Exploring the Challenges of m-Government Adoption in Saudi Arabia

Anan Alssbaiheen and Dr. Steve Love
School of Information Systems and Computing, Brunel University, UK
Anan.alssbaiheen@brunel.ac.uk
Steve.love@brunel.ac.uk

Abstract: This study explores challenges faced by m-government services provided by the Ministry of Higher Education and Technical and Vocational Training Corporation in Saudi Arabia. By collecting data through surveys from students registered with the Ministry of Higher Education and Technical and Vocational Training Corporation and employees of IT and Communication Ministry in Saudi Arabia, this study shows that the high level of mobile penetration in the country offers an opportunity for Saudi Arabian government to offer mobile government services in the country. The results suggest that students find m-government services ineffective and expensive. However, employees believe that the effective implementation of m-government services is a feasible option and it would enhance the technological development in Saudi Arabia. Certain barriers to m-government adoption were identified, including the lack of necessary infrastructure and insufficient level of understanding amongst students. There is also a lack of the customization of mobile government services and lack of access to mobile technologies.

Keywords: Saudi Arabia, Mobile Government, m-government, e-government, Challenges, Customization of Services, Mobile Infrastructure

1. Introduction

There is a high penetration of mobile devices in Saudi Arabia (Pingdom, 2011). Smartphone adoption rate is predicted to rise from 25% to almost 50% between 2013 and 2017 (Pingdom, 2011). 4G service has also been introduced in the country. Saudi Arabia has been forecast to be one of the leading 4G markets in the region (Pingdom, 2011). The United Nations Conference on Trade and Development (UNCTD, 2011 cited in Pingdom, 2011) compared global mobile phone adoption rates and reported that Saudi Arabia has one of the fastest growing rates of mobile phone adoption in the world. Mobile internet usage is also growing in the country. Previous studies such as Al-Gahtani et al (2007) and Mengistu et al (2009) suggest that there is a huge opportunity for the government to provide different services through mobile devices. It has been suggested that other than the need to fulfil a growing consumer demand from citizens, the provision of mobile government (m-government) services is also likely to increase the level of visibility and transparency in the relationship between the Saudi Arabian government and its citizens (Mengistu et al., 2009).

Different government departments in Saudi Arabia have started to provide m-government services to the people. The Ministry of Higher Education provides services through which students can track information regarding higher education. To use this service, students are required to register on the website of the Ministry and provide the ministry with their mobile numbers. Students can then access information regarding higher education, scholarships and other relevant issues and the Ministry sends them information via SMS. Similarly, King Saud University provides students with the opportunity to interact with teachers and administration to get help in their curriculum activities. The students also get information about any events (e.g. conferences) on their mobiles. To use this service, students register and provide their mobile numbers. The Technical and Vocational Training Corporation also facilitates the use of mobile internet, sending people information about different training programmes and other news, which can be accessed and downloaded using mobile phones. However, the effectiveness of such services remains to be studied. Bouwman et al (2008) and Alshehri et al (2012) suggested that m-Government services face a variety of different challenges that impede their effectiveness.

A plethora of previous studies explored the challenges facing m-government services. The majority of them concerned the challenges facing m-government within European countries, where the mobile penetration rate has reached 100 per cent (Public Service, 2011). Furthermore, a large proportion of research has concentrated on countries where m-government has already become an important part of the provision of services, in countries such as Hong Kong, Germany, Estonia and Singapore (Jotischky & Nye, 2012). As a result, very little research has been conducted into the potential opportunities and challenges which are likely to be associated

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with the implementation of mobile services in countries such as Saudi Arabia, where they have not yet been comprehensively introduced. Furthermore, the relevance of empirical studies which have focused on the topic of mobile services is further diminished by the fact that very few of them focus on the provision of mobile services by government agencies; most of these studies focused on the introduction of mobile technologies within sectors such as banking and healthcare, where such changes are predominantly driven by a desire to increase productivity and focus on the need to cater to consumers (Oxford Business Group, 2008). Such examples do not adequately reflect the increased level of complexity associated with the introduction of mobile services by the government, where the stakeholders which are involved are more complex, involving citizens, government employees, public administrators and foreign expatriate workers and investors (Bouwman et al., 2008).

These issues represent a significant gap in the research literature. Hence, it is hoped that this study, which focuses on the exploration of challenges facing m-government services in Saudi Arabia, will not only be useful in increasing the effectiveness of any future implementation, but will also be a valuable contribution to the existing body of research literature. The focus will be of the challenges facing the above mentioned higher education-related services provided by the Ministry of Higher Education and services provided by Technical and Vocational Training Corporation. The reason to focus on these services is that other services provided by different government departments are the provision of information using SMS. Such services are basic, relying on traditional mobile functionalities, and they do not exploit the potential advantages of modern smartphone technology, which can offer more sophisticated service provision through interactive interfaces.

Thus, the aim of this study is to highlight and explore challenges faced by m-government services provided by the Ministry of Higher Education and the Technical and Vocational Training Corporation. This study will also identify and recommend different steps which should be taken in order to increase the effectiveness of m-government.

2. Literature review: the concept and challenge of m-Government

Following Kushchu and Kushchu (2004), we understand m-Government as an extension of (and complement to) electronic government (e-government) services and features accessed via mobile devices. That is, m-Government is understood as a complement to rather than a replacement of e-government services. The main focus of m-Government is to provide government services to the citizens anywhere and anytime through any type of mobile device (Tsai et al., 2009). According to Kushchu and Kushchu (2004), m-government is about the provision different government services and information to public, businesses and employees through mobile devices. Seen in this light, m-Government is about creating and enhancing the portability and mobility for the business and public. Public and business can access the information across time and space. This enhances the efficiency and effectiveness of the information and government services (Yu and Kushchu, 2004). Put simply, the defining feature of m-government is the mobile platform itself.

The mobile device offers advantages which are difficult to achieve from static devices, such as landline phones or computers. The small size of the mobile phones offers the users great benefits in mobility. Thus, if government is able to offer services through mobile services, the public can use these services across time and space (Yu and Kushchu, 2004). Yu and Kushchu (2004) explained the importance of the mobility of government services using their 3P model (Table 1).

Table 1: 3P model by Yu and Kushchu (2004)

Component	Description	Examples
Prime value	M-government fulfils the need for real-time information and solves problems	Warning against mobile phone theft SMS for those with special hearing needs
Pleasure value	M-government can strengthen public-government relations and make interactions enjoyable with improved services	Fight against crime Faster information sharing
Post value	Comparative relation between cost and benefits	M-voting Location identification

There is a plethora of studies which have studied different aspects m-government services. For example, Jotischky and Nye (2011) suggest that the growth in the range of m-Government services which has occurred in many African countries in tandem with an increase in mobile penetration is likely to increase the transparency of political processes. However, Bhavnani et al (2008) argue that the introduction of m-government services in India demonstrates the importance of it being rooted in the existing government policy framework. In particular, it is suggested that the implementation of a Mobile Service Delivery Gateway to act as a bridge between the country's mobile service users and the existing e-governance infrastructure of the government is highly effective at broadening the reach of m-Government services to rural citizens.

There is a significant difference in the way in which the role of mobile services is perceived. According to researchers such as Hayes and Lemstra (2008), m-government services are perceived to be playing an important role in providing consumers (i.e. citizens) with a range of services which are not available within standard government service provision, thus contributing to the creation of a 'new mobile ecosystem'. Research which has been conducted into usability issues pertaining to mobile applications suggests that characteristics such as ease of navigation, text source and colour rendering are important determinants of the usability of a mobile application (Shneiderman & Plaisant, 2010). Rabi'u et al (2012) expanded upon this, suggesting that it is important to ensure that the speed of the internet is well managed in order to ensure usability. This can be achieved by providing a software platform capable of supporting a display which is vision friendly and provides speed. In short, it is important for the emphasis on the design of a usable mobile application to consider the provision of speedy and rapid display capabilities.

Garofalakis et al (2007) suggested that another important characteristic with respect to mobile usability is ease of navigation. Specifically, a mobile application which is easily navigable is likely to be successful because it makes it easier for users to easily gain access to the information that they require. Garofalakis et al (2007) suggested that the key characteristics which need to be considered in the development of a mobile application are user-centred design of the interface and the extent to which it provides an interface which is both intuitive and usable. The usability of the interface depends on the extent to which the facilities of the application meet requirements of user interaction, help tools, operability, contextuality and learnability.

Many other challenges can also be expected, including less technical aspects of m-government services. For example, Alsenaidy and Ahmad (2012) argue that a socio-economic inequalities exist in Saudi Arabia with regard to the use of m-Government services in the country, as more affluent sections of the population (e.g. the more educated and affluent) who are more prone and able to access m-Government services could benefit from them while less educated and less affluent citizens are effectively denied access. The customization of mobile services can offer a solution. Ho (2009) suggests that the increasing ubiquity and customization of mobile channels for government services increases the effectiveness of personalisation. Ardissono et al (2002) argue that the technology provider should ensure that they implement the necessary tools, including pattern recognition, collaborative technology, data mining and click stream analysis to allow the web content to be manipulated in order to correspond with the results of real time detection of user behaviour.

Thus, we argue that the provision of m-Government services in such a tailored way can deliver targeted information to online users and avoid overload of information and spam as well as mitigating social stratification amongst citizens caused by the ways in which they access government services. Ho (2009) argues that the personalisation of mobile services is also important source of competitive advantage. Al-Khamayseh et al (2006) found that the personalisation of mobile services ensures that consumers are not overloaded with information, which helps to them to use government services and encourages them to use the same more frequently.

The barriers to the provision of m-Government services among the general public must be handled carefully. Mengistu et al (2009) explained that one of the hindrances includes issues of privacy and security, usability and the variety of mobile platforms in existence. According to Al Thunibat et al (2011), security and privacy issues are considered enormous in the wireless communication era, as one cannot connect to wireless networks anonymously. Mengistu et al (2009) explained that wireless network operators provide a chance for hackers to intercept, tamper with and misuse public data being transported through public airwaves by wireless network operators. Hence, the government should address this challenge and proper measures must be taken to avoid any danger to public data.

Another key challenge faced by the Saudi government is the lack of m-government readiness. According to a report from the World Bank (2012), more than 50% of the population are regular internet users, but most people are not able to avail the benefits of m-government, as they are not aware of the complete usage of mobile devices. According to Basamh et al (2014), the government must continue to develop and induce awareness among the population about the benefits of m-Government, mobile usage and to ensure general public accessibility to m-government services. It is the government's prime responsibility to ensure the credibility of the system and provide assurance to the public that their personal data is safe and no one else can access it. Mengistu et al (2009) further elaborates that the lack of a comprehensive legislative framework regarding cyber-crimes, laws specifying the rights of citizens and responsibilities of government (the data holder), data privacy and information practices contribute to poor readiness. Lack of trust in the government's ability to regulate online data inhibits acceptance among potential users of m-Government services (Al Gahtani et al, 2007).

Ntaliani et al (2008) found that compatibility and synchronization across various stakeholders is a must in mobile communication, such as mobile services providers, communication and government departments related to technology and communications, as well as the global standardization of contents across networks and agencies. According to Susana and Goodwin (2010), in order to address the critical issues about the interoperability and measurability, the supply of sustainable and standardize technology must be ensured. Ever-changing technical capabilities of the organization are considered and monitored continuously.

3. Methodology

Data was collected using multiple choice surveys administered to government employees and students. Two surveys were conducted as part of this paper, which was administered to a sample of students registered with the Ministry of Higher Education and Technical and Vocational Training Corporation who are using the services of the latter via mobile devices. The purpose is to understand the different challenges they face while using services through mobile devices. The other survey was conducted by the employees working at the Ministry of Communication and Information Technology. The purpose of this survey from employees was to gain further insights into why the challenges highlighted by the student sample exist. The second survey was conducted among government employees focused on a sample of employees who were working at the Ministry of Communication and Information Technology in Saudi Arabia. The decision to focus the research on this government department was due to the fact that the Ministry established the country's first e-Government program, 'Yesser' in 2005 (Saudi Government, 2012). The electronic provision of government transactions and services was established by Supreme Royal Decree 7/B/33181. Hence, focusing the research on this Ministry made it possible to focus the questions which were asked on the particular challenges and advantages which Ministry employees had experienced concerning the implementation of this program. It is important to note that there are no women working within this department; hence, all of the respondents to the research conducted among employees were male.

The first survey targeted at students consisted of 25 questions about their attitudes towards current m-Government services, problems they are facing and how these services could be improved. The survey aimed at employees consisted of 19 questions about the different benefits and challenges associated with the implementation of the m-Government services and how these could be improved. More specifically, the content of the questionnaire was based on questions focussed on identifying challenges to m-government in Saudi Arabia:

- Frequently use m-Government services.
- m-Government services provide a more convenient way to access government services.
- m-Government services would be more effective if they were personalised for me as an individual user.
- I think e-Government services are likely to be very popular with citizens in the long term.
- I regularly have access to a mobile device, such as a mobile phone or tablet.
- I often access government services on my mobile device.
- I am familiar with the benefits of m-Government services.
- m-Government services are too inefficient to be of any use to me.
- I think m-Government services would be more effective if they were personalised for me as an individual.

- I think m-Government services are the preferable option to help make political processes more transparent.

These questions were taken from previous studies such as Bhavnani et al (2008), Alsenaidy and Ahmad (2012), Ho (2009) and Al-Khamayseh et al (2006). In total, 103 responses were obtained from the students. The average age of those who were interviewed and surveyed ranged from 24 to 41 years old, and the majority (76 per cent of the sample) were employed.

Table 2: Characteristics of research participants (students)

Characteristics	**Citizens**
Average age	27
Average length of professional experience	4 years
Gender	37% female, 63% male

The questionnaire designed to survey employees contained 19 closed ended and three open ended questions relevant to m-government services and the challenges facing them. On the other hand, four questions asked some demographic information. Employees' survey was conducted on a sample of 46 employees at the Ministry of Communication and Information Technology in Saudi Arabia. The majority of employees were aged between 30 and 41 years old, and all of them were male (as explained previously), with an average of just over three years' of professional experience.

Table 3: Key characteristics of research participants (employees)

Characteristics	**Employees**
Average age	35
Average length of professional experience	7 years
Gender	100% male, 0% female

Both surveys consisted of a series of multiple choice questions in the style of a Likert scale followed by a series of open ended questions (Coolican, 2004). One of the limitations associated with the Likert technique which was identified by Kothari (2008) is the possibility of an acquiescence effect, whereby respondents are likely to give a positive bias to their answers. This was controlled for by including a mixture of both positive statements and negative statements within each of the attitude scales. The incorporation of open ended questions was decided upon because it makes it possible to gain a deeper insight into the attitudes of the respondents rather than relying solely on multiple choice questions (Kothari, 2008).

In order to collect the data pertaining to the employees, letters were written to the Ministry of Communication and Information Technology explaining the aims and objective of the study and asking for consent to circulate surveys among the employees. In the communication sent to the Ministry, it was emphasised that all of the information which was obtained from the employees would be kept strictly confidential in line with the provisions of the 1998 Data Protection Act of the UK, and that responses would be kept anonymous. Once the necessary consent had been obtained, the researcher was provided with a list of email addresses of the employees within the department, and used this to email around questionnaires. The interview questions were also emailed around to the selected employees. A total of 60 employees were initially contacted, of whom 46 responded.

With regard to the data pertaining to students, a list of contact details was obtained from a marketing agency in Saudi Arabia. This list of individuals was further whittled down based on the gender of citizens (given that the sample of employees was wholly male, an attempt was made to conduct research on a balanced sample of both male and female students), and employee status. Eventually, a sub-sample of 200 individuals was selected, who were emailed with copies of the survey. A total of 103 students responded, representing a response rate of just over 50 per cent. Descriptive statistics and graphs have been used to analyse the quantitative data using.

4. Empirical Results

4.1 Benefits of using m-Government services

Despite the fact that the students were already using m-Government services from the Ministry of Higher Education and Technical and Vocational Training Corporation, there was a lack of certainty among citizens about m-Government services. The students surveyed were familiar to some extent with the m-Government services, but one-third of participants stated that m-government services were too inefficient to be useful. Overall, the answers suggested a lack of familiarity with the usability of m-Government services, with 50 per cent of citizens stating that the services which they were using are not of much benefit to them. They seem 'unsure' of the advantages of these services.

This lack of familiarity with m-Government services is emphasised by the fact that 40 per cent of those surveyed were 'not sure' of whether m-government services were more useful than e-government services.

On the other hand, employees suggested that m-government can be very helpful for the students and other citizens.

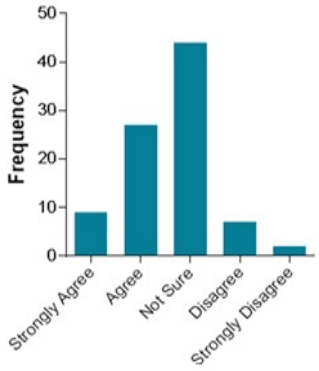

Figure 1: Uncertainty about the benefits of m-Government services by others

Thus, as far employees are concerned, as shown in figure 1 above, a vast majority have the conviction that m-government will benefit the country and the people. m-Government initiatives would enhance the efficiency of Saudi Arabian government services. In contrast, students appear to be less sure of the benefits of m-Government services and in particular of the way in which they are likely to result in long-term benefits for them.

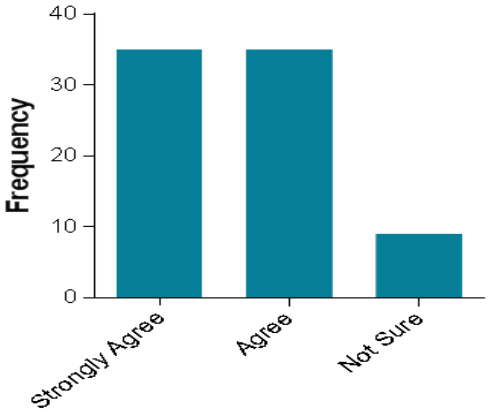

Figure 2: Employees' beliefs about long term popularity of m-Government services

As shown in figure 2 above, just over half of the respondents believed that the shift towards m-Government services would be a lasting one, due to the prevalence of mobile phones and the range of different features available on smart phones. One respondent commented that the popularity of m-Government services was

likely to last as long as another technology does not emerge to earn the trust of the public. It was also pointed out by the respondents that the longevity of the introduction of m-Government services was due to the fact that 'the society of [Saudi Arabia] is very advanced in using smart phones and new technologies based on mobile phones'. However, the remaining respondents did not believe that it would result in lasting change, or that it would take a significant amount of time and investment in the infrastructure of m-government in order to effect lasting change. In other words, a rapid shift towards the provision of m-Government services was much less likely to result in lasting change.

4.2 Challenges facing m-Government services

The key issues or challenges facing m-government among participants related to the perceived benefit they derived from m-services. Further results provide important information about these issues.

4.2.1 The personalisation of m-Government services

The employees suggested that there is a lack of personalised government services, and therefore students usually receive information that is irrelevant to them from the Ministry. All of the respondents stated that the personalisation of m-government services would be of benefit in increasing the effectiveness of m-Government services. This is due to the fact that greater personalisation was believed to result in greater simplicity and more awareness. Indeed, it appears that although the concept of personalisation is manifestly likely to increase the appeal and effectiveness of m-government services for the students, the extent to which such personalisation could actually be implemented was likely to be limited by restrictions of mobile technology. This was emphasised by the respondents, who commented that personalisation of services was limited by the 'restrictions of mobile technology'. One way in which m-Government services could be personalised for users would be to ensure that the government develops systems which analyse the behaviour of subscribers. For example, if it is clear that a particular mobile service user frequently uses one particular type of government service, it would be highly effective for the government to provide the user with tangible offers and benefits associated with the use of that service. Different user interfaces could also be developed in order to reflect the fact that the certain users are more likely to use certain types of government services. Such a feedback loop would be similar in structure to the way in which online retailers and supermarkets provide a range of targeted offers to their consumers on the basis of their historical/browsing history. Such a system of personalisation is frequently referred to as 'structured network data', which refers to the fact that the use of mobile networks facilitates the collation of data by means of media packets and signalling (Popa, 2010).
The effectiveness of Saudi Arabia's m-Government services therefore depends on the extent to which it is possible for the government to efficiently use the data available in a way which is necessary for the operation of the mobile network and to make it possible to more effectively tailor their services to citizens. The technological capabilities required to capture this information rely on the establishment of various probes which can interface with streams of MAP and GTP data, and to present this to the final application. This range of capabilities is responsible for the transfer of the data which is required by the various applications. Therefore, it is clear that in order to be successful at meeting the needs of users, the launch of m-Government services needs to be underpinned by signalling probes or GTP technologies which can be used in the mobile network to form the basis for the establishment of a more personalised experience for consumers. Hence, the long-term success of the government's launch of m-Government services will depend to a large extent on the availability of processing engines and high speed probes (Gafni, 2009).

4.2.2 Lack of infrastructure

Another issue which came to the fore was the lack of required infrastructure. Respondents were unsatisfied with the availability and speed of internet, as well as with the security and privacy issues. The development of a centralised database within a government agency, improved speed and availability of internet and improving the security features were emphasized as key requirements by the respondents.

Similarly, both students and employees are unsatisfied with the friendliness of the interfaces, and the range and availability of services. Clearly the usability of interfaces is of fundamental importance to m-Government applications, yet existing iPad applications offered by the Ministry, developed to offer the current range of m-Government services, has been criticised as being 'clunky'. There is a growing diversity in the range of mobile applications available in Saudi Arabia, with the result that the quality of a particular mobile application is a concept which is multidimensional in nature, with key dimensions including flexibility, portability,

maintainability, functionality, accessibility, efficiency, responsiveness and usability. In order to ensure that these requirements are met, the design of the mobile application should be iterated several times in line with the requirements of users (Rabi'u, Ayobami & Hector, 2012). The demands and requirements of users represent a key challenge to the developers and the designers of all mobile applications, and these issues represent significant constraints to issues pertaining to usability in the field of mobile applications. In order to address the problems of usability, it is important for the government to ensure that all of the applications which are developed meet key standards of usability, such as learnability, understandability, operability and attractiveness. Ensuring that these issues are addressed requires a robust analysis of the system in order to ensure that the needs of all of the service users are met and to ensure that both the functional and non-functional requirements of the mobile applications are given sufficient attention to meet users' needs (Ivan and Zamfiroiu, 2011).

Employees were of the view that the government should establish a participatory framework to align all government services to users' needs, and to provide consistent and comprehensive government services rather than the current system whereby Ministries pursue their own projects in an uncoordinated and ad hoc way. The employees also suggested that the effectiveness of implementing mobile services by the government could also be increased if the government developed a workspace on the national portal and listed all m-government services on it to allow for easier access. These recommendations for employees offer important areas for consideration, but the fundamental requirement of m-Government systems is to include and consult with users from the inception of m-government projects and throughout their development, to ensure the value and usability of the m-government services in fulfilling their function (i.e. to serve end-users).

4.2.3 Expensive internet service

The students also suggested that access to mobile internet is expensive. According to one respondent, the effectiveness of m-Government services was likely to benefit those members of the population who had access to internet on their phones, but it was possible that such services might result in a disparity in the way in which the more well off were likely to benefit from the services compared to those of lower socioeconomic status, who were likely to have limited access to such services.

Furthermore, it was stated by one respondent that internet access in Saudi Arabia was very expensive compared to the cost associated with equivalent services in the UK, with many providers over-charging for their data services. Respondents considered the cost of accessing mobile internet in Saudi Arabia to be very high; this means that students are only able to access government services on their mobile if they can afford to pay the associated costs, which means that mobile service provision to more affluent/technologically adaptive students would disadvantage students who cannot access them. One of the respondents stated that the success of the transition was likely to be limited because m-Services did not have the full functionality of e-government services, and therefore a full transition might take a longer time. The complementary nature of both m-Government and e-Government led some respondents to stress the importance of government services being made available in all channels, with both e-Services and m-services being perceived to be useful.

Besides continuing to make government services available in electronic channels, one respondent noted that several alternative/complementary channels exist to expand service provision formats, including kiosks, customer centres and so on as well as the web. One interesting insight which was highlighted in the data was the need for effective change management, which would need to be coordinated in order to alter the cultural attitudes of the population and to ensure that they would be more open to the concept of using m-Government services. This is exemplified by the response of one participant who noted that, in order to be successful, it was necessary to 'change the culture of using e-Government services' before shifting to the provision of m-Government services.

4.3 Conclusion

This study explored challenges faced by m-Government services provided by the Ministry of Higher Education and the Technical and Vocational Training Corporation. It identified and recommended different steps which should be taken in order to increase the effectiveness of m-Government in Saudi Arabia.

This research finds that that there are many opportunities for the introduction of m-Government services in the country. There is a high level of mobile penetration among the Saudi Arabian population, which means

that there is a burgeoning demand for broader provision of a greater range of services which are instantly available anytime, anywhere. However, the results of this study show that the students who were using m-Government services currently provided by the Ministry of Higher Education and the Technical and Vocational Training Corporation unsatisfied with these services and there is a lack of certainty amongst the students using these services about the advantages of m-government. Furthermore, some students who thought the use of m-government services was prohibitively expensive due to the costs of buying mobile phones and the cost of internet service provision in Saudi Arabia.

There also appears a lack of consensus among both the employees and students who participated in the research about the effectiveness of the implementation of m-Government services in Saudi Arabia. Employees see it a viable option in the future, whereas students do not foresee it being significantly beneficial or long-lasting. It can be inferred from this that rather than being perceived as heralding a new era of citizen participation and access to government services, Saudi students view m-Government initiatives as fads of little significance.

There does not appear to be a sufficient level of understanding among the Saudi Arabian students about the benefits associated with m-Government services. The results suggest that in order to be successful, the implementation of the services needs to be closely tailored and personalised to the individual needs of target users. As a result, the government needs to ensure that it clearly understands the needs and preferences of its target users. Finally, it was found that while the concept of m-government services is appealing to users, the extent of its uptake will ultimately depend on the way in which it is implemented. One possible way in which this could be achieved would be through communicating closely with target users to understand what they are looking for from implementation, and by possibly establishing a framework with other sectors of the government in order to ensure that the mobile services which are introduced by different sectors are rolled out in a timely and cohesive manner.

The most fundamental barrier to m-government in Saudi Arabia is the lack of infrastructural facilities, such as the low speed and erratic availability of the internet and data security issues. Furthermore, to implement m-Government services effectively it is essential to ensure that the introduction of mobile services is perceived to be a complement to, rather than a substitute for, the e-Government services which were previously introduced. Thus, the features of the rollout of m-government services should be tailored so that they fit seamlessly into the existing structure of e-government services, by expanding on existing strengths and addressing any weaknesses within the existing e-government service structure. It would therefore be worthwhile to identify the process which the Saudi Arabian government followed when introducing e-Services, with particular attention to the things they excelled in during this process, and the mistakes that they made in order to avoid making their replication with regard to m-Government.

Furthermore, conducting a detailed analysis of the process of introducing e-Services would also help to identify the strengths and weaknesses in the current framework of government e-Services and make it possible to formulate a range of criteria to be met by the rollout of new mobile services in order for them to be effective. This would provide a much more rigorous yardstick against which the success of the implementation of mobile services could be usefully measured. The criteria which emerge from this research could also be useful in establishing recommendations that the Saudi Arabian government should follow when deciding upon how to introduce its range of mobile services.

References

Al-Khamayseh, S., Hujran, O., Aloudat, A. & Lawrence, E. 2006. Intelligent M-Government: Application of Personalisation and Location Awareness Techniques'. Available at: <http://www.m4life.org/proceedings/2006/PDF/1_Al-Khamayseh.pdf?> [accessed 14 November 2012].

Alsenaidy, A. & Ahmad, T. (2012) A Review of the Current State of M-Government in Saudi Arabia, *Global Engineers & Technologists Review,* 2(5): 5-8.

Al Thunibat, A., Zin, N.A., & Sahari, N. (2011) "Identifying User Requirements of Mobile Government Services in Malaysia Using Focus Group Method", Journal of e-Government Studies and Best Practices, 24(2): 11-24.

Ardissono, L., Goy, A., Petrone, G. & Segnan, M. (2002). Personalization in Business-to-Customer Interaction. *Communications of the ACM*, 45(5), 52-53.

Baltagi, B. H.,. 2011. *Econometrics,* New York, USA: John Wiley & Sons

Bhavnani, A., Chiu, R., Janakiram, S. & Silarszky, P. 2008. *The Role of Mobile Phones in Sustainable Rural Poverty Reduction*. Working Document, World Bank ICT Policy Division Global Information and Communications Department. Washington, DC: World Bank.

Bouwman, H., de Vos, H. & Haaker, T. 2008. *Mobile Service Innovation and Business Models.* London: Routledge Publishers.

Chapman, S. 2005. *Research Methods.* London: Routledge Publishers.

Coolican, H. 2004. *Introduction to Research Methods and Statistics in Psychology*. 4th edition. Hodder & Arnold.

Cresswell, J. 2004. *Research Design: Quantitative and Qualitative Approaches*. 2nd edition. Thousand Oaks, Cal.: Sage Publications.

Dougherty, C. 2007. *Introduction to Econometrics.* Cambridge, UK: Cambridge University Press.

Gafni, R. 2009. Usability Issues in Mobile-Wireless Information Systems. *Issues in Informing Science and Information technology*, 6. Available at: <http://iisit.org/Vol6/IISITv6p755-769Gafni608.pdf> [last accessed 9 September 2013].

Garofalakis, J., Stefani, A., Stefanis, V. & Xenos, M. 2007. Quality Attributes of Consumer-Based M-Commerce Systems. *IEEE International Conference on E-Business and Telecommunication Networks, ICE-B*, 130-136. Available at: http://quality2.eap.gr/Publications/XM/Conferences%20English/C47-%20Quality%20of%20M-Commerce.pdf [last accessed 10 July 2013].

Ho, S. Y., 2009. Opportunities and Challenges of Mobile Personalisation: An Exploratory Study. Available at: <http://is2.lse.ac.uk/asp/aspecis/20090100.pdf accessed 14 November 2012> [last accessed 9 June 2013].

Ivan, I. & Zamfiroiu, A. 2011. Quality Analysis of Mobile Applications. *Informatica Economica*, 15(3). Working Paper of Academy of Economic Studies, Romania. Available at: <http://revistaie.ase.ro/content/59/12%20-%20Ivan,%20Zamfiroiu.pdf> [last accessed 26 October 2012].

Jotischky, N. & Nye, S. 2012. Mobilising Public Services in Africa: The M-Government Challenge. *Informa Telecoms & Media.* Available at: <http://www.informatandm.com/wp-content/uploads/2012/02/ITM-M-Government-White-Paper.pdf> [last accessed 26 October 2012].

Kirkpatrick, L. A. & Feeney, B. C., 2010. *A Simple Guide to SPSS.* New York: Cengage Learning.

Kushchu, I., and Kuscu, M.H. (2004), From E-government to M-government: Facing the Inevitable. Mobile Government Lab, pp.1-12

Kothari, C. R. 2008. *Research Methodology: Methods and Techniques,* New York: John Wiley & Sons.

Mengistu, D., Zo, H., & Jeung Rho, J. (2009). M-Government: Opportunities and Challenges to Deliver Mobile Government Service in Developing Countries. Fourth International Conference on Computer Sciences and Convergence Information Technology

Oxford Business Group, 2008. *The Report: Saudi Arabia 2008.* Oxford, UK: Oxford University Press.

Pingdom (2011): Middle East's mobile-subscription count will cross 250-million mark in 2012 in Trackbacks, Available at: http://royal.pingdom.com/2011/11/30/smartphone-boompredicted-in-the-middle-east/, [Accessed on 26/06/2014]

Popa, M. (2010). Audit Process during Projects for Development of New Mobile IT Applications. *Informatica Economica*, (14) 3. Academy of Economic Studies, Romania. Available at: <http://revistaie.ase.ro/content/55/1003%20-%20Marius%20Popa.pdf> [Accessed on 26/06/2014]

Public Services (2011, 7 November). Mobile Government: The Future? Available at: <http://www.publicservice.co.uk/feature_story.asp?id=17611> [[Accessed on 26/06/2014]].

Rabi'u, S., Ayobami, A. S. & Hector, O. P. 2012. Usability characteristics of mobile applications. *Proceedings of International Conference on Behavioural & Social Science Research, Kampar, Malaysia.*

Saudi Government, 2012. About e-government. *Saudi e-government National Portal.* Available at: <http://www.saudi.gov.sa/wps/portal/!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3iTMGenYE8TIwP_YD9XA89QQ28fdydPD1czM_3g1Dz9gmxHRQB-LiGP/> [last accessed 8 October 2012].

Seidman, I. 2006. *Interviewing as Qualitative Research: A Guide for Researchers*. Cambridge, UK: Cambridge University Press.

Shneiderman, B., & Plaisant, C. (2010). *Designing the User Interface: Strategies for Effective Human-Computer Interaction*. 5th edition. New York: Pearson.

Weinberg, S. L. & Abramowitz, S. K. 2002. *Data Analysis for the Behavioural Sciences using SPSS.* New York: John Wiley & Sons.

Yu, B., & Kushchu, I. (2004). *The value of mobility for e-Government, The 4th European conference on E-Government,* Castle Dublin, Ireland, p. 887-898