, especially in urban areas (mobile devices, internet coverage); 2- security and privacy of data; 3- awareness and motivation for the public people about the benefit of M-government; 4- lack of customization to meet customer needs. (Respondent 34)*

This finding is in keeping with Ivan and Zamfiroiu (2011), who reported that conventional E-government infrastructure, is inadequate to ensure effective M-government services delivery to society. The successful provision of M-government services requires good technologies providing adequate speed, privacy and data security. Government should not only assure the availability of infrastructure and services for chosen region, but also ensure its own mobility as well. The government should also improve (i.e. change) the style of government departments and make them more user-friendly instead of obstructively bureaucratic.

One of the largest hindrances in the implementation of M-government service is thus lack of infrastructure. This dimension includes the adoption of middleware technologies, software availability and integration, and M-government standards. However, the development of required infrastructure is prohibitively expensive and complicated (Shneiderman and Plaisant, 2010). One impediment is the lack of shared standards and infrastructure amongst different government departments supposed to provide mobile services. Thus, there is a need of a common infrastructure and technical standards. Moreover, another key challenge is ever-changing technologies and mobile phone applications. Hence, government may face challenges to meet the changing needs of the users and to keep pace with innovative technologies while ensuring common standards across departments, all within the framework of a legislative environment protecting users. Thus addressing the infrastructure problem may need flexibility in regulations, technological expertise and many private-public partnerships.

## Awareness and Intention to use the M-Government Services

The interview data shows that most of the interviewees are aware of the government initiatives of M-government services. This offers an indication of an attractive opportunity for the provision of E-government services. They have also shown strong intention to use M-government services. Many interviewees are already using a few of the available M-government services, offering a major opportunity for the government to take initiatives to capture the trend and provide M-government services. The results suggest similar intentions to use M-government among respondents:

*Yes, because it takes less time to do any service. Also my friend recommends using E-government, it's better than going directly to the government and showing up, which takes time to finish service that I want. (Respondent 37)*

Most of the respondents showed similar intentions to use M-government services. One of the respondents already using E-government suggested that it is preferable to traditional government delivery:

*Yes, because of three reasons: 1- to help people get fast service and avoid crowds of people in any government organization; 2- less people in government organizations and less time from employees to see customers in the organization means the process will be faster for whatever services people want; 3- customers avoid traffic to go to any organization for services. E-government helps them to get services faster from their homes, with no need to see employees and employees have no need to see customers. (Respondent 11)*

This suggests that people are using E-government services and also have intention to use such services. Although interviewees are unsatisfied with slow internet speed, high costs and lack of data security, users with different mobile bundles such as 2G from STC, 5G from STC, 5kd bundle from Zain telecom etc. are still willing to take risks and use M-government service due to the convenience it offers:

*Yes, I think there is always risk in using the internet, no matter when or where. However, life has become so much easier with internet that we are now willing, more than ever, to take the associated risks. (Respondent 71)*

Many of them, however, were unsatisfied with the E-government services currently available:

*Yes, mainly to pay for government fees and traffic tickets. I think they still have long way to go before the claim to be an E-government. (Respondent 12)*

One interviewee was aware of numerous government departments and institutions providing mobile services in the country:

*Many agencies are providing mobile services, such as the Ministry of Higher Education, Ministry of Commerce and Industry, Ministry of Interior, a lot of governmental universities... (Respondent 64)*

However, respondents are generally unsatisfied with the services and desire an enhancement in quality:

*Yes I'm using it, but I believe it needs more enhancements. (Respondent 15)*

One of the reasons is the security issues:

*No, I don't trust the implementation of such services by the government. The contracts go to the lowest bidder and then data is at risk. Government employees are the worst when comes to data security. (Respondent 74)*

