TOWARDS A USER-CENTRIC

MOBILE GOVERNMENT IN JORDAN

A thesis submitted for the degree of Doctor of Philosophy

By

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Abstract

Mobile government (M-Government) is an evolving delivery channel for governments to provide timely information and services ubiquitously to residents, businesses and other government departments through mobile devices.

Developing countries have a higher mobile penetration rate than the fixed-line Internet rates, which opens doors of opportunities for these countries to bridge the digital gap and gain a better reach through M-Government. Jordan has realised the potential of M-Government and launched the E-Government Mobile Portal on the 18th of April, 2011.

This thesis uses a mixed-method approach comprising surveys, interviews, meta-analysis and focus groups. The findings show that the critical success factors for M-government from the users' perspective are the following: user acceptance, security, privacy, trust, cost**,** mobile device limitations, usability**,** availability of services, broadband and content.

The findings also show that there are ' high effect' success factors in addition to the critical ones which are the following **:** mobile payment system, accessibility, awareness, education, reliability, legal issues and mobile penetration.

Additionally, this thesis also proposes a success framework for M-Government that provides practical strategies to tackle each success factor. Furthermore, it recommends an M-Government user-centric road map with implementation stages aiming to assist the Jordanian Government and other governments in tackling each success factor in order to ensure a successful implementation of M-Government.

Acknowledgments

This thesis is dedicated to Awwad Basha, my loving and caring father, without his support I could never achieve this, and my beloved mother Um Sultan for her continued prayers, moral support and patience.

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Lastly to my wife, Um Salma, for her patience during these years and for having to raise our two angels, Salma and Sara, alone. Her patient love enabled me to complete this work. And it is to Um Salma that this achievement is dedicated with thanks and love.

Publications

Peer reviewed Journals

Al-masaeed, S. and Love, S. (2013) Mobile Government in Jordan: Is it a Step in the Right Direction? *International Journal of Handheld Computing Research*. Accepted for publication.

Al-masaeed, S. and Love, S. (2013) Building a User-Centric Success Factors Model for Mobile Government. *International Journal of E-Services and Mobile Applications*. Accepted for publication.

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Conferences

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Chapter 1

Introduction

1.1 Overview

This chapter introduces the thesis with an emphasis on its key components. It starts by providing a brief review about implementing mobile government in Jordan, and then the justification of the research problem is detailed. The research method used is then explained, followed by explaining the research aim and objectives. Finally an overview of the thesis chapters is provided**.**

This chapter is structured as follows: Section 1.2 provides background information in regards to research problem. Section 1.3 clarifies the research justification. Section 1.4 defines the research aim and the required objectives to fulfil the research aim. Section 1.5 describes the research methods utilised in this research. Section 1.6 clarifies the structure of the thesis. Finally, section 1.7 summaries the chapter.

1.2 Background

The global spread of mobile phones has been faster than any other information technology in history, with total mobile subscriptions reaching almost 6.8 billion by the end of 2012 (International Telecommunications Union, 2013). Developing countries are trying to reach out to their citizens because mobile government brings lots of opportunities to these countries.

Developing countries have a higher mobile penetration rate than the fixed-line Internet rates, which presents opportunities for these countries to bridge the digital gap and gain a better reach through M-Government.

The number of mobile phone subscriptions worldwide rose from 1 billion in 2001 to 6.8billion in 2012, and the mobile phone penetration rate rose globally from less than 20% in 2001 to 96% in 2012. Most of this growth has come from developing countries, which accounted for more than 80% of the new mobile subscriptions added in 2011 (International Telecommunications Union, 2013).

Mobile phone penetration in Jordan rose from less than 20% in 2001 to 139 % in 2012, as shown in figure 1.1. Jordan has achieved a higher penetration rate than most other areas in the world, as illustrated in figure 1.2.

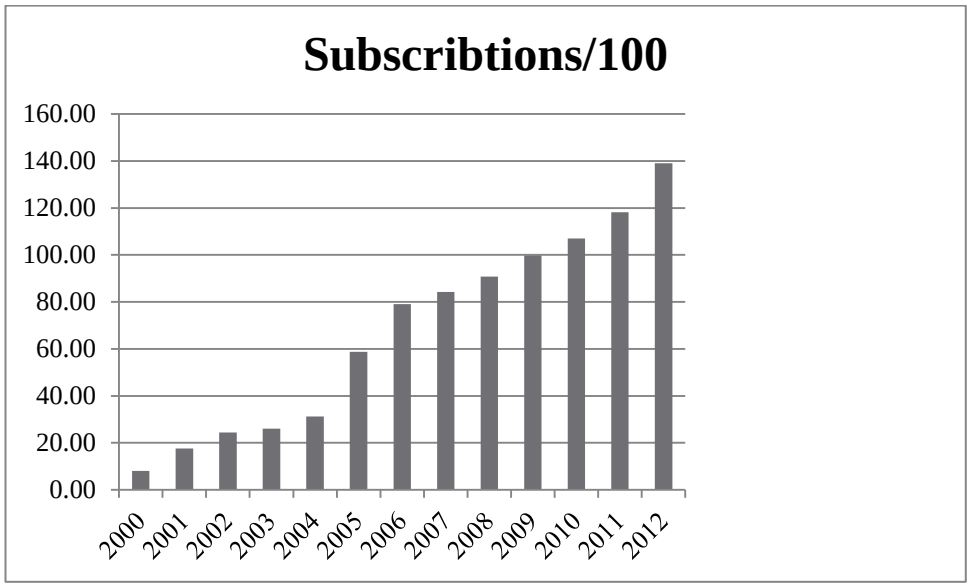


Figure 1.1: Mobile telephone subscriptions per 100 inhabitants/ Jordan

Source: International Telecommunications Union website

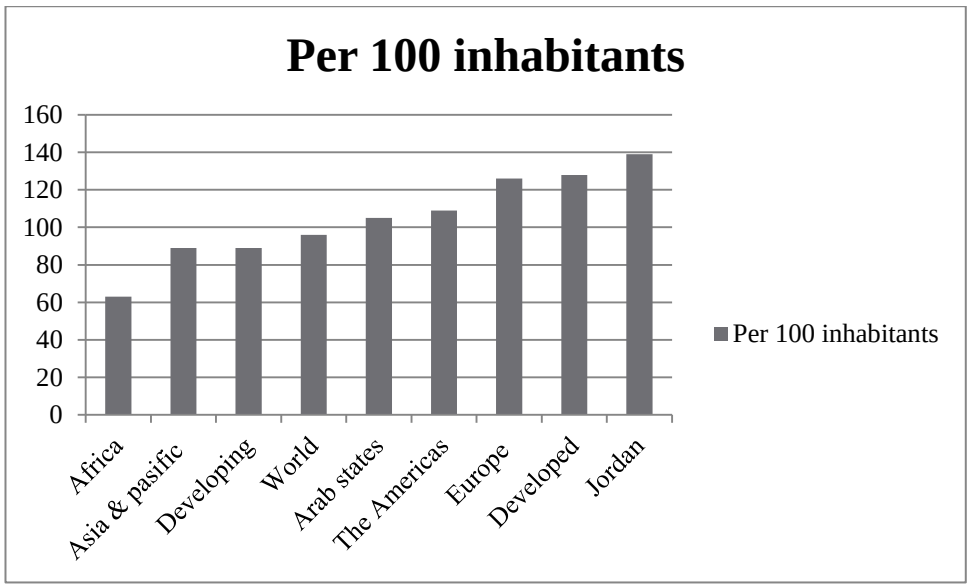


Figure 1.2: Mobile penetration rate comparisons

Source: International Telecommunications Union website

Jordan launched its electronic government (E-Government) portal in 2006 through the following uniform resource locator (URL): www.jordan.gov.jo. The portal includes the following content (Jordan E-Government Portal, 2011):

- Description of and procedures to complete 1800 government services.
- A list of 117 ministry and government entities with lists of services and contact information.
- Access to 49 e-services which are available online, such as customs, traffic violations, property taxes etc.
- A service that enables users to communicate with ministries and government entities in regard to complaints, suggestions, technical problems, or any direct enquiry.

The Jordanian E-Government program faced many challenges, including low level of Internet penetration, telecommunication infrastructure constraints, digital divide, privacy and security concerns (Elsheikh, Cullen and Hobbs, 2008). Lack of awareness is another important challenge (Al-jaghoub, Al-yaseen and Al-hourani, 2010).

The higher rates of mobile penetration in Jordan and the existing infrastructure for M-Government are the two main factors that induced the Jordanian Government to start providing some of its services via mobile phones in 2008 through the SMS Gateway Project (Bataineh, Abu-Shanab and Jdaitawi, 2005). Another important driver for mobile government in Jordan is the big percentage of rural areas in Jordan; 78% of Jordan is semi-desert, as illustrated below in figure 1.3 (Jordan Department of Statistics, 2011).

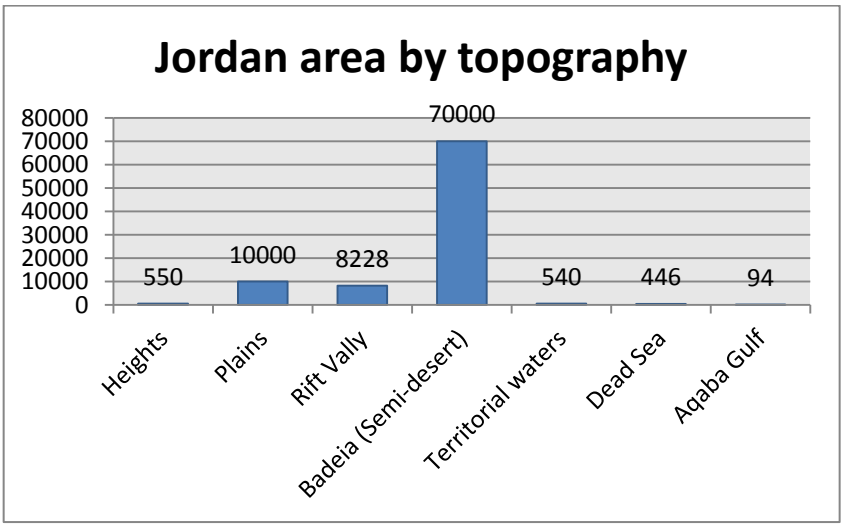


Figure 1.3: Jordan area by topography

Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS).

Jordan launched its E-Government mobile portal on the 18th of April, 2011. The new portal offers 27 informational services to the Jordanian citizens and businesses.

1.3 Research justification

Most E-Government projects fail due to the lack of need assessment before project implementation. Furthermore, insufficient data is available about success and failure rates due to the political implications of such failures. Moreover, in the developing world, government policy makers have a lack of awareness of electronic government costs, especially the intangible ones (Misuraca, 2009). Carroll (2005) argues that mobile government will not achieve long-term, persistent use, unless the services and applications of mobile government meet citizens' needs. Ishmatova (2007) concurred with this notion, and argued that potential users' preferences are among the critical factors for the success of mobile government.

Investigating citizens' needs and using a citizen-centric design for government services are the two important factors that enable the wide adoption of government services (Kolsaker and Lee-Kelley, 2007; Shareef et al., 2009; Emmanouilidou and Kreps, 2010).

According to Germanakos, Samaras and Christodoulou (2007), mobile private and public service providers are trying to meet two contradictory objectives: improving the service to users and reducing the cost of providing these services. Authors argued that the only way to meet these objectives is by carefully analysing the requirements of users.

According to Peinel (2007), government to citizen electronic services are not fully successful because they are mainly created to satisfy demands of legislation and not citizens. Hallin and Lundevall (2007, p.27) supported the previous argument, stating that "*To start with people rather than with technology or with the organization, is an important prerequisite for success*".

The Jordanian Government states clearly in its mission statement that it seeks to focus on the satisfaction of the recipients of government services, but it did not consider analysing users' needs as one of the factors that would enable it to achieve that. Furthermore, the Jordanian Government in its strategy defined the critical success factors for the E-Government program without mentioning users' satisfaction or perspectives among them; instead, the Government focused on technical, organisational and legal issues.

There is little research in the area of users' needs of mobile government, since mobile government is still an emerging phenomenon. There is no research at all in the area of users' needs and the critical success factors of mobile governments in Jordan after

launching the mobile government portal. This suggests that there is a need to define success factors from the users' perspective and provide practical solutions to tackle these factors.

Therefore, conducting this research will help the Jordanian Government to better judge existing applications and improve future ones, a critical need given that Jordan cannot afford failure due to its limited resources. Furthermore, this research will be also useful for developing countries because most of them share common circumstances with Jordan. On the other hand, this research also will contribute to the mutual international research to explore this new phenomenon.

1.4 Aim, objectives and contributions to knowledge

The aim of this research is to provide a roadmap for implementing a user-centric M-Government in Jordan successfully. The specific objectives of the research to support its aim are as follows:

- **Objective 1:** Measure awareness of M-Government and capture people's attitudes towards it. Furthermore, capture the government perspective in regards to launching the mobile government portal and citizens' awareness of that.
- **Objective 2**: Create a user-centric success factors model for mobile government to citizen services (G2C).
- **Objective 3:** Validate and refine the user-centric success factors model.
- **Objective 4:** Generate recommendations for government strategies that tackle each success factor of the proposed model.
- **Objective 5:** Validate the suggested success polices and determine if Jordanian users will adopt M-Government based on these polices.

  The following contributions to knowledge have resulted from this research: The use of meta-analysis to define success factors for mobile government, Meta-analysis findings, the user-centric M-Government success factors model, M-Government user-centric success framework and M-Government user-centric success roadmap.

1.5 Research methods

The mixed-method approach is the research method adopted in this thesis. Questions were defined and the mixed-method approach was deemed the most suitable approach for answering the questions of this research.

The mixed-method approach has gained popularity in practice in innumerable scholarly journals (Bernard and Ryan, 2010). In mixed-methods approach, both quantitative and qualitative methods are combined to generate more holistic data for the study (Curry, Nembhard and Bradley, 2009). Tashakkori and Teddlie (1998, p.17) defined mixed-method studies as "*Those that combine the qualitative and quantitative approaches into the research methodology of a single study or a multiphased study*".

This research is a multi-phase study which has been implemented through employing the following qualitative and quantitative research methods: questionnaires, interviews, meta-analysis and focus groups.

1.6 Thesis overview

This thesis is composed of seven chapters. The content of the following six chapters is briefly outlined below and illustrated in figure 1.4.

Chapter 2: Provides a literature review about M-Government in general and M-Government in Jordan in particular. This chapter includes three main sections. The first section introduces the concept of M-Government and highlights its required drivers, benefits and challenges. In addition to that, this section lists some of the definitions used for both electronic and mobile government and presents researchers' debates on the relationship between both terms and concludes by suggesting a suitable definition for electronic and mobile government. Furthermore, this section describes the most important classification approaches and suggests a new classification scheme.

The second section differentiates between M-Government in both developing and developed countries and highlights some M-Government cases and existed services. In section three, the Jordanian experience in implementing mobile government is presented. This section identifies the existing drivers for implementing M-Government. Secondly it demonstrates the Jordanian electronic government program and finally it discusses the Jordanian mobile government program and lists government internal mobile based initiatives that target service efficiency improvement.