Thus, overall situation seems favourable to initiate M-government services in Saudi Arabia, with some reservations. People (i.e. the relatively well educated but representative sample) are aware of M-government services and intend to use them due to the convenience they offer. Most of them are already using some kind of E-government services, which is a good indication about the readiness of the people to use M-government services in the country and offers an opportunity for the government to take the initiative. However, regular internet users only comprise about 54% of the total population (World Bank, 2012). Therefore, it can be said that many people are still unaware about the usage of mobile devices in order to get the benefits of M-government. Hence, the government needs to create awareness among general public about mobile usage and about the benefits of M-government and to ensure accessibility to whole public (Al-Gahtani et al., 2007). Nevertheless, from the response of the interviewees about the awareness and intention to use, it can be concluded that the provision of M-government services would be a success in the country. This conclusion can be further supported through the awareness of the people about the benefits of using M-government service in Saudi Arabia. Additionally, as suggested by one participant cited previously, the adoption of M-government by some users (e.g. educated regular internet users) would relieve the struggling bureaucracies of the burden those users would otherwise comprise, making access to traditional services easier for those not using M-government.

As mentioned previously, the fundamental advantage of M-government is the convenience it offers, not only in terms of accessing particular government services, but also in relieving citizens of the whole tortuous process of travelling to such offices (the main cities in Saudi Arabia, Riyadh and Jeddah, are characterized by traffic congestion) and having their processes delayed by inefficient government employees:

*Yes it does [offer convenience], instead of using the car and getting stuck in the traffic and instead of the long line waiting I believe it is more convenient. (Respondent 52)*

Thus, although a small minority of respondents were unsure of the benefits of the government, and the majority had some concerns about data security, many already use E-government applications, and most expressed awareness of government initiatives in mobile services and willingness to use them. In conclusion, the Saudi Arabia is a country in which M-government services would be welcome, especially as respondents were positive about the provision of better services due to the availability of better technologies:

*I think with this remarkable improvement in the mobile technologies, the government needs to take this into consideration and to help citizens to achieve their interests easily. (Respondent 37)*

To conclude the findings, it can be suggested that overall, informants think that M-government is beneficial for them. This agrees with Ntaliani et al. (2008), who suggest that M-government is a key tool to offer services for both public and private sector firms in most of the developing countries and it is one of the most convenient ways to offer such services. Trimi and Sheng (2008) suggested that the widespread availability of the internet and its increasing ubiquity over the last decade has primed the mass of people around the world to seek the easiest and most convenient ways to access and use a range of different services, including electronic-government and mobile-government. The

easy availability of many mobile tools with the wireless internet technology strengthen readiness for E-government generally and M-government in particular.

### **Customized M-Government Services**

Although there is a general readiness for M-government, and this can be achieved with necessary coordination among stakeholders, the provision of mobile service faces another challenge which is the demand from the customers for customized services. Most of the respondents showed a strong desire to have in place customized mobile services which means that the government needs to focus on the availability of the customized services keeping in view the requirements of different individuals and groups. The data suggest that the respondents have a strong desire that the government should provide customized services which meet different needs of different government services:

*Yes this way will be easier on a person to look for what they exactly need without considering other services he is not in need for. (Respondent 11)*

The customization challenges have been a topic of many previous studies, including that of Ntaliani et al. (2008), who argued that personalization of government services is an important element of M-government to save the people and organizations from the burden of over-information. Thus, customization of these services is vital for the success of M-government initiatives. Basamh et al (2014) suggest that the customization of the services enhances the effectiveness and acceptance of M-government services, but Shneiderman and Plaisant (2010) argued that there are a few key challenges in this regard, such as determining accurately the needs and requirements of the users, deciding on the contents of the services and making the services user-friendly. Moreover, users may face inconsistencies in the services provided by different government departments in terms of navigation, content, interfaces and formats.

Cross-departmental consistency in M-government services provision in terms of navigation, content, interfaces and formats is clearly necessary if M-government is to comprise a comprehensive and meaningful wing of governance. The government needs to ensure that user interfaces are easy to use and enhance the involvement of the users, giving the latter control and offering support systems and customer service so that the issues or enquires can be sorted efficiently. The government needs to implicate intelligent techniques to understand the varying needs of the users and respond actively by providing services accordingly, and this is a main challenge for many government services in developing countries (Al Thunibat et al., 2010).

### **KEY FINDINGS**

The study reveals that the features of M-government and their usefulness as perceived by the participants are at a very early stage of development in Saudi Arabia. The participants could easily envisage the theoretical benefits of M-government, but they felt that these can be realised only with ubiquitously available and highly functioning internet access, and they do not foresee such quality in internet service provision in the country in the near future. It is manifestly clear from the responses generated by the study that people would enthusiastically adopt M-government services in Saudi Arabia to gain easy access to information and facilities which are otherwise difficult to attain, however it is currently not possible due to the current infrastructural capacity.

Therefore, there is a range of challenges facing M-government initiatives in Saudi Arabia. One of the challenges is the lack of uniform availability of internet for all users. Mobile internet users are facing difficulties in internet access and issues of quality and speed. This finding is in agreement with the literature (e.g., Basamh et al., 2014; Mengistu et al., 2009) who found that lack of required internet speed impedes the proper download and ultimately results in hindering the acceptance and

effectiveness of the M-government services. Mengistu et al. (2009) also suggested that lower speed and bandwidth result in inconvenience and discomfort amongst the service users become obstacles for the success of the M-government services.

Data security and privacy is another key challenge. Interviewees were not satisfied with the data security and this adds to the challenges of M-government, as data security and safety issues can hamper the willingness of the people to adopt the services. This finding concurs with Ivan and Zamfiroiu (2011) who revealed that issues resulting from cybercrimes, data privacy and lack of fair information practices and laws impede the adoption and use of online services.

Other than these concerns mentioned in the literature, an additional infrastructural challenge that M-government service in Saudi Arabia is facing is the obstructive and bureaucratic attitude of government departments. The problems associated with physically interfacing with government bureaucracy (i.e. going to offices), which are a fundamental reason most participants are willing to use M-government despite their security concerns, must be addressed to facilitate M-government adoption, because while automated processes such as those involved in current E-government facilities for paying fines (as cited above) clearly favour M-government use, processes that require a human response from the government end will be hampered by the same inefficiencies of the traditional office environment. Thus, in addition to adequate internet speed, privacy and data security, effective provision of M-government services requires a better administrative style from government departments.

Another challenge is the issues of customization of the M-government services. The majority of respondents showed a strong desire for the availability of customized mobile services, which means that government needs to focus on the availability of the customized services, keeping in view the requirements of different individuals and groups. There can be challenge of understanding the requirements of the different users and then making available different services, contents and delivery according to those requirements. This is keeping with Ntaliani et al. (2008), who argued that personalization of government services is an important element of M-government to save the people and organizations from the burden of over-information. Basamh et al (2014) suggest that customization of these services is vital for the success of M-government initiatives.

The availability of internet on mobile devices as well as awareness amongst the customers about the availability and benefits of mobile government services are the key opportunities for Saudi Arabian government M-government initiatives. This finding is in contrast with previous studies (Al Thunibat et al., 2010; Basamh et al., 2014), which suggested a lack of awareness of M-government and popular unwillingness to use such services as key challenges facing M-government initiatives in developing countries.

## **CONTRIBUTION AND FUTURE RESEARCH**

This study explored the opportunities and challenges of the M-government in Saudi Arabia. It found that M-government in Saudi Arabia is faced with challenges relevant to the issues of quality and speed of internet service provision, customization of services, and data security and privacy as well as infrastructural challenges and the bureaucratic attitude of the government departments, all of which are common barriers to M-government in developing countries (Al Thunibat et al., 2010; Mengistu, et al., 2009; Ntaliani et al., 2008). This study also contributes to the M-government literature by revealing that opportunities for M-government initiatives in Saudi Arabia. These opportunities include the awareness amongst the people about the government initiatives of M-government services and willingness of the people to use these services conditioned by the security and safety of their data and other aforementioned challenges. This study offers lessons for the government to focus and overcome these challenges in order to capitalize on the available opportunities of M-government services in Saudi Arabia. It is likely that government is already working on conquering these challenges in Saudi Arabia given its focus on investment in technology and infrastructure, of which M-government is an

important component. Thus, exploration of the measures and actions taken by the government and their success in addressing the barriers to M-government offer an interesting area for future research.

While the high mobile internet penetration of the Middle East and North Africa, particularly the GCC, should be borne in mind when interpreting the findings of this study, its results are not specific to any cultural set or population, and they can be generalized to other settings. Therefore, this is an opportunity for developing countries to conduct similar research in their set up and explore the perspective of M-government and the associated opportunities and challenges that they may face. Also, this study serves as a baseline for countries (especially developing countries) to utilize the findings in order to be more specific in their intentions for implementing M-government services and the planning mechanism behind the program.



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## APPENDIX

### Set of Semi-Structured Interviews

Please indicate your gender:

- Male  Female

Please indicate your age group:

- 18-25 Years  26-33 Years  34-41 Years  42-49 Years  50+ Years

Please indicate your educational level: Please indicate your position:

- Employed  
 High School or Less  
 Diploma  
 Bachelor Degree  
 Master Degree or above  
 Unemployed  
 Other (Please Specify):

1. Are you aware of mobile government services and initiatives of the government? Please explain your answer. (The purpose of this question is to understand the awareness of people about m-government initiatives. It will enhance our understanding about the opportunities and challenges which m-government services are facing. If people are unaware, it will pose a challenge to the success such initiatives and vice versa.)
2. Can you access the internet everywhere? If not, why? (This question helps to understand the availability of and access to the internet. It enhances our understanding about the opportunities and challenges which m-government services are facing. For instance, if people do not have access to the internet, they would not be able to use these services, which would pose a fundamental barrier.)
3. Can you access the internet on your mobile? (This question helps to understand internet access on mobile devices in particular. This also enhances our understanding about the opportunities and challenges which m-government services are facing. For instance, if mobile companies are offering internet access with mobile phones, this presents a *potential* opportunity even in the absence of existing services and use.)
4. Which service bundle do you use and why? (This question helps understand what services people are using on mobile devices. This also enhances our understanding about the opportunities and challenges which m-government services are facing. For instance, if mobile companies are offering packages that are supportive to mobile government services, it will be an opportunity.)
5. Do you use E-government services? What do you think about these services? What about the interface? (This question explores existing use of mobile government services. This helps to understand the type of services currently used and what type of challenges users face (i.e. barriers to user adoption). Hence, overall this question helps to understand what improvements are needed in the provision of such services.)
6. Are all government sectors providing m-services? (health, education etc.) (This explores public awareness of government initiatives and provides information about further services required.)

7. Do you intend to use mobile government services? Why? (This question explores intention and willingness to use mobile government services. It also helps to understand the challenges and opportunities to M-government adoption. For example, if people show a strong desire to use such services, it will be an opportunity; otherwise it is a challenge. This also accesses information about key aspects motivating the use of M-government services and barriers to use.)
8. Do you think that mobile-government services provide a convenient way to access government services? Please explain your answer. (This question helps to understand whether the use of M-services is convenient for users, and if it not, what challenges they face. In other words, this question would help identify what needs to be improved.)
9. Do you think that there is a need for customized and personalized mobile government services? If so, why? (This question assays popular demand for customized services and solicits information about what type of services they want. This helps to understand what type of customized services should be provided.)
10. Would you like to have personalized customer services to get required information as part of mobile government services? What kind of services would you like to access and why? (This question explores desires for customized information provision to understand whether the government should offer such services or not and what challenges exist in this regard.)
11. What is your overall opinion about the benefits of mobile government services? (This question invites participants' opinions about the perceived benefits of the mobile services and hence enhances understanding of what services need to be included in mobile government services.)
12. What are the obstacles to m-government services? (This question explores the key challenges facing the provision of mobile government services from the perspective of intended users. This information will help to improve the services.)
13. Do you think that there are any data security and safety issues? (This question explores user concerns about security issues and how to improve security and user comfort.)