Chapter 3: The research methodology chapter introduces the research strategy and research methods used to conduct the research presented in this thesis. This research is a multi-phase study which was implemented through conducting five phases and employing the following qualitative and quantitative research methods: questionnaires, interviews, meta-analysis and focus groups. This chapter describes the objective, research methods, research questions, procedures, data collection and analysis tools for each study.

Chapter 4: This chapter measures Jordanian citizens' awareness of launching a mobile government (M-Government) portal in Jordan and investigates their attitude towards it.

Furthermore, this chapter captures the government perspective in regards to launching the mobile government portal and citizens' awareness of that. This chapter presents research phase 1 and its findings.

Chapter 5: This chapter presents a systematic review of previous studies using a meta-analysis method and concludes an initial conceptual success factors model for mobile government to citizen services (G2C). Furthermore, this chapter outlined how the meta-analysis method is used and the initial model is validated by 40 academics in the field of MIS and IT.

Chapter 6: This chapter develops strategies aiming to assist Jordanian Government and other governments on tackling each success factor in order to ensure a successful implementation for M-Government. In this chapter, applied policy research is implemented through conducting three focus groups. Furthermore, this chapter presents a user-centric success framework and suggests a roadmap for the Jordanian Government aiming to assist Jordan in implementing a user-centric M-Government.

Chapter 7: The concluding chapter presents a summary of the research findings from Chapters 4, 5 and 6. Furthermore, it articulates contributions of this research to the field of user-centric M-Government in Jordan and other developing countries. Moreover, this chapter presents potential limitations of the research and possible areas for future research that may extend the current research findings.

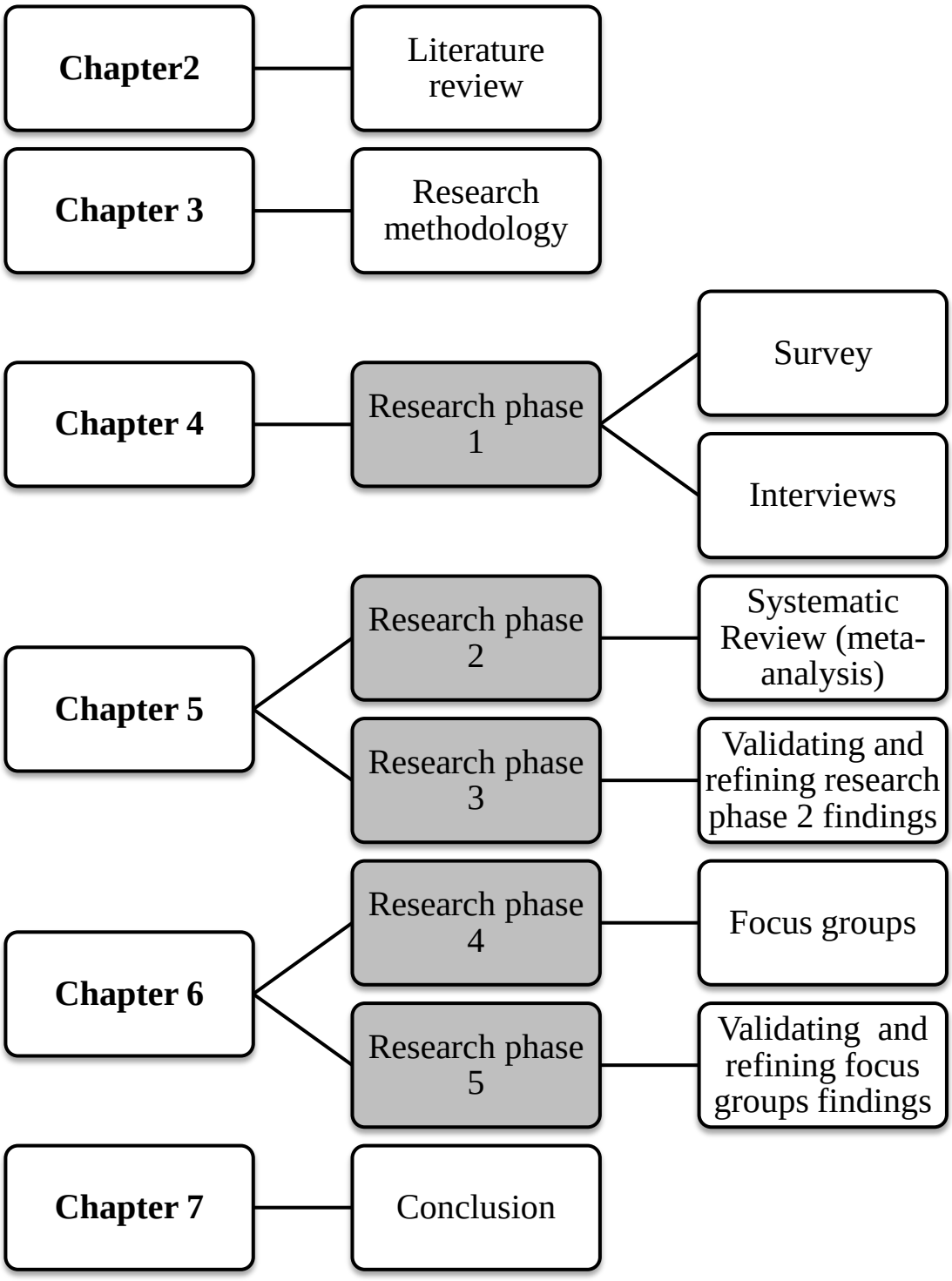


Figure 1.4: Thesis structure

1.7 Summary

This chapter provided background information regarding the research problem and clarified the research justification. Furthermore, it defined the research aim and the required objectives to fulfil it, and described the research methods utilised in this thesis. Finally, this chapter clarified the structure of the thesis.

Chapter 2

Literature Review

2.1 Overview

This chapter provides an overview of previous research on M-Government .This chapter is structured as follows. Section 1 introduces the concept of M-Government as an emerging phenomenon and highlights its required drivers, classification approaches, benefits and challenges. In addition to that, this section lists some of the definitions used for both electronic and mobile government and present researchers' debates on the relationship between both terms and concludes by suggesting a suitable definition for electronic and mobile government. Section 2 differentiates between M-Government in both developing and developed countries and highlights some M-Government cases and existed services. Finally, section 3 presents the Jordanian experience in implementing electronic and mobile government.

2.2 M-Government as an emerging phenomenon

This section defines M-Government and lists its classification themes, required drivers, benefits, limitations and existing M-Government services.

2.2.1 Mobile and wireless terminology

In order to understand mobile government, firstly we have to identify the term "mobile" and how mobile devices differ from wireless ones, because the two terms are quite often confused in the world of mobility, and in many cases they are used interchangeably, even though they mean two different things. Mobile means capable of moving or being moved. A mobile device is one that is portable and can be carried by an individual while satisfying communication needs (Lee, Tan and Trimi, 2006).

In contrast, a wireless device is a device without wires, even if it is a desktop computer connected to the Internet through a wireless router. Based on that, it is clear that almost all mobile devices are wireless, but wireless devices may not always be mobile (Chang and Kannan, 2003; Roggenkamp, 2007). In mobile government, the term "mobile" refers to two components: the mobility of users and the mobility of technologies, such as mobile and handheld wireless devices (Hassan, Jaber and Hamdan, 2009).

The European Mobile Manifesto (2009) defined four strengths of mobile devices. The strengths are the following: mobile is becoming a platform for broadband and rich applications, ubiquity, connectivity and personalisation, as illustrated below in figure 2.1.

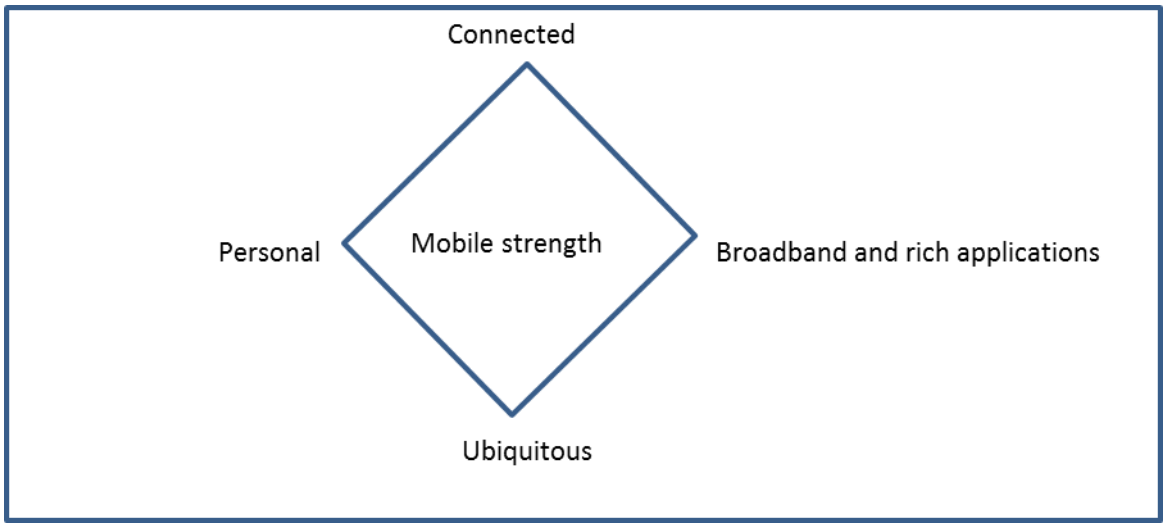


Figure 2.1: Mobile strengths

Source: The European Mobile Manifesto, 2009

2.2.2 Mobile device types and wireless networks

This section introduces mobile devices and wireless networks and clarifies types and functions for both technologies.

Mobile devices

A mobile device is one that is portable and can be carried by an individual while satisfying communication needs (Lee, Tan and Trimi, 2006). The following devices are mobile devices (Sheng and Trimi, 2008; Salkute, Kolhe and Veedhi, 2011):

Tablet PC: A tablet PC is similar to a laptop computer because it often carries a wireless network card, adequate hard drive and memory. Tablet PC is a single screen where the consumer uses a stylus to write on the tablet instead of the traditional keyboards used in laptops.

Personal Digital Assistant: A Personal Digital Assistant (PDA) is a small handheld device that functions much like a laptop computer or tablet PC. PDA devices usually have the following features: calendars, to-do lists, Wi-Fi, GPS, and the ability to download additional applications.

Smartphone: A smartphone is a combination of a cellular phone and a PDA which combines standard phone features with computer functionality. Smartphones usually have the following features: Wi-Fi access, email, calendars, camera, voice dialling and GPS. Typical modern smartphones also allow the user to download additional applications and personalise the device. Many smartphones have the capability to act as a modem for a laptop computer, providing a high-speed Internet connection (Kroski, 2008).

Laptop computers: A laptop computer is the most common type of mobile computer device. A laptop computer is a one-piece device that is capable of handling any task normally carried by a desktop computer.

Notebook computers: Notebook computers function much like laptops but are smaller and sleeker, and functionality limited to basic computer programs and Internet browsing.

Wireless networks

Wireless network refers to any type of computer network that is not connected by cables of any kind and implemented and administered using a transmission system called radio waves. The following networks are wireless networks (Sheng and Trimi, 2008; Salkute, Kolhe and Veedhi, 2011), as summarised in table 2.1:

Wireless Internet: This network has a global coverage and it services both consumers and businesses. With the existence of 3G and 4G wireless networks this network will allow transmitting content-rich information at a higher speed.

Wireless Personal Area Networks (WPAN): Wireless network that interconnects devices within a relatively small area that is generally within a person's reach. The primary standard for this network is Bluetooth.

A wireless Local Area Network (WLAN): A wireless network that links two or more devices using a wireless distribution method, providing a connection to the wider Internet through an access point that have limited connectivity of about 20-30 feet. Wi-Fi is a type of Wireless LAN.

Wireless Metropolitan Area Networks (WMAN): Wireless networks that connect several Wireless LANs. WiMAX is a type of Wireless MAN which can connect users directly to the Internet from anywhere within a major metropolitan area.

WiMAX technology is gaining rapid acceptance all over the world because it represents a good solution for rural connectivity, is faster than wireless solutions, has no significant infrastructure requirements, and is more affordable and convenient since no digging of trenches or blocking of roads is required (Chaudhari, Dalal and Jha, 2012).

Wireless Wide Area Networks (WWAN): Wireless networks that typically cover large areas such as neighbouring towns and cities and employ the same technologies used for mobile phones

Sheng and Trimi (2008) summarised wireless technologies in table 2.1.

Table 2.1: Summary of wireless networks

Source: Sheng and Trimi (2008)

Network	Technology	Description	Coverage area	Applications
Wireless Internet		3G and 4G	Global	Content rich Video Voice E-mail Internet access
WWAN	Cellular	Analogue and digital networks that transfer signals along transmitters	National	Voice E-mail Text-messaging
WMAN	WiMax	A set or IEEE standards for wireless DSL/cable (802.16) and mobile access (802.16e)	Building to buildings (30 miles)	Voice E-mail Text-messaging Internet access
WLAN	Wi-Fi	A set of IEEE standards (802.11 standards) for wireless LAN	In building or campus (30 feet)	Voice E-mail Text-messaging
WPAN	Bluetooth	Open wireless specification for personal area network connection in short range (802.15)	A few feet (10 feet)	Synchronisation Data exchange

2.2.3 Mobility

Mobility is the key enabler of mobile government. Mobile devices enable the public to access services and information ubiquitously, while enabling government and field employees to have access to government databases and update records instantly (Salkute, Kolhe and Veedhi, 2011).

According to Roggencamp (2007), mobility is the key component of mobile government and there are three perspectives on mobility: technological, economical and sociological.

The author presents four basic concepts of mobility: device mobility, user mobility, service mobility and session mobility.

Device and user mobility deals with the continuous access to the service while being moved from one physical location to another. Furthermore, service mobility concept introduces the idea of service delivery anytime, anywhere and anyhow, which includes service delivery regardless of user settings and mobile device type. Moreover, session mobility is the capability of starting, pausing and resuming a user session when switching between services and/or devices which does not exist at any of the currently available applications (Roggencamp, 2007).

Based on the previous mobility concepts, the author devised four questions to be answered when designing mobile government applications: what is being mobile? Why mobile? Are the non-mobile alternatives available? And who are the beneficiaries (Roggencamp, 2007).

Kushchu and Yu (2004) defined the following three driving forces for mobility:

- Increased expectations of government services.
- Emergence of mobile Internet with improved capabilities.
- Further improvement on existing E-Government efforts whereby people can access applications through a new channel.

2.2.4 Electronic and mobile government definitions and relationship

There are many definitions for both electronic and mobile government terms. This section lists some of the definitions used for both terms. Furthermore, it presents researchers' debates on the relationship between both terms and concludes by suggesting a suitable definition for electronic and mobile government.

Sheng and Trimi (2008, p.54) define E-Government as "*The use of wired-Internet technology by public-sector organizations to better deliver their services and improve their efficiency*". Misra (2011) defines M-Government as public service delivery including transactions on mobile devices such as mobile phones, pagers and PDAs. Gouscos, Drossos and Marias (2005, p.221) defined it as "*The continuous optimization of service delivery, constituency participation, and governance by transforming internal and external relationships through technology, the Internet, and new media*". Kumar and Sinha (2007, p.294) defined it as "*the government's use of information technology to exchange information and services with citizens, businesses, and other arms of government*".

According to Keoduangsine and Goodwin (2009) M-Government is the use of mobile devices by the government to deliver services and information to citizens. Kushchu and Kuscu (2003) defined M-Government as the strategy and its implementation involving the employment of all kinds of wireless and mobile technologies in order to improve benefits to the E-Government stakeholders, including citizens, businesses and government units.

Another definition of mobile government is that it provides a new channel of service delivery and addresses the mobility of the government itself, whereby governments have to bring personalized, localized and context-aware services to citizens (Song and Cornford, 2006). According to El Kiki and Lawrence (2006a), M-Government is a new tool for governments which represents a mix of complex strategies to improve the efficiency of traditional government tasks because it enables the establishment of a favourable relationship between the government and the citizens.

According to Rossel, Finger and Misuraca (2006) mobile government is reinforcing traditional electronic government claims of providing more efficient, effective and open government through allowing for more transparency, access, affordability and participation.

Kumar and Sinha (2007) define M-Government as E-Government with the ICTs that are limited to mobile and wireless technologies. Some authors used the term “ubiquitous government” instead of mobile government, and others used both terms (Anttiroiko, 2005; Chun, Adam and Atlur, 2007). While E-Government was an important initial step taken by many governments, mobile government is viewed as its inevitable successor (Kushchu, 2007).

There are several theories about the relationship between E-Government and M-Government, and whether or not the latter is replacing the former or merely evolving as a supplement to it (Waema and Musyoka, 2009). According to Sheng and Trimi (2008) and Mengistu, Zo and Rho (2009), M-Government is value-added E-Government because it offers many advantages. Kushchu and kuscu (2003) stated that M-Government is not a replacement for E-Government, but it complements the latter. Lallana (2004) supports these views, believing that M-Government is a subset of E-Government, as shown in figure 2.2.

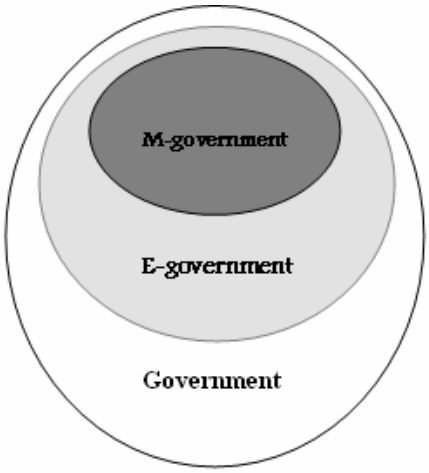


Figure 2.2: M-Government and E-Government relation

Source: Lallana, 2004

Hallin and Lundevall (2007) introduced a user-centric definition of mobile government, defining it as "*A public body which supports the mobility of its people, by providing its services when and where the people need them, and by supporting the development of whatever wireless technologies are needed, and the education of people in these*" (Hallin and Lundevall, 2007, p.26).

Notably, all electronic and mobile government definitions include the concept of citizens as a category receiving government information. It might be more suitable if the word "residents" were used instead, since residents include citizens and non-citizens who are potential recipients of government electronic services in any country (e.g. immigrant workers).

In this thesis, mobile government is defined as a new delivery channel for governments to provide timely information and services ubiquitously to residents, businesses, other government departments and other government in field employees through mobile devices.

According to the previous mobile government definition, electronic government will be defined as the use of information and communication technology (ICT) to deliver governments' information and services to residents, businesses, other government departments and other government in field employees through electronic and mobile devices.

2.2.5 Drivers required for mobile government

According to Cho and Chun, the necessary drivers fundamental to the implementation of M-Government are high percentage of mobile device penetration and the existence of mobile Internet applications (Cho and Chun, 2010). The extensive use of mobile devices, including Internet-enabled mobile phones and PDAs, is inducing governments to adopt mobile government tools (Sharma and Gupta, 2004).

Many governments started the deployment of mobile government in order to meet the rising expectations of citizens and businesses for improved services (Kushchu and Borucki, 2004). Researchers believe that the following factors are the forces influencing the move from E-Government to M-Government:

- Mobile device penetration.
- The emergence of mobile Internet.
- Mobile net applications and services.

Carroll (2005) examined the viability of M-Government from citizens' perspectives, employing a multi-method approach whereby he included focus groups, questionnaires, participant observation and semi-structured interviews. The study targeted three groups: 16 year-olds, post-graduate IT students, and IT professionals. Carroll (2005) found three necessary drivers of mobile government: The need to increase the efficiency and effectiveness of service provision, the availability of an adequate technological infrastructure for mobile services and citizens' needs and desires to access public sector services.

Similarly, Kushchu and Borucki (2005) presented three drivers for mobile government: mobile technology advancements, citizens' acceptance of mobile technology and the development of government services and applications.

Gouscos, Drossos and Marias (2005) stated that there are two drivers for shifting toward mobile government. The first driver is the maturity of the mobile market and the high mobile penetration rate. The second driver is the uniqueness of mobile phones through personal nature of mobile phones and the ability to deliver location-based services. The authors stated that these two drivers will allow personalised transactions and strong authentication.

Kuscu, Kuschu and Yu (2007) listed rapid evolution of mobile Internet technologies and standards, increasing mobile infrastructure and penetration in the world and users adoption of mobile applications as the main driving forces for mobile government.

Hellström (2008) defined the drivers to use mobile phones for good governance in East Africa as access, reach, adoptions since mobile phones are becoming an integral part of people's lives, interaction, cost of mobile phone technology versus Internet technology and efficiency.

Mengistu, Zo and Rho (2009) identified the following main drivers that prompt shift from E-Government to M-Government in the developing countries:

- High mobile penetration.
- Browsing the Internet through mobiles.
- The added value of mobility.
- The ability of reaching rural areas.
- Mobile phones technology affordability.
- Ease of learning.
- Easy infrastructure setup.

Kushchu (2009) presented a response model where he illustrated two factors pressuring governments to embrace mobile technology applications:

- Complementing existing E-Government applications.
- Taking advantage of the benefits of mobility.

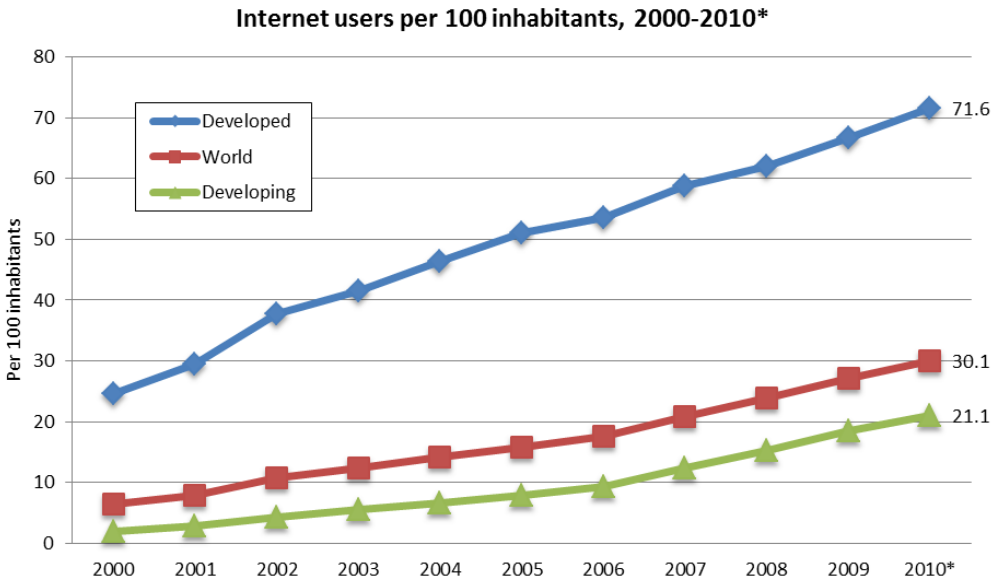
Zefferer (2011) stated that there are three enablers for mobile government which are:

- Introduction of powerful mobile devices such as smartphones, tablet PCs etc.
- Advancements in mobile communication technologies.
- Growing mobile markets internationally.

The global spread of mobile phones has been faster than any other information technology with total mobile subscriptions reaching almost 6.8 billion by the end of 2013 (International Telecommunications Union, 2013).

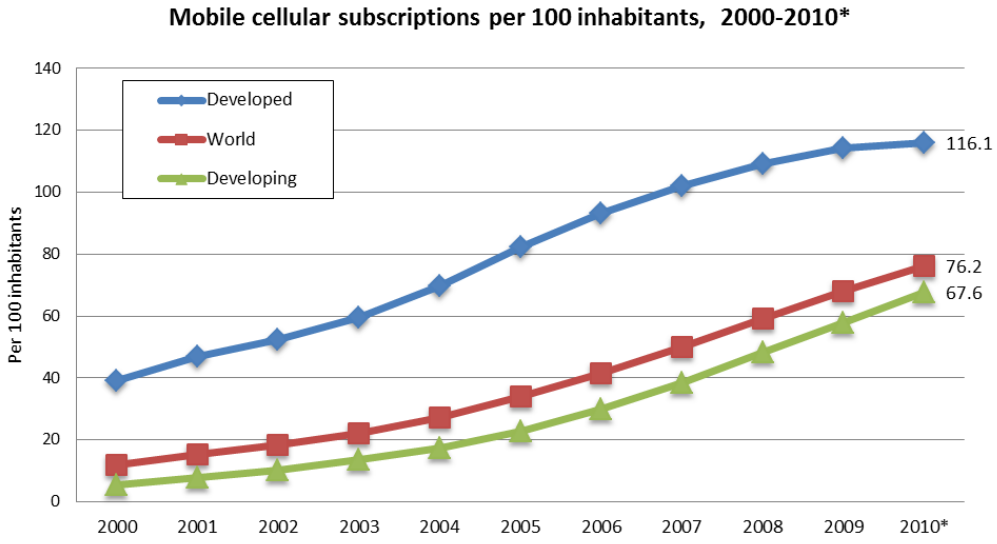
Developing countries have a higher mobile penetration rate than the fixed-line Internet rates, which creates opportunities for governments and citizens in these countries to bridge the digital gap and gain a better reach through M-Government. There was a rapid

increase of mobile users worldwide in the last few years compared to Internet users, especially in the developing countries, as illustrated in figures 2.3 and 2.4.



*Estimates
The developed/developing country classifications are based on the UN M49, see:
http://www.itu.int/ITU-D/ict/definitions/regions/index.html
Source: ITU World Telecommunication /ICT Indicators database

Figure 2.3: Internet users per 100 inhabitants, 2000-2010



*Estimates
The developed/developing country classifications are based on the UN M49, see:
http://www.itu.int/ITU-D/ict/definitions/regions/index.html
Source: ITU World Telecommunication /ICT Indicators database

Figure 2.4: Mobile cellular subscriptions per 100 inhabitants, 2000-2010

Figure 2.5 shows the percentage of the world's population covered by a mobile cellular signal in the years 2003 and 2010, clearly showing a 29% increase in coverage area.

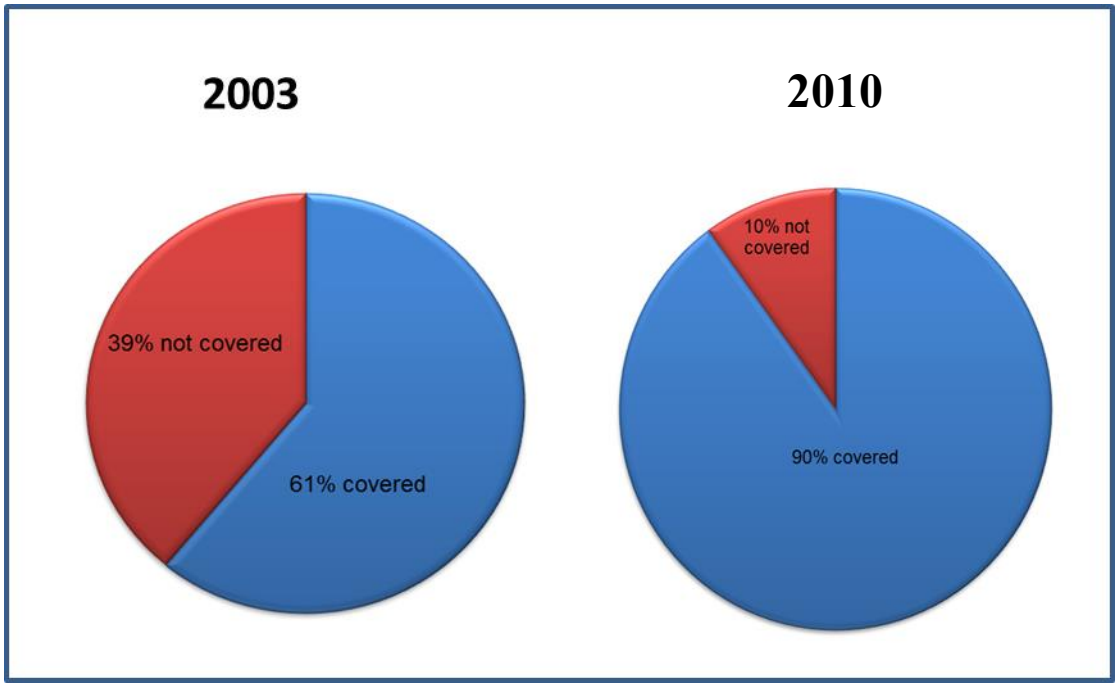


Figure 2.5: Percentage of the world's population covered by a mobile cellular signal in the years 2003 and 2010

Source: ITU World Telecommunication/ICT Indicators database

The number of mobile phone subscriptions worldwide rose from 1 billion in 2001 to 6.8 billion in 2012 and the mobile phone penetration rate rose globally from less than 20% in 2001 to 96% in 2012. Most of the growth was in developing countries, which accounted for more than 80% of the new mobile subscriptions added in 2011 (International Telecommunications Union, 2013).

In order to measure readiness for mobile services in a particular society, Mobile Readiness Index (MRI) was commissioned by the Baltic Development Forum in Sweden. Three aspects should be analysed to measure the readiness of a society: the maturity of technology, the capacity of service providers and the level of interest among users. To use MRI model and in order to measure the previous mentioned factors, quantitative and qualitative statistical studies should be conducted (Rannu, Saksing and Mahlakõiv, 2011).

Mobile government development in any country depends on two factors: the development level of E-Government in that country and the development level of mobile technologies. Therefore, mobile government development has been uneven worldwide, reflecting the

different stages of development in different countries with regard to these factors (Mengistu, Zo and Rho, 2009).

Moon (2010) recommended four factors for facilitating and improving the implementation process of mobile government initiatives: firstly, governments should develop strategic mobile government plans and enterprise architecture; secondly, governments should allocate and secure adequate financial resources; thirdly, strong political leadership that believes in mobile government and is willing to support it should exist; finally, intergovernmental, interagency and inter-sectorial collaboration should be planned for and achieved.

Al-Khamayseh and Lawrence (2010) identified the following drivers for mobile and wireless technologies utilisation: cost driver, since mobile government services represents a cheaper channel of service delivery than going physically to the counter; quicker service delivery; productivity of staff; demand; coverage; and volume of use.

2.2.6 Mobile government classification

Many researchers tried to introduce different classification schemes for mobile government services. This section describes the most important classification approaches and suggests a new classification scheme.

Type of transaction classification

Many researchers classified mobile services based on the type of transaction performed into three categories (Norris and Moon, 2005; Sheng and Trimi, 2008; Hassan, Jaber and Hamdan, 2009; Salkute, Kolhe and Veedhi, 2011):

- Informational functions through publishing, updating information and sending alerts through SMS service.
- Transactional functions whereby users are allowed to perform transactions through the mobile portal.
- Operational functions, which usually refers to internal government operations.

Parties involved classification

Other researchers classified mobile practices based on parties involved into four categories (Sheng and Trimi, 2008; Salkute, Kolhe and Veedhi, 2011):

- Government to citizen (G2C).
- Government to business (G2B).
- Government to government (G2G).
- Government internal effectiveness and efficiency (IEE).

Web-based and non-web-based classification

Misra (2011) classified mobile government into web-based mobile government and non-web-based mobile government. Web-based M-Government services are the M-Government services which can be accessed through the World Wide Web. Non web-based M-Government services are M-Government services that do not require any Internet connection and mainly include Short Message Service (SMS).

Services nature classification

Naqvi and Al-Shihi (2009) classified mobile government services into two groups: push and pull services. They defined push services as passive in nature services and pull services as the services that require public to be more active in initiating or responding the services.

Level of service classification

Rannu, Saksing and Mahlakõiv (2011) proposed a classification model for SMS services based on the level of service. The model was built based on the existing service offering and not the direction of the services evolution. The classification model clarifies that each level is independent of the other levels and can be complementary to other levels at the same time.

The model classifies SMS serviced into six levels based on the service offerings: listen, notification, pull-based information, communication, transaction, and integration.

Tasks and the technology classification

Salkute, Kolhe and Veedhi (2011) stated that M-Government services can be classified based on the following criteria: parties involved or types of transaction. Parties involved classification classifies M-Government services into three categories: government to citizen (G2C), government to business (G2B), and government to government (G2G).

Types of transaction performed classify M-Government services into three categories: informational, transactional and operational functions .Informational functions include information publishing, alerts and updates. Transactional functions allow users to perform transactions through mobile devices. On the other hand, operational functions refer to internal governmental operations.

Authors argued that one of the critical success factors for implementing mobile government is the fit between technology and the government tasks they support. Based on the previous argument and after reviewing the existing mobile government applications, Salkute, Kolhe and Veedhi (2011) suggested a classification framework based on the tasks and the technology used. The framework categorised current mobile government applications into four groups:

- G2C: informational

(Public access to information and emergency alerts)

- C2G: Operational

(Electronic democracy)

- G2C: informational/ operational

(Location based services)

- Information Technology: operational

(Field inspections)

2.2.7 Mobile government benefits and opportunities

Kushchu and Borucki (2004) believe that mobile government provides many opportunities. It provides more accessibility and availability because citizens can access government information on an anytime, anywhere basis, and mobile phones are generally always carried around and are always on. Furthermore, it allows the government to deliver personalized content to the end-users. Moreover, it allows governments to reach a larger number of citizens, especially those who live in rural areas and do not have experience with computers.

Borucki, Arat and Kushchu (2005) analysed case studies of five governmental entities that initiated mobile applications and identified impacts of mobile governments on the internal workings of public sector organizations. They used the following case studies:

- North London Strategic Alliance street wardens pilot project overview, which is a mobile government application aimed at streamlining the operations of street wardens and represents a collective effort of four London boroughs.
- Barnsley Metropolitan Borough Council home impact team officers' mobile data project overview.
- Mobile working at London Borough of Barking and Dagenham project, which enables void inspection surveyors to use pocket PCs to transfer their findings electronically back to the office.
- Norwich City Council street scene project, for parking services overview.
- Hong Kong Environment Protection Department mobile field inspection system overview.

The authors concluded that there are productivity gains and implications on business structure and mobile workers. Furthermore, they listed many positive impacts, such as increased productivity, improved efficiency, enhanced knowledge sharing and reduction of the number of people conducting the job. On the other hand, negative impacts were noted, especially for mobile workers, such as limited human interaction and privacy issues due to the location-based nature of the applications.

Sandy and McMillan (2005) listed five benefits of mobile government service provision: a new channel for service delivery, better access to data by government employees, instant information update, increased productivity and improved service delivery for citizens.

El Kiki and Lawrence (2006a) clarified benefits from the perspectives of both employees and citizens. For employees, M-Government provides a seamless environment for them to communicate and meet without the need to plug into a network interface, in addition to accessing information from anywhere to make better and faster decisions. From the citizen's perspective, M-Government saves time, effort and money through the ability to access government services and information on an anytime, anywhere basis.

According to Sheng and Trimi (2008), M-Government offers many advantages. Firstly, it improves the delivery of government information and services, therefore citizens can get immediate access on an anywhere-anytime basis. Secondly, mobile technology (M-technology) may be the best solution to overcome Internet connectivity problems and digital divide issues since m-technologies have been more evenly distributed among different layers of society. Thirdly, wireless networks are a more cost-effective choice for countries with dense populations and difficult terrain. In addition to that, M-Government

increases the efficiency and effectiveness of government employees, because they can access required information immediately and update records on the spot. Finally, M-Government can open up additional channels for citizen participation.

Ntaliani, Costopoulou and Karetsos (2008) found many benefits of mobile government, especially in the agricultural sector, including enhanced mobility and ubiquity, provision of location-based services, time saving, on-time information delivery, ease of use and improving emergency management.

According to Rannu, Saksing and Mahlakõiv (2011), the following factors are the benefits of implementing mobile government:

- Wider reach for government services because mobile phones are available to a greater number of people.
- Mobile phones are accessible everywhere and at all times.
- More personalization options since mobile devices are designed for a single user.
- M-Government's cost-effectiveness for both government and citizens.
- Mobile government will enable government officials to better manage resources.
- Faster information flow between government and its in-field employees.
- Increased democracy through proactive participation of citizens in decision-making.
- Mobile government is the best solution to digital divide.
- Mobile government through SMS services can improve communication with disabled people who are hearing-impaired.

Georgescu (2011) classified mobile government benefits into benefits for the public sector and for citizens. The following benefits were listed for the public sector: reducing gap with citizens through larger reach, more efficient public services, image and reputation enhancement and increased citizens' commitment to both environment and public sector. The following benefits were listed for citizens: less time and effort to get services, more services, enhanced citizens' mobility and anytime, anywhere interaction.

Salkute, Kolhe and Veedhi (2011) stated that mobile communication technology has three advantages compared to wired technologies: it removes time and space constraints, thereby improving communication; it removes infrastructural constraints, thereby

decreasing the digital divide; and it removes the cost restriction of having a computing device. Researchers also argued that mobile government has the following three obvious benefits:

- Larger reach in terms of area and citizens.
- Increasing effectiveness and efficiency of government employees.
- Promoting democracy through providing citizens with a new channel to participate in decision making.

The World Wide Web Consortium (W3C) outlined the main benefits of E-Government services' multi-channel delivery as follows (W3C, 2011):

- Increase of flexibility and access options for the user.
- Increase of the choice according to the information consumer's preferences.
- Wider usage and impact of government services.
- Cost savings.
- Quicker deployment of services which may provide easy, accurate and personalized content delivery.
- Integration of government services in the front-office.

Alsenaidy and Ahmad (2012) reviewed the state of M-Government in Saudi Arabia and concluded the following benefits of M-Government: increasing the productivity and effectiveness of public services, delivery of government information and services, low cost, government services reached larger number of people and ease of use.

Misuraca (2009) argued that mobile government can be more beneficial on the local level than on the national level, because most residents' day-to-day services are required from the former. Furthermore, mobile government will increase the proximity between local administrations and citizens, which will lead to improved governance.

Another factor which strengthens this argument is that the government in-field employees' effectiveness and efficiency will increase substantially. The in-field employees will be mainly reporting to local administrations and will be dealing with local community; if they become more effective, efficient and closer to the local community, local governance will be improved as well.

Personalization and location awareness techniques can improve M-Government services and generate many opportunities. Al-Khamayseh, Lawrence and Zmijewska (2006) studied the use of personalization and location awareness techniques within some M-

Government services according to the user geographical location. They classified personalization techniques into the following categories:

Collaborative filtering personalization: this personalization technique consists of two types of collaborative filtering, user-based and item-based. Both types recognize patterns of similarity and the difference is that the user-based collaborative filtering systems recognize similarity patterns between users' choices, while item-based collaborative filtering systems recognise similarity patterns between requested items themselves.

Location based personalization: in this technique, citizens want to obtain information that is related to their location. Therefore, the user's location should be determined through one of the following two positioning techniques:

- Tracking the continuous signals sent by mobile phones to their base stations.
- Using GPS or any equivalent technology.

The authors argued that since most phones do not have GPS technologies, government partnership with private mobile operators is a major critical success factor for intelligent mobile government services that relay on locating citizens.

Location awareness technologies can function even in GPS-denied environments through cooperative localization in wireless networks. Cooperative localization allows for highly accurate location awareness and this new technology is enabled by a paradigm of cooperation between wireless nodes (Wymeersch, Lien and Win, 2009).

2.2.8 Mobile government challenges, limitations and success factors

As outlined in the previous section, mobile government has many benefits and researchers agree that there is great potential to improve government service delivery. However, M-Government has many challenges and obstacles to overcome.

This section presents what other researchers found while they were trying to identify implementation challenges and obstacles. Researchers explored these success factors from different perspectives, using different research methods and in different countries. Therefore, some of these factors are common while others are not.

The Technology Acceptance Model (TAM) theory is widely used in the information systems studies. TAM explains how users accept and use a new technology. The theory proposes that when users are presented with a new technology, perceived usefulness and

perceived ease-of-use are the main factors influencing their decision about how and when they will use the new technology (Davis, 1989).

TAM has been widely criticised, therefore its proposers tried to redefine it many times. One of the main limitations is the methodology used to test the TAM model. Other limitations are in the variables and relationships present in the model. Furthermore, there are limitations in the theoretical foundation for the TAM model (Chuttur, 2009).

Al-Khamayseh and Lawrence (2006) analysed 29 experts' answers for two open-ended questions and suggested a roadmap for M-Government implementation. Authors argue that mobile and wireless technologies improvements will increase people adoption and demand for new services. Therefore, content developers will be pressured to satisfy users' needs which will stimulate businesses to take advantage of mobile applications. They anticipated that government will follow businesses and adopt mobile technology.

According to Al-Khamayseh and Lawrence (2006), Mobile government is facing many challenges such as lack of mobile technology standards, privacy concerns, security concerns such as hacking, device loss or theft and finally solution costs, which is an important challenge because governments have to provide affordable and secure mobile services.

Many researchers consider mobile usability to be the main challenge to the success of mobile computing and mobile government (Terrenghi, Kronen and Valle, 2005; Kushchu, 2007). Fidel et al. (2007) analysed the efficacy of MAXIMO system, which is Fully Mobile Wirelessly Connected Technology Application (FMWC) implemented in Seattle Public Utilities organization (SPU) in the city of Seattle. Their study used a work-centred analytical framework for developing and clarifying the strategic choices in this project via a formative model. They first present related literatures and their analytical frameworks, and then they propose research questions and finally reported their findings focusing on one of the proposed research questions.

The researchers focused on the organisational communication issues and how the new mobile application influences the task performance and the in-field workers' perception of the communication climate.

The study revealed many challenges and obstacles to successful implementation. The system was difficult to use, ignored informal work, and cannot account for informal processes and implicit knowledge. The study results clarify the importance of having the end-user input and perception into consideration before implementing such systems (Fidel et al., 2007).

Al-Khamayseh, Elaine and Zmijewska (2006) conducted an online survey of global experts from researchers and Industry experts on the success factors of mobile government.

The survey results identified seven critical success factors with privacy and security ranking highest on the list. The critical success factors according to percentage of participants who chose that factor are listed below:

- Privacy and Security

(ensuring the security of applications and the privacy of users).

- Infrastructure

(M-Government infrastructure consists of wireless networks and mobile access devices).

- User needs and preferences

(the fulfilment of user needs and preferences).

- Quality and user-friendly applications

(quality applications mean simple and user-friendly applications).

- E-Government

(the existence of electronic government services).

- Acceptance

(users' acceptance of M-Government services and applications).

- Cost

(Cost of accessing services should be low).

Purposive sampling was chosen as a good technique in order to generate rich and in-depth data, because the sample chosen demonstrates experienced people and professionals in the mobile technology field, who are likely to know what can be considered as a critical success factor, but the study did not consider the end-users' perspectives (i.e. the people who will receive these services).

Sandy and McMillan (2005) introduced a success factor model which was based on six groupings: cost, business re-engineering, education, acceptance, security, and access.

Carroll (2005) conducted a multi-method research in order to examine users' practices while mobile and identify their needs as extracted from their actions and articulations. The research included four methods: focus groups, questionnaires, participant observation and interviews.. The research results showed the importance of meeting citizens' needs in order for mobile government applications to succeed. The research also identified the following success factors for mobile government:

- Users' convenience.
- Simplicity of mobile tasks.
- Mobile traffic control.
- Usability issues.
- Privacy and security concerns.

El-Kiki and Lawrence (2006a) researched the main barriers to success in mobile government and suggested solutions to overcome them. This study was based upon stratified purposive sampling, because the authors were looking for rich, in-depth information. The research involved the deployment of a web based survey to researchers and industry experts. The survey consisted of two sections, the first of which covered demographic information, and the second of which included two open questions about barriers and suggestions. The study identified the following four groups of barriers:

- Organisational: lack of leadership, economic and financial issues, legal issues, vision issues.
- Technical: interoperability, open-source, scalability and reliability.
- Social: awareness, pricing, privacy, security, trust and usability.
- Governance: accountability, transparency, openness, accessibility and participation.

Targeting researchers and industry experts was a good approach but the research lacks the end-user perspective, which is an important factor in mobile government success since user adoption is the most important critical success factor.

El-Kiki and Lawrence (2006b) analysed mobile users' needs covering the satisfaction and usage of M-Government services. The outcome of this research was part of exploratory research which relies on reviewing available literature. They defined a conceptual model of end-users' needs from M-Services. The model was built on four groups representing the indicator domains as follow:

- Value for money: in this goal, pricing and content are two factors to be considered.
- Quality of services: this goal was analysed into seven components: awareness, accessibility, availability, reliability, accuracy, responsiveness, courtesy and helpfulness.
- Efficient transactions: usability, timeliness, trust of e-commerce, privacy and security.
- Strategic data: accountability, transparency and usage.

Carroll (2006) argued that M-Government success relies on satisfying the needs of all stakeholders, especially citizens. The author proposed a framework for M-Government representing two sets of forces: drivers that push the use of mobile technologies and individuals pulling these services. The framework is illustrated below in figure 2.6.

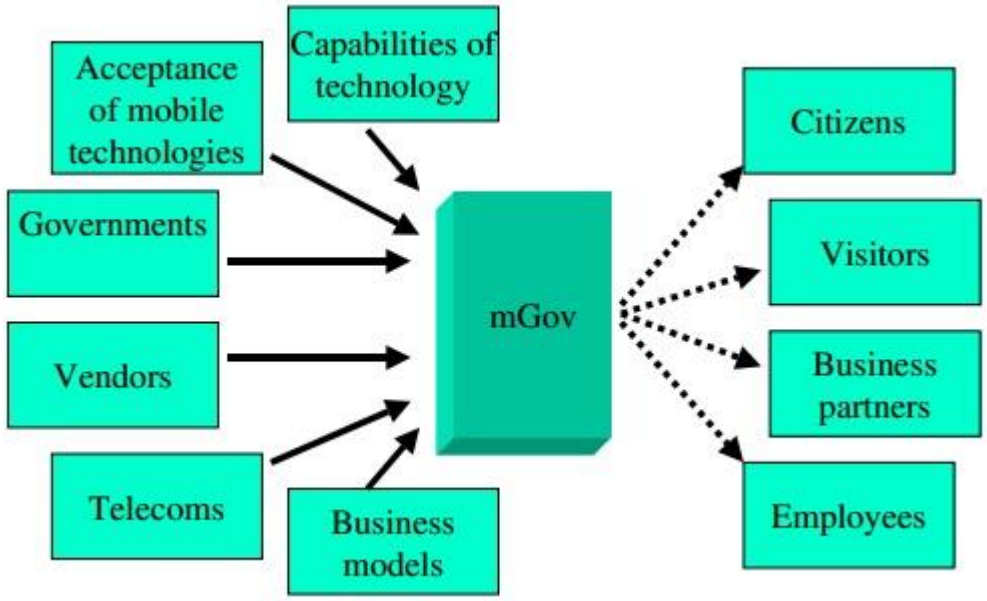


Figure 2.6: Carroll's M-Government framework

Source: Carroll (2006)

Carroll identified the following drivers for M-Government: acceptance of mobile technology, capabilities of technology, government needs, telecommunication companies, vendors of systems and business models. On the other hand, the author defined the following individuals who will pull services: citizens, visitors, business partners and employees.

According to Capra, Francalanci and Marinoni (2008), there are soft success factors for mobile government implementation. Researchers defined the following as key success factors: decentralization for local mobile government diffusion, soft skills such as leaderships and communication, horizontal organizations and early involvement of people.

Kumar and Sinha (2007) stated that privacy and security and accessibility are the critical issues for mobile government and suggested two guiding principles for planning for mobile government. Firstly, the fact that M-Government is not a substitute of E-Government but a complement of it, therefore there should be a mix of M-Government and E-Government within the E-Government strategy and that mix should be determined by the existing conditions in each country.

Secondly, It will be very difficult to regain citizens' trust if they had bad experience, therefore authors suggested the following guidelines: choosing applications wisely (non-trivial and not very difficult) in addition to ensuring that application is user-friendly and supported by a suitable back-office system.

According to Ishmatova (2007), not all of the existing electronic government services can be migrated to mobile applications. The author argues that the following situations are suitable for adopting mobile applications: mobile and time-critical situations in addition to situations in which people have time to enjoy entertainment. Ishmatova concluded that all services that require a high level of accuracy and concentration are not suitable to be adopted on a mobile platform.

Bataineh, Abu-Shanab and Jdaitawi (2005) believe that the main limitations for mobile government are the limitations of mobile devices themselves, such as low memory and size, no common standards, the fact that mobile technology is still evolving and security restrictions, especially when dealing with sensitive information.

Vincent and Harris (2008) concurred in this, claiming that the only challenges facing citizens in adopting M-Government are the limitations of devices such as display, user input and other functionality issues.

Sheng and Trimi (2008) argued that a misfit between mobile technology and mobile government applications will lead to many challenges for the mobile government development. Security and privacy, accessibility and application infrastructure issues were defined as the main challenges for mobile government.

Keoduangsine and Goodwin (2009) developed a conceptual user satisfaction model for mobile E-Government service and a questionnaire was conducted in the Lao People's Democratic Republic to determine overall level of satisfaction with mobile E-Government.

The study results show that users are moderately satisfied with most aspects of mobile government services. High mean ratings were given for awareness, accessibility, availability, responsiveness and privacy. On the other hand, low mean ratings were given for accuracy, reliability, trust and security (Keoduangsine and Goodwin, 2009).

Hassan, Jaber and Hamdan (2009) introduced an adaptive M-Government framework which is illustrated below in figure 2.7. The authors argued that content adaptation is the most important part in the process of designing M-Government applications. The adaptive framework takes into consideration four contexts:

- Personal context, which includes users' personal information and preferences. This context is very important because it allows personalisation when designing applications.
- Device context, which includes device information, characteristics and capabilities. This context is very important because device capabilities determine content type and size.
- Connectivity context, which includes wireless connection type. This context is very important because wireless network type determines content type.
- Geographical context, which includes information about the user's geographical location. The importance of this context is derived from the location-based services which require determining the user's location.

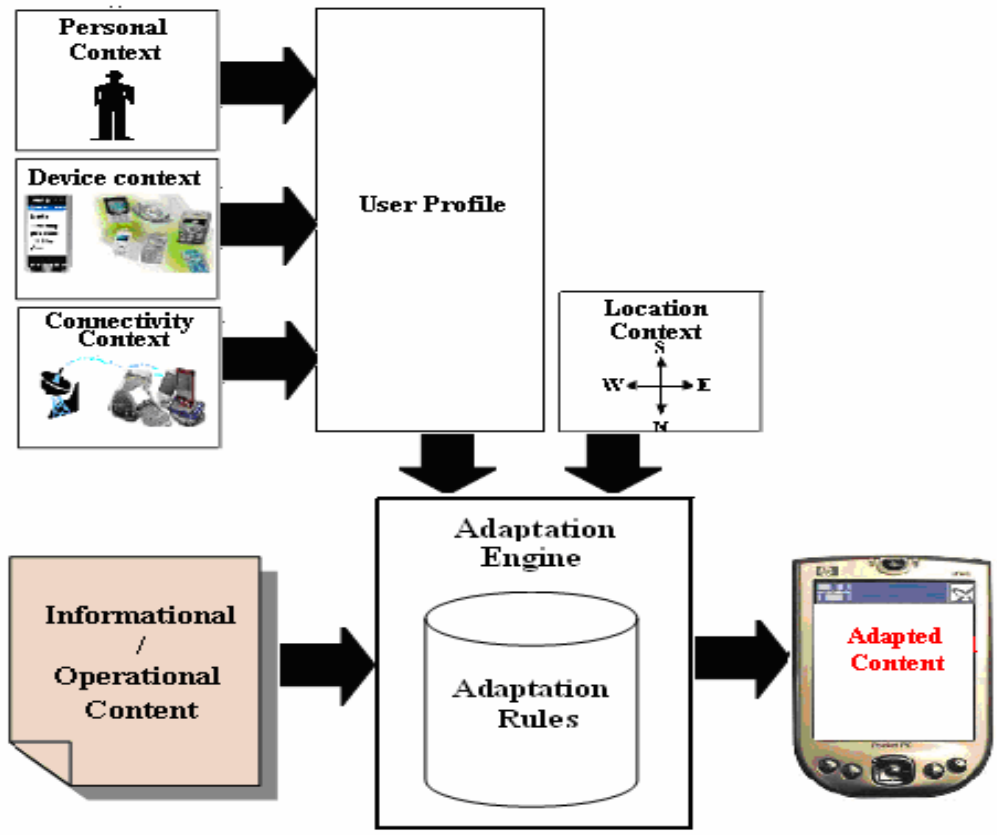


Figure 2.7: Adaptive mobile government content framework

Source: Hassan, Jaber and Hamdan, 2009.

Hassan, Jaber and Hamdan (2009) also defined some of the design guidelines that can be followed to overcome some of the mobile computing technical challenges:

1. Due to the small size of mobile devices' screens, the authors suggest that graphical content use should be minimised.

2. Governmental services should be presented in the mobile portal as a menu of hyperlinks.

3. Public services should be ranked in users' mobiles based on their preferences, which can be extracted from past browsing experience.

According to Gunadi and Sandy (2009), building a success factor model for electronic and mobile government services delivery has to focus not only on the factors but also on their relation. In order to show the complexity of the success factors, authors presented and modelled the following two success factors: informatics infrastructure and organisation, in addition to business process and delivery.

The researchers argue that mobile government service delivery success factors and their relations formulate a system. Researchers implemented a causal loop diagram in order to represent relations among success factors in cause and effect factors which eventually form a closed loop. This model is shown in figure 2.8 where a causal relationship is represented by an arrow with overhead pointing to the effect factor. In this model the (+) and (-) symbols next to the arrow represents the change direction whether it's same or opposite direction between the cause and effect factors.

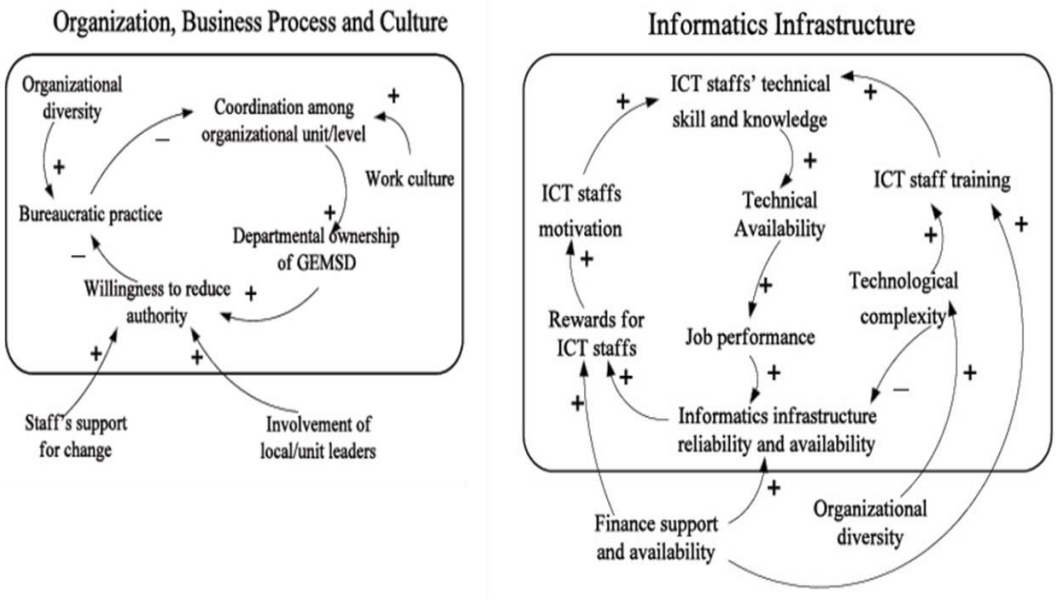


Figure 2.8: Gunadi and Sandy model for electronic and mobile service delivery

Mengistu, Zo and Rho (2009) studied the challenges for mobile government in developing countries; their study concluded that the following are the main challenges:

- Privacy and security issues, because wireless networks use public airwaves for transporting data which are vulnerable to hackers. Therefore, it is very important for governments to ensure privacy and security.
- People readiness: many people in developing countries are not aware of the impact or meaning of E-Government and M-Government.
- Solid legal frameworks for electronic services are not in place yet.
- Compatibility: no global standardization of content and the importance of interoperability across different government agencies.
- Mobile computers' limited power supply.
- Low bandwidth and download speeds.
- High cost of mobile Internet in some developing countries.

Misra (2011) defined technical challenges which have to be sorted out. She reported that mobile devices' small screen and limited space, in addition to issues of interoperability, usability and operation are the main challenges for the web-based mobile government. Rannu, Saksing and Mahlakõiv (2011) identified the following ten challenges to the future of mobile government:

- Physical limitations of mobile devices, which will result in limiting the amount of information available.
- Cost of implementing mobile applications.
- Mobile digital divide, since some people will not be able to use this technology (typically older and poorer people).
- Changing the mobile mind-sets, since most people believe that mobile phones are mainly a tool for fun rather than for serious activities.
- Overcoming privacy and security concerns.
- Managing mobile data overload.
- Government employees' resistance to organizational change.
- Lack of clarity about future M-Government planning.
- Lack of mobile technology standards which will lead to increasing cost of implementing mobile government since each country will spend money alone on developing its own customized mobile systems.

- Lack of global telecommunication standards.

Al-Khamayseh and Lawrence (2010) conducted a success factors study for mobile government and used case study methodology claiming that this is the suitable method for exploratory research. Researchers studied a large city council in Queensland, Australia. The researchers concluded the following success factors related to the five categories of drivers, solutions, employees, providers and citizens (table 2.2).

Table 2.2: Mobile government success factors 1

Source: Al-Khamayseh and Lawrence, 2010/ QLDCC1 Case Study

Category	Success factors
Drivers	Saving costs Staff productivity Coverage Volume of use Constituents' demand Fast service delivery
Solutions	Business case Clear objectives Determine business
requirements	Architecture Managed as a project (IT project management skills) One platform solution Software reuse Testing and evaluation
Citizens	Acknowledge receipt of problems Fast response Increase trust Citizen's convenience
Employees	Understanding staff abilities Staff acceptance Involvement in planning Staff technology literacy Training provision Change management Application ease of use
Providers	Understanding of the services provided Researching the market Negotiate the best deal Utilizing government contracts Provider's experience and infrastructure

Al-Khamayseh and Lawrence (2011) conducted another success factors' study for mobile government using another case study, Queensland Regional City Council. The researchers constructed a table of success factors related to nine categories, as illustrated in table 2.3. Even though these two studies conducted by same authors, different range of success factors were found since each case study has its own nature.

Table 2.3: Mobile government success factors 2

Source: Al-Khamayseh and Lawrence, 2011/ QLDCC2 Case Study

Category	Success Factors
Drivers	The availability of technology
Solutions	Easy management Up-to-date Selecting of access device Data transfer speed One platform Device independent solution Low overhead on the back office systems
Constituents (Citizens)	Broadband availability Mobile penetration and usage Easiness and readability of G2C services G2C services to mimic the real life process
Constituents (Employees)	Staff trust Staff acceptance Training Change management
Providers	Security Data transfer speeds Infrastructure Compatibility with the department systems Future plans
Business Case	IT liaison with business groups Understanding business requirements Awareness of available technologies Justifying the needs and costs Reflect on benefits
Security	Update department's network Awareness of all the risk, threats and vulnerabilities Implement as many security levels as required Best password selection procedures No information to be kept on devices
Government Help	Negotiation with providers
Benefits	Understanding the benefits

Al Thunibat, Zin and Sahari (2011) investigated the potential needs of users in Malaysia for mobile government services. The researchers used a questionnaire and six focus groups to accomplish that. Researchers concluded that the following are the main

limitations and problems facing Malaysians when using mobile government: security and privacy, mobile usability issues, access speed, quality of service, lack of personalization and high cost of mobile access and services. Researchers provided group members with a prototype demonstration of the mobile government portal in order to help participants develop sufficient ideas to fulfil the study objective.

Salkute, Kolhe and Veedhi (2011) listed the following factors as the main challenges for implementing mobile government:

- Security and privacy.
- Accessibility.
- Usability issues, such as small screens, small keypads, short battery life, limited computing power, input capabilities and limited graphical capabilities.
- Application infrastructure issues because there are different platforms for wired and wireless Internet access.

GSMA Europe defined the following critical success factors for the successful delivery of M-Government services in the European Union (GSMA Europe, 2011):

- Services need to be designed around users' needs.
- Services need to be interoperable across the single market.
- Mobile broadband needs to be delivered to every region of the EU.

Alsenaidy and Ahmad (2012) reviewed the state of M-Government in Saudi Arabia and concluded the following challenges of M-Government: privacy and security, trust, information overload, additional costs and people awareness.

Zefferer and Teufel (2011) presented a plan to overcome challenges for only smartphone M-Government services. The plan consists of the following recommendations: development of accepted smartphone-based M-Government services, handling of different smartphone platform and guaranteed security and services. The previous plan does not provide practical strategies to assist governments in implementing M-Government successfully.

One of the factors not generally recognised as a success factor for M-Government in the foregoing portion of the literature review is the mobile data congestion issue, which is a very important issue. Currently, the awareness of mobile data congestion problem is different around the world. However, by 2014-2015, mobile data congestion is likely to be a major global problem (Deloitte, 2010).

2.2.9 Existing mobile services

Many countries in both the developed and developing worlds have anticipated the tremendous opportunities offered by mobile technologies. Therefore, many countries launched different applications based on their needs. This section illustrates the most important existing mobile government services types.

Kushchu and Yu (2004) researched the value of mobile government applications and built a value model that has the following three dimensions of evaluations:

- Prime value, which means satisfying a real need for users, such as instant information release, mobile warning and quick information collection.
- Pleasure value, which represents services that will make interaction with government more enjoyable, such as mobile transactions, faster information exchange and fighting against crime.
- Post value, which means the attitudes of users toward government services and their feelings after using government services; this dimension deals with cost, privacy and security issues. Examples for this dimension are location identification and mobile voting.

Zefferer (2011) presented some of the mobile projects based on their service class; the following services classes were defined:

SMS security alerts

In this type of services, residents and businesses can register at an SMS service and get alerts by SMS in case of security threats; for instance this service is already used in London.

SMS emergency and disaster alerts

In this type of services, SMS is used to alert residents in case of natural disasters. This service is used in many countries such as China (USATODAY, 2011), Bangladesh (Physorg*, 2011*), the Netherlands (CNN, 2011) and South Korea (Pomanada, 2011).

Health services

There are two types of health services, the first type of services usually informative where SMS messages are sent to people to inform them about health related topics. Examples of these types of services include the *Ask Brook* service in the UK (Brook, 2011), and the

Text4baby project in the USA (Text4baby, 2011). The second type of service is mainly for health in-field employees to either access data bases from remote locations or update records remotely.

Education

These services are mainly used in developed countries and they are usually used to improve communication between schools, universities, students, and parents through using SMS to deliver personal information such as exam results to parents. On the other hand, developing countries use mobile technologies to obtain teaching materials, especially in remote areas where wired communication lines are not in place.

Agriculture

The main advantages of mobile agriculture projects are enhancing communication between producers and consumers and eliminating intermediaries, whereby all participants can benefit from the process and update farmers with data.

Financial services

These types of services are important for both developed and developing countries. In developing countries, these services represent a great need, especially in rural areas where no financial system is in place.

Transport

Mobile technologies in this arena are mainly used in developed countries where users can pay parking fees or buy transport tickets using mobile phones and SMS messages.

Mobile ID and mobile signature

Mobile ID and mobile signature are used in many countries, notably in Austria, Scandinavia, and the Baltic. These two factors are very important especially when countries moved to mobile government applications that require transactions.

Mobile applications are widely used to help in-field employees to work quickly and more effectively. Police forces are using mobile technologies in many countries; for example, Zurich City Police invested in a mobile solution that allows them to use mobile laptops through wireless networks to get prompt access to databases and also connect their laptops to other devices such as scanners and printers (Cisco, 2011).

Kuscu, Kuschu and Yu (2007) classified mobile government applications and services to the following categories:

• Instant information release, such as the services that allow for disseminating special notification and warnings, in addition to SMS for people with hearing disabilities.

• Quick information collection, such as the services that help in searching for missing citizens and criminals, or the uses for fire fighting service.

• Mobile transactions, such as mobile automobile parking and tax declaration.

• Faster information exchange, such as the use of mobile devices with hospital staff and elderly care workers.

• Fighting against crimes, such as reporting crimes services.

2.3 M-Government in developed and developing countries

2.3.1 M-Government in developed countries

Developed countries are already benefitting from E-Government services through their existing wired infrastructure. Developed countries are looking to take advantage of mobile technologies in order to extend government reach to their citizens (Ghaysi and Kushchu, 2004).

M-Government in the developed countries represents just one out of many channels and opportunities to get in contact with public administration. Therefore, M-Government is mainly used for convenience, especially with the availability of smart phones and functionality such as GPS on mobile devices (Zefferer, 2011).

The European E-Government action plan for 2011-2015 has an objective of reaching 50% of EU citizens and 80% of EU business by 2015. It is expected that mobile government will play an important role in achieving these goals. Europeans know that some services cannot be implemented through E-Government, and the only way to deliver the services will be via mobile technologies – for example public sector workers who are out in the field, such as law enforcement security and homecare health applications (GSMA Europe, 2011).

2.3.2 M-Government in developing countries

In this section we will list the important reasons for developing countries to implement mobile government applications and illustrate some cases for mobile government implementations in developing countries.

Why use M-Government in developing countries?

Governments in the developing countries are trying to reach out to their citizens. Mobile government brings lots of opportunities to the developing countries. Developing countries have a higher mobile penetration rate than the fixed-line Internet rates, which opens doors of opportunities for these countries to bridge the digital gap and gain a better reach through mobile government.

Mengistu, Zo and Rho (2009) claimed that the following are attractive features forcing governments in developing countries to adopt M-Government:

- Increased mobile penetration.
- In some areas mobiles are the only way to connect to the Internet.
- Accessibility anywhere.
- Remote areas with no adequate infrastructure for wired Internet.
- Low-cost technology.
- Ease of learning.
- Mobile infrastructure can be easily installed.
- Government continuous efforts to improve E-Government.

Ghaysi and Kushchu (2004) stated that most of the developing countries have low people readiness due to many factors; therefore, many E-Government applications cannot be implemented and if implemented will not succeed. The authors identified the following benefits for mobile government in the developing countries:

- M-Government will allow governments to bypass building all required heavy infrastructure for used in E-Government.
- The costs of owning mobile devices are low.
- Ease of use; any common person can use it to access information.
- Governments can attain a better outreach to the public.
- The high rate of mobile penetration in developing countries.

Hellstrom (2008) argued that mobile government in developing countries may be the only viable option, identifying the following factors as the rationale to use mobile government in east Africa: more access, larger reach, adoption, more interaction, lower cost and higher efficiency. Hellstrom concluded that there is no other option in countries with poor infrastructure.

Georgescu (2011) claimed that there were two reasons that will motivate citizens in developing countries to adopt mobile government: lower cost of mobile phone technology

versus Internet technology and the ability to connect remote areas which were unconnected through wired Internet.

Governments in developing countries can start implementing M-Government in three different phases. Firstly, government to citizen one-way information applications should be developed to reach citizens in time of crisis. Secondly, interactive applications should be developed to increase citizens' participation and enhance democracy. Thirdly, highly interactive M-Government applications can be developed that may include transactions (Ghaysi and Kushchu, 2004).

M-Government initiatives in developing countries represent an opportunity to governments to deliver services to users who have no access to wired Internet; therefore, it helps to overcome the digital divide (Zefferer, 2011). According to Rannu, Saksing and Mahlakõiv (2010), M-Government is particularly suited for the developing world because mobile phone penetration rates are much higher than Internet access rates.

Mobile government cases from developing countries

Gang (2005) presented a case of mobile government in Beijing, China. The study showed that mobile government initiatives have rebuilt trust between citizens and government through closer interaction and efficient service delivery. The study also focused on the involvement of the top leadership and their support as one of the key success factors for mobile government.

Antovski and Gusev (2005) conducted an exploratory research through an electronic survey to measure users' readiness to adopt M-Government in Macedonia, which is a developing country in Europe. The research sample consisted of young people with strong IT knowledge. This study researched the following factors:

- Citizens' awareness of electronic and mobile government services.
- Mobile government benefits from citizens' perspective.
- Mobile government challenges from citizens' perspective.

The authors concluded that mobile government is a must for developing countries in order to bridge the digital divide. Researchers addressed six issues facing the implementation of mobile and electronic government: infrastructure development, mobile payments infrastructures, privacy and security, user-friendly, legal issues, compatibility and interoperability.

Hellstorm (2008) identified the following challenges for adapting and implementing M-Governance applications in East Africa:

● Who should pay for the services and what do they cost?

● Content production and update.

● Usability issues of mobile phones.

● Interoperability issues between operators and roaming between countries must be solved.

● Promoting mobile penetration and increased accessibility.

● Regulation and legal aspects of mobile applications.

Abu-Samaha and Abdel Samad (2008) studied the prospects of mobile government in Jordan. They presented the results of a number of surveys conducted by the Ministry of Information and Communication Technology which were employed to assess the Government services' delivery channels between the years 2000 and 2005. The surveys were undertaken following a mixed-method approach that included interviews with government officials, focus groups and questionnaires.

The survey results indicated that the following are the main mobile government concerns in Jordan from the interviewees' perspectives: security and privacy, lack of device maturity, bandwidth limitations and limited display capacity and data presentation.

Li, Guan and Fan (2009) studied the influence of mobile government in China and reported the following positive influences:

- Promoting government administrative reforms and changing functions through accelerating innovation, improving efficiency and accelerating transformation of government functions.
- Reducing bureaucracy.
- Promoting social civilisation through providing continuous access to government information and providing a new channel for citizens' political participation.

The study reported many suggestions for developing mobile government. The first suggestion is creating the right laws, regulations and standards to tackle many issues, such as SMS validity, privacy and security. The second suggestion is establishing the

perfect security system of mobile government. The third suggestion is reengineering and optimizing the administrative business process.

Mengistu, Zo and Rho (2009) stated that in spite of all the benefits of mobile government in developing countries, the following main challenges inhibit its successful adoption:

- Interoperability, compatibility and usability issues.
- Privacy and security concerns.
- Citizens' readiness in terms of training and education.
- Legal issues.
- Mobile power limitation and wireless networks low bandwidth and download speeds.

Naqvi and Al-Shihi (2009) analysed critical success factors for developing mobile government initiatives in Oman, which is one of the Arabian Gulf countries. The authors conducted interviews with government officials representing the related government departments involved in mobile government application. SWAT analysis method was used to analyse data and extract critical success factors. The study results show that there are more cultural issues than technical issues in the case of Oman.

Waema and Musyoka (2009) reported the results of a small survey for a group of Kenyan professionals which represents part of developing the country's second phase E-Government strategy. The aim of the survey was to show citizens' perspectives on E-Government. The study results show that Kenyans know about E-Government services but most of them did not try it.

The results show also that mobile phone penetration is far higher than Internet penetration in Kenya. Therefore researchers argue that there is a case for mobile government in Kenya to be the best solution for government services to reach most of the citizens (Waema and Musyoka, 2009).

Mobile penetration is not the only mobile government necessary driver, and the authors missed exploring many important necessary drivers, including existing/required ITC infrastructure and technologies (e.g. WIMAX, 3G etc.) and the existence of mobile applications/services.

Al Thunibat, Zin and Sahari (2011) conducted an exploratory research to discuss the main challenges and opportunities of the M-Government in Malaysia. The authors conducted

exploratory research due to the fact that M-Government is an emerging discipline; therefore, they have used a combination of qualitative and quantitative methods.. The study findings showed the following results (Al Thunibat, Zin and Sahari, 2011):

- Awareness of M-Government services is reasonably high.
- Mobile government services usage is low.
- Citizens acknowledge M-Government services' usefulness.
- M-Government challenges were defined as:
    - Interoperability (roaming, multi platforms).
    - Usability issues.
    - Privacy and trust concerns.

Trimi and Sevrani (2010) conducted a qualitative study to evaluate M-Government projects in Albania. Researchers defined research questions and conducted interviews with key individuals involved in E-Government project in Albania. The study results show that M-Government applications do not exist in Albania, even though these applications are the best and only way to serve Albanian citizens and businesses.

E-Government services are in place, but most of these services are out of reach for the majority of citizens and businesses due to the low penetration rate of fixed Internet access due to the prohibitive cost and the low penetration rate of PCs in Albania. They argued that M-Government applications will be the best solution for Albania, especially with a high mobile penetration rate and the existence of WIMAX technology. However, the following challenges must be overcome by the Albanian government (Trimi and Sevrani, 2010):

- Applications have to be designed based on user needs and wants.
- Achieve public awareness and educations.
- Financing M-Government projects.
- Privacy and security concerns.

Alsenaidy and Ahmad (2012) reviewed the state of M-Government in Saudi Arabia and concluded that the existing M-Government services in the country are extremely convenient and useful. They also stated that there are some challenges, such as trust, privacy and security, due to the fact that M-Government in Saudi Arabia is still in its early stages.

The adoption of M-Government services in Egypt was investigated by Abdelghaffar and Magdy (2012). They found that the following factors significantly affect the adoption of M-Government among the youth in Egypt: perceived usefulness, face to face interaction, awareness and social influence. Researchers distributed a questionnaire among students

in four universities, therefore these conclusions cannot be generalised to all citizens of Egypt.

2.4 Mobile government in Jordan

This section discusses the Jordanian experience in implementing mobile government. Firstly, it identifies the existing drivers for implementing mobile government. Secondly, it demonstrates the Jordanian electronic government program and finally it discusses the Jordanian mobile government program. In order to better understand the Jordanian mobile government services, this section classifies the mobile government initiatives and services into government to residents and businesses services and government internal mobile based initiatives which are targeting service efficiency improvement.

2.4.1 Mobile government existing drivers in Jordan

Mobile phone penetration in Jordan rose from less than 20% in 2001 to 139 % in 2012, as shown previously in figure1.1 . Jordan achieved a higher penetration rate that most other areas in the world, as illustrated previously in figure 1.2.

Most Jordanian families use mobile phones and some users may have more than one line. However, Internet penetration in Jordan is still behind the desired level and needs to be increased greatly. Table 2.4 and figure 2.9 show a comparison between households who own mobile phones, landlines, PCs and Internet access.

Table 2.4: Comparison: mobile phone, land line, PC and Internet access

Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS). Household Expenditures and Income Survey, 2008.

City Name	Households with mobile telephone	Households with telephone line	Households with Internet access	Households with PC
Ajloun	94.4	16.4	2.3	31.6
Amman	94.5	46.9	13.6	45.2
Aqaba	96.2	22.9	3.6	45.7
Balqa	92.1	24.3	3.9	23.8
Irbid	93.8	30.1	4.3	33.2
Jarash	93.2	7.0	5.1	18.6
Karak	89.1	25.5	3.8	30.7

Maan	90.8	16.2	1.9	33.3
Madaba	94.5	20.7	1.8	28.0
Mafraq	92.9	15.2	2.5	17.8
Tafiela	94.4	19.0	0.2	33.2
Zarqa	93.3	24.4	4.6	31.3

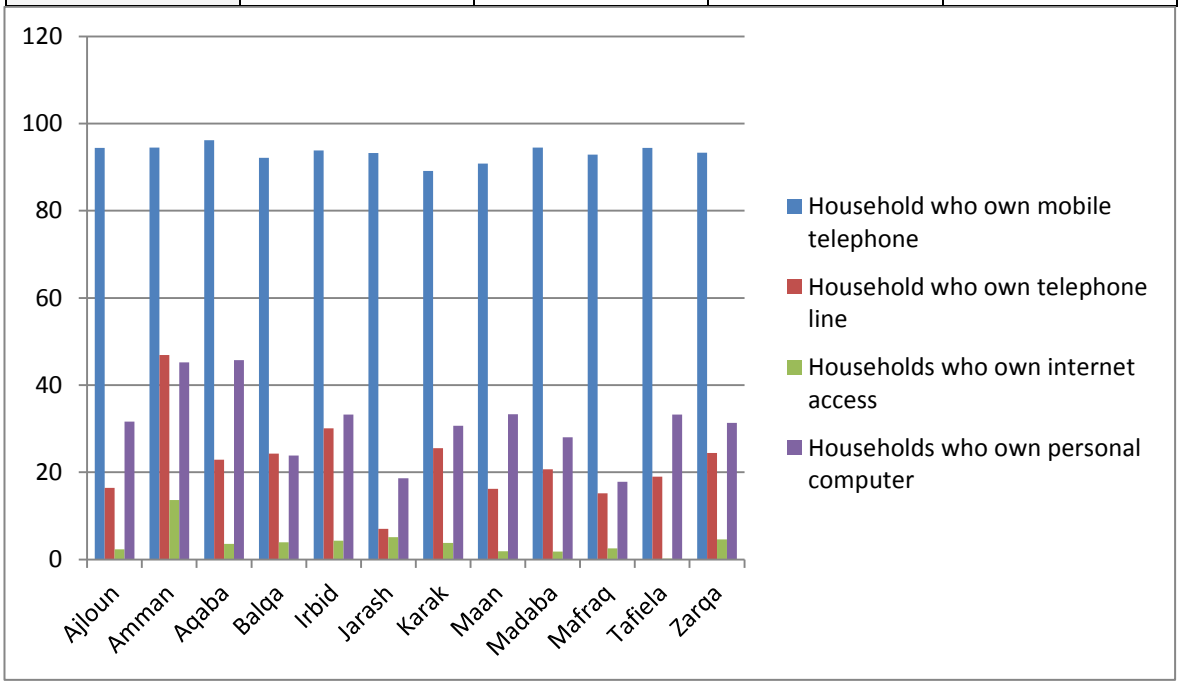


Figure 2.9: Comparison: mobile phone, land line, PC and Internet access

Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS). Survey, 2008.

The higher rates of mobile penetration in Jordan and the existing infrastructure for M-Government are the two main factors that induced the Jordanian Government to start providing some of its services via mobile phones in 2008 through the SMS Gateway Project (Bataineh, Abu-Shanab and Jdaitawi, 2005). Another important driver for mobile government in Jordan is the big percentage of rural areas in Jordan; 78% of Jordan is semi-desert, as can be seen in table 2.5 and figure 2.10 (Jordan Department of Statistics, 2011).

Table 2.5: Jordan area by topography

Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS).

Indicator	Area (KM^2)*
Heights	550
Plains	10000
Rift Vally	8228
Badeia (Semi-desert)	70000
Territorial waters	540
Dead Sea	446
Aqaba Gulf	94
Total Area Of Kingdom	**89318**

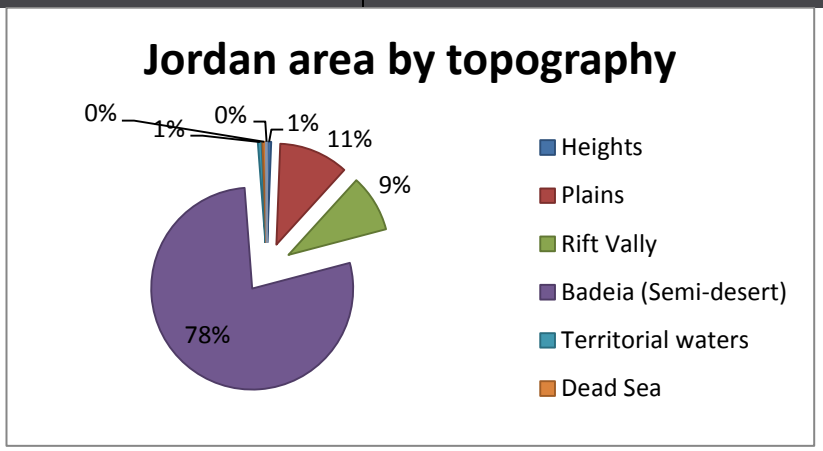


Figure 2.10: Jordan Area by topography

Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS).

Jordan was ranked 50th on the global Networked Readiness Index and 4th on the lower income countries (Dutta and Mia, 2011). Although Jordan's ranking in the 2010 UN E-Government Survey dropped to a lower position, it is still among the top 15 for developing countries, as shown in table 2.6 (UN E-Government Survey, 2010).

Table 2.6: Top-ranked E-Government developing countries

Source: UN E-Government survey 2010

1 Republic of Korea
2 Singapore
3 Bahrain
4 Israel
5 Colombia
6 Malaysia
7 Chile
8 Uruguay
9 Barbados
10 Cyprus
11 Kazakhstan
12 Argentina
13 United Arab Emirates
14 Kuwait
15 Jordan
16 Mongolia
17 Ukraine
18 Antigua and Barbuda
19 Mexico
20 Saudi Arabia
21 Russian Federation
22 Brazil
23 Qatar
24 Peru
25 Belarus

2.4.2 Jordan E-Government program

Jordan launched its electronic government portal in 2006 through the following uniform resource locator (URL): www.jordan.gov.jo. The portal includes the following content (Jordan E-Government Portal, 2011):

1. Description of and procedures to complete 1800 government services
2. A list of 117 ministry and government entities that has list of services and contact information.
3. Access to 49 e-services which are available online, such as customs, traffic violations, property taxes etc.
4. A service that enables users to communicate with ministries and government entities in regard to complaints, suggestions, technical problems, or any direct enquiry.

Jordan E-Government strategy classifies the electronic services provided by the government of Jordan to four types (Jordan E-Government Strategy, 2011):

- Vertical e-services, which are the services provided end-to-end by one government entity.
- Cross-organizational e-services, which are the services that require the involvement of many government departments
- Shared services, which are enablers providing technology-based functionality that are central to the provision of vertical and cross-organizational services.
- Composite services, which are bundles services those have to flow across multiple government entities and contribute to E-Government overall objectives.

Jordan E-Government program mission as identified in the Ministry of Information and Communication Technology is to manage change in the government and focus on the satisfaction of the recipients of Government service. The Jordanian Government defined the following application themes in order to achieve its mission (Jordan E-Government portal, 2011):

1. Applications related to electronic services.
2. Define and develop appropriate technological infrastructure.
3. Define and develop the structure of adequate legislative and regulatory environment.
4. Effective process re-engineering to achieve high efficiency.
5. Transformation and development in the field of education, training and knowledge transfer.
6. Change management and restructuring of government institutions.

The Jordanian Government has identified key performance indicators for technical components, standards and support services, and defined the following Critical Success Factors for e-Government in Jordan (Jordan E-Government Strategy, 2011):

- Sponsorship and buy-in from leadership at all levels in government.
- Activation of the National e-Government Steering Committee.
- Availability of resources.
- Availability of required ICT and business skills.
- Cooperation of government entities.
- Empowerment of the program from the central government.
- Sustainability of the E-Government strategy implementation despite political changes.
- Availability of related laws and regulations.

- Internet penetration.
- Private sector participation and support for E-Government.

The Jordanian E-Government program has faced many challenges, such as low level of Internet penetration, telecommunication infrastructure constraints, digital divide, privacy and security concerns (Elsheikh, Cullen and Hobbs, 2008). Lack of awareness is another important challenge (Al-jaghoub, Al-yaseen and Al-hourani, 2010).

2.4.3 Jordan Mobile Government Program

This section presents the Jordanian mobile government initiatives.

Government to residents and businesses services

Jordan launched the E-Government mobile portal on the 18th of April, 2011. The new portal offers twenty-seven informational services to the Jordanian citizens and businesses, as shown in table 2.7. In order to use the mobile application, users should download the Java application through their mobile operators or through the E-Government web portal www.jordan.gov.jo, and those whose mobiles are not Java-enabled can send an SMS to 94444 to get any of the e-services provided by the portal (Telecompaper, 2011).

The portal provides two types of SMS messages: pull and push messages. Push messages are sent by the Government to citizens without a request, such as reminders, awareness campaigns, etc. On the other hand, pull messages are sent by citizens to the Government request certain information. Citizens will are not charged when sending the enquiry message, but they are charged 7 Jordanian Piaster (excluding fees and taxes) upon receiving the required service or information.

The new portal provides the following advantages to Jordanian citizens:

a. Easy access to important information pertaining to governmental procedures anywhere, anytime.

b. Citizens can set reminders to pay fees and taxes to avoid penalties such as violation fees, municipal taxes, vehicle licensing etc.

c. Citizens stay informed and aware of all matters related to Government departments through receiving Government push messages.

d. The portal provides a quick and easy method to use services.

Table 2.7: Electronic services provided by Jordan mobile government portal

Source: Jordan E-Government Portal

Service Number	*Service Name*
1.	*Property tax*
2.	*Water bill - Amman*
3.	*Competitive ranking - Service Bureau*
4.	*Vehicle licensing*
5.	*Taxes for individuals*
6.	*Vehicles violation fees*
7.	*Weather forecasts*
08.	*Complaints/ Amman municipality*
09.	*Corporate taxes*
10.	*Cultural Centre activities*
11.	*Car customs fees enquiry*
12.	*Notification of new tender release*
13.	*Inquire about a particular tender*
14.	*To inquire about a particular bidder*
15.	*Advertising/ housing and urban development*
16.	*Fatwa subscription*
17.	*Fatwa request*
18.	*Query for a transaction regarding borders and residency*
19.	*Membership number/ customs*
20.	*Enquiry about custom deposits*
21.	*Balances of temporary entry/ customs*
22.	*Transit guarantees/ customs*
23.	*Flight schedules at Queen Alia International Airport*
24.	*Flight schedules for Royal Jordanian Air lines*
25.	*Complaints to the Greater Amman Municipality*
26.	*Progress in transactions regarding land*
27.	*Survey Department services*

Government internal mobile initiatives

More than 30% of the Government workforce in Jordan has always been mobile, such as police officers, health and building inspectors, fire fighters and social services employees (Al-Omari, 2006). Therefore, Jordanian Government entities have realized the need to implement mobile applications to help mobile government workforce providing services in a more efficient way. This section introduces mobile government initiatives used within the Jordan government entities to help mobile workforce improve their effectiveness and efficiency.

Blackberry service use in Government entities

Many government entities in Jordan use blackberry e-mail service to accelerate the decision-making process and to increase efficiency and effectiveness. For example, King

Abdullah II Design and Development Bureau (KADDB) uses this service for all of its managers and board members, who travel a lot based on their job requirements.

Mobile government uses in Public Security Department

The police forces use laptops in their vehicles connected wirelessly in order to access databases while they are mobile and use mobile devices to issue traffic violation tickets.

Other Mobile government projects

There are also separate mobile government projects in Jordan, such as SOHITCOM project (Social Health and IT for Rural Communities). The SOHITCOM project has two functions. It provides an information portal which represents a forum for asking and finding answers to health questions. This forum allows users in rural areas to text in questions to partner doctors and receive answers via SMS. The second part of SOHITCOM project is the vaccination reminders through mobiles, which is basically a reminder service via mobiles for mothers who want to keep track of when their children need vaccinations (Mobileactive, 2011).

2.5 Chapter summary

Previous literature shows that there is little research in the area of what users require from mobile government, since the latter remains an emerging phenomenon, especially in developing countries, even when a mobile government portal has been launched. This suggests that there is a need to define success factors from the users' perspective.

Previous literature shows only one plan to overcome challenges for only smartphone M-Government service suggested by Zefferer and Teufel (2011). The plan does not provide practical strategies to assist governments. Hence, in order to implement M-Government successfully, practical solutions must be presented to portray M-government success factors. Previous literature shows only one suggested roadmap which was developed by Al-Khamayseh and Lawrence (2006) through analysing 29 experts' answers to two open-ended questions. The authors argued that mobile and wireless technologies improvements will increase people's adoption and demand for new services. Therefore, content developers will be pressured to satisfy users' needs which will stimulate businesses to take advantage of mobile applications. They anticipated that governments would follow businesses and adopt mobile technology.

The previous road map neither provides solutions for success factors nor provides development stages to assist governments in implementing M-Government successfully. This thesis will help to fill all previous gaps by building a success factors model and presenting practical solutions for these factors following a clear development stages.

Chapter 3

Research Methodology

3.1 Overview

This chapter introduces the research strategy and research methods used to conduct the research presented in this thesis. This research is a multi-phase study which was implemented through conducting five phases and employing the following qualitative and quantitative research methods: questionnaires, interviews, meta-analysis and focus groups. This chapter describes the objective, research methods, research questions, procedures and data collection and analysis tools for each research phase.

3.2 Research strategy

In this research, the mixed-method approach was undertaken. Mixed-methods approach is becoming the third major research paradigm, in addition to quantitative and qualitative approaches (Johnson, Onwuegbuzie and Turner, 2007). This approach was chosen based on a question-driven perspective (O'Leary, 2009) as detailed in the research design section 3.2.1 which presents the rationale for using mixed-method approach. Questions were defined and the mixed-method approach was the most suitable approach for answering research questions.

Tashakkori and Teddlie (1998, p.27) defined mixed-methods studies as "*Those that combine the qualitative and quantitative approaches into the research methodology of a single study or a multiphased study*". In mixed-methods approach, both quantitative and qualitative methods are combined to generate more holistic data for the study (Curry, Nembhard and Bradley, 2009).

Mixed-methods approach has many strengths and some weaknesses. The major strengths and weakness for mixed-methods approach are listed below in table 3.1 (Johnson and Onwuegbuzie, 2004).

In mixed-method approach, research methods are determined by the research questions being asked (Gray, 2009). This research employed the qualitative and quantitative research methods of questionnaires, interviews, meta-analysis and focus groups (as illustrated below in figure 3.1).

Table 3.1: Strengths and weaknesses of mixed-methods research

Source: (Johnson and Onwuegbuzie, 2004).

Weaknesses	Strengths
• Can be difficult for a single researcher to carry out both qualitative and quantitative research. • Researcher has to learn about multiple methods and approaches and understand how to mix them appropriately. • Methodological purists contend that one should always work within either a qualitative or a quantitative paradigm. • More expensive. • More time-consuming. • Some of the details of mixed research remain to be worked out fully by research methodologists (e.g., problems of paradigm mixing, how to qualitatively analyse quantitative data, how to interpret conflicting results).	• Words, pictures, and narrative can be used to add meaning to numbers. • Numbers can be used to add precision to words, pictures, and narrative. • Can provide quantitative and qualitative research strengths • Researcher can generate and test a grounded theory. • Can answer a broader and more complete range of research questions because the researcher is not confined to a single method or approach. • A researcher can use the strengths of an additional method to overcome the weaknesses in another method by using both in a research study. • Can provide stronger evidence for a conclusion through convergence and corroboration of findings. • Can add insights and understanding that might be missed when only a single method is used. • Can be used to increase the generalizability of the results. • Qualitative and quantitative research used together produce more complete knowledge necessary to inform theory and practice.

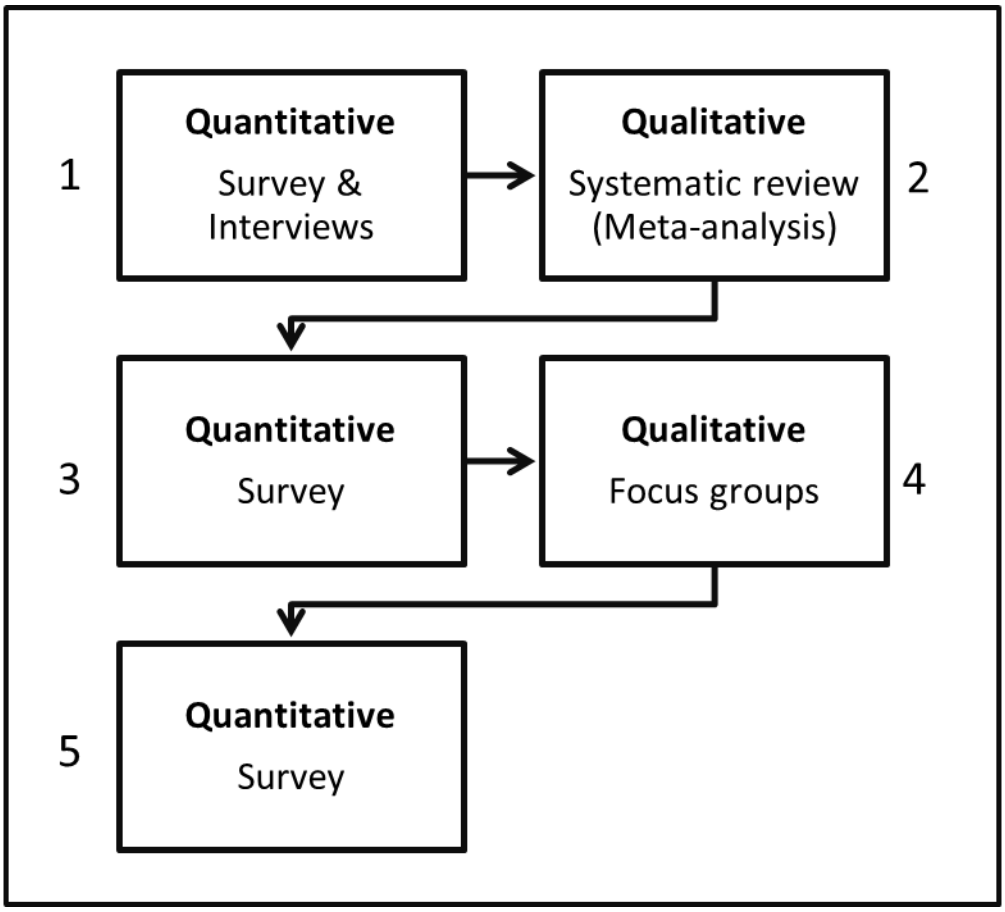


Figure 3.1: Mixed method approach

Bryman (2008) lists the following ways of combining quantitative and qualitative research:

- Triangulation: triangulation refers to cross-checking results obtained from an investigation associated with one research method against results of using a method associated with the other research strategy.
- Offset: offset refers to offsetting weakness of an investigation associated with one research method by including a method associated with the other research strategy that has its own strengths.
- Completeness: completeness indicates that research question requires using both methods to be achieved.
- Different research questions: refers to using both quantitative and qualitative methods to enable researcher to answer different research questions.
- Instrument design: In this case, qualitative research is used to inform the design for survey questions.
- Confirm and discover: refers to testing hypothesis generated be qualitative research using quantitative research.

The following section (section 3.2.1) presents the rationale for using mixed-method research and the ways of combining quantitative and qualitative research in each study of this multi-phased research is presented.

3.2.1 Research design

This study is a multi-phase study consists of five research phases conducted in three studies. Study 1 uses both survey (quantitative) and interviews (qualitative) methods, because each method answers a different research question. In study 2, systematic review using meta-analysis (qualitative) method was used before conducting the questionnaire (quantitative) because systematic review was employed to develop questionnaire variables (instrument design) and a questionnaire followed to test hypotheses generated from systematic review (confirm and discover).

Similarly, the same two rationales for using mixed-method research used in study 2 are used again in study 3, which consists of research phases 4 and 5. Focus groups were employed to develop questionnaire variables (instrument design) and a questionnaire was followed to test hypotheses generated from focus groups (confirm and discover). Figure 3.2 illustrates mixed-methods research design.

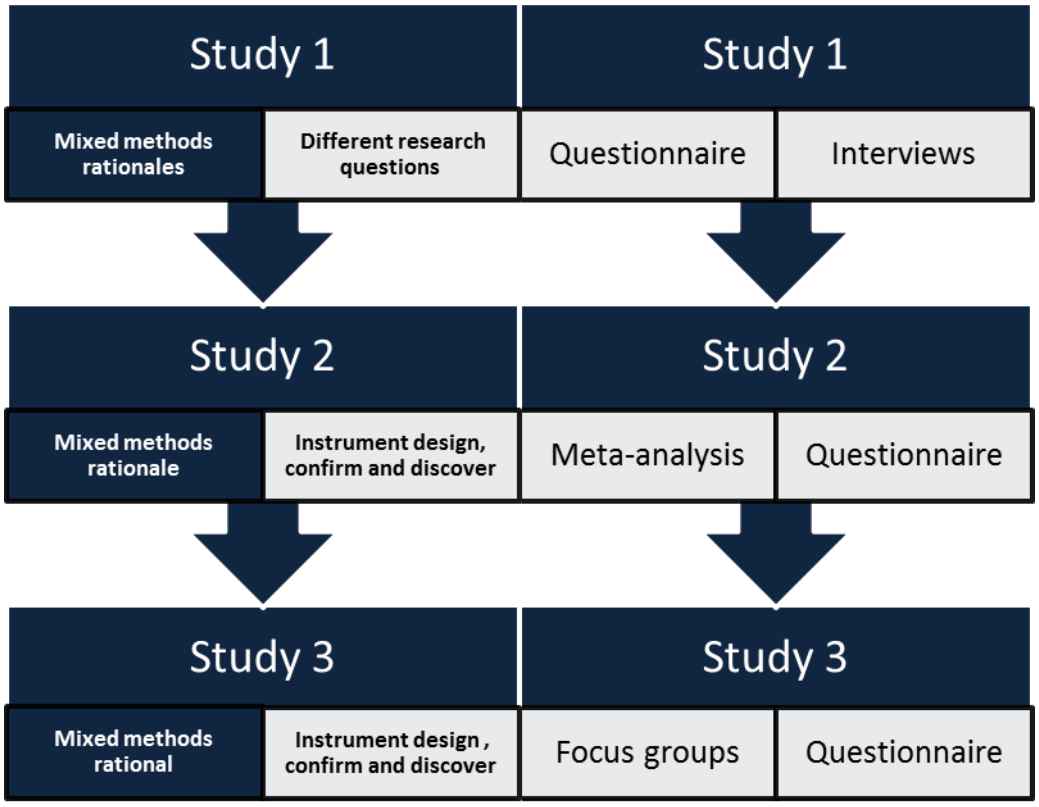


Figure 3.2: Mixed-methods research design

3.2.2 Research paradigm

There are three main paradigms in the social sciences: positivism, interpretivism and critical realism. Positivism is associated with the ontology of empiricism, which assumes the existence of quantifiable phenomena that can be objectively analysed; it is predominant in natural sciences. Interpretivism advocates the importance of human interpretation, and its ontological foundations are centred on the existence of human perceptions of phenomena that are subjective; it is mainly associated with the social sciences. Positivism lends itself to numbers and quantification, while interpretivism lends itself to words and description (Thomas, 2009).

The third paradigm which is the epistemological basis for this research is critical realism which can be defined as:

> A specific form of realism whose manifesto is to recognize the reality of the natural order and the events and discourses of the social world and holds that we will only be able to understand-and so change-the social world if we identify the structures at work that generate those events and discourses. Bryman (2008, p.14)

In this research, mixed-method approach was chosen as a research methodology that would best answer research questions. Research questions do not necessitate adherence to any epistemological paradigm for its own sake, but rather that the researcher employs the methods likely to answer them. This stance on mixing paradigms while mixing methods is called pragmatic or context-driven. In this stance, paradigms are not very important in making of enquiry decisions but responsiveness to the demands of the enquiry context is what matters most (Tashakkori and Teddlie, 2003).

3.2.3 Research questions of the thesis

The aim of the current research study is to generate a roadmap to assist the Jordanian Government in implementing user-centric mobile government successfully. The particular research questions for the research which target research objectives are as follows:

1. Is mobile government in Jordan a step on the right direction?
   (This question targets objective 1 presented on section 1.4)
2. What are the critical and high effect success factors that relate to the users?

   (This question targets objectives 2 and 3 presented on section 1.4)

3. How can the Jordanian Government tackle each success factor?

(This question targets objectives 4 and 5 presented on section 1.4)

The next section introduces the research methods used in each research phase of this multi-phase study.

3.3 Research phase 1

Research phase 1 was conducted in order to measure citizens' awareness of launching mobile government portal in Jordan and their knowledge of electronic government in general and mobile government in particular as an emerging phenomenon. Furthermore, this study also captured the government perspective in regards to launching the mobile government portal and citizens' awareness of that. Moreover, this study identified the main barriers that hinder the usage of mobile Internet, electronic government services and mobile government services in Jordan.

3.3.1 Research methods

In this study, both qualitative and quantitative research methods were implemented. Quantitative research was implemented through the distribution of a questionnaire by hand to measure the Jordanian citizens' awareness of E-Government and M-Government services and mobile Internet usage. The qualitative research was implemented through conducting Interviews with Jordanian officials involved in E-Government and M-Government programmes. The purpose of this exercise was to capture government perspective on launching Jordan mobile government portal, whilst gaining an insight of citizens' awareness of that.

3.3.2 Research design and theory

This study design includes a survey research presented in appendix 1 and the employment of semi-structured interviews with a number of people. Furthermore, this study took an inductive approach to the relationship between theory and research, because the researcher generated theories emergent from the research. Bryman defines inductive theory as "*An approach to the relationship between theory and research in which the former is generated out of the latter*" (Bryman, 2008, p.694).

3.3.3 Research questions

- This study answered the following research questions:
- To what extent are Jordanians aware of the following:

  - Electronic government services?
  - Mobile government services?
- What is the mobile Internet usage level in Jordan?
- How do Jordanians rate the quality of the following services:
  - Electronic government services?
  - Mobile Internet services?
  - Mobile government services?
- What are the main barriers that hinder the usage of the following services in Jordan:
  - Mobile Internet?
  - Electronic government services?
  - Mobile government services?
- What is the Jordanian attitude towards mobile government services?
- What is the Government's perspective of launching the new mobile government portal in Jordan?

3.3.4 Data collection methods

Data were collected using self-administrated questionnaire and interviews. Even though online surveys promise many advantages (e.g. flexible formats, speed and timeliness, convenience, ease of data entry and analysis, low administration cost and ease of follow-up), the researcher chose to administrate a paper survey for the following reasons (Evans and Mathur, 2005):

- In Jordan, Internet penetration is low, which will result in lack of responsiveness.
- Online survey method will raise many questions about sample selection and implementation. Some authors argued that Internet users represent one category of the society, therefore, results derived based on online surveys cannot be generalized.
- Online surveys will raise many privacy and security issues.

3.3.5 Questionnaire design

Before writing the questionnaire questions, the researcher had to identify similar studies and find out how they were structured. Choudrie and Dwivedi (2005) conducted a similar survey to measure the citizens' awareness and adoption of E-Government initiatives in the UK, especially public awareness of the "Government Gateway". In the questionnaire, researchers used two types of questions: multiple choice questions to get the

demographic variables including age, gender and education; and Yes/No questions to measure awareness.

A similar study was undertaken by Farouk and Kalid (2005) to measure the awareness of electronic government in Malaysia. Researchers used a questionnaire which consisted of three sections: the first section addressed participants' background; the second section addressed participants' computer and Internet usage; and the third section measured participants' awareness of electronic government.

Bradburn and Sudman (2004, p.112) stated that "*Knowledge questions are an important part of the process of qualifying participant opinions and should be asked before attitude questions are asked*". Authors argued that easier knowledge questions (which are awareness questions in our case) such as the yes/no questions are most appropriate for public issues in their early stage of development. The previous rule applies for the mobile government issue, since it is not a long-standing phenomenon at this stage.

Based on the survey purpose and previous similar studies, three types of questions were asked: closed questions to define gender and city, multiple choice questions to define age range and educational level, and yes and no questions to measure mobile Internet usage and citizens' awareness of electronic and mobile government's services, followed by open-ended questions and Likert scale style questions to get more data and to clarify the yes and no questions.

The research considered the Internet usage and E-Government awareness questions because they were perceived to be important questions to understand mobile government awareness and people attitudes towards it.

This questionnaire and the other two questionnaires in phases 3 and 5 were translated into Arabic using a back-translation method, which is a reliable method for instrument translation (Brislin, 1986). The questionnaires were translated into Arabic by a bilingual translator and then back-translated into English by another translator to confirm semantic consistency. The two translators then discussed the differences between the two English translations and agreed upon a final version for each questionnaire.

3.3.6 Interview design

In this study, structured interview type was implemented (standardized, open-ended interview). Therefore, the same open-ended questions were asked to all interviewees. The sample included Jordanian Government officials from the Information Technology and Communication Ministry who are involved in Jordan M-Government Programme. Three

interviewees were interviewed according to purposive sampling methods. Therefore, the researcher examined in-depth reliable information to research the government view of launching their portal.

An interview was conducted with three Government officials: Secretary General (Ministry of Information and Communications Technology), Mobile Government Project Coordinator (Ministry of Information and Communications Technology) and Electronic Government Director (Ministry of Information and Communications Technology).

Interview questions were chosen to help the researcher achieves the objective of conducting the interviews which is to capture Government's perspective of launching the new mobile government portal in Jordan and to also cross-checking results obtained from the questionnaire research that relate to Jordanians awareness level of launching the M-government portal.

The following questions were asked:

What are the factors that motivate the Jordanian Government to use mobile technology to deliver services? This question was chosen to identify the mobile government drivers from the governmental perspective.

How did you promote the launch of your M-Government portal? This question was asked to qualify the results derived from the mobile government awareness question.

Do you think that Jordan has the required ICT infrastructure for M-Government, and why? This question was asked to get the Government perspective of the available infrastructure and its adequacy.

Do you think that Jordanian citizens have the required mobile devices to use mobile government portal and why? This question was asked in order to get in-depth data on the possible ways to access the portal.

Do you think that Jordanian citizens are ready to use mobiles for serious matters such as receiving government information and services, and why? This question was asked in order to get the governmental perspective of Jordanians' attitudes towards the new technology.

How do you rate Jordanian citizen's responsiveness to launching the new portal, and how many have used the portal so far? This question was asked in order to shed light on mobile government adoption and the government satisfaction rate.

3.3.7 Sample

Random sampling was implemented in the survey, which is based on probability theory, since the research is seeking to estimate a parameter from a sample of data to a larger population (Bernard and Ryan, 2010). The sample included local citizens from six different cities to assess government efforts in promoting new service. The researcher chose an array of cities ranging from main cities to remote areas. This allowed the comparison attitudes between locals in the different regions. The questionnaire was completed by 120 citizens (20 citizens from each city).

The sampling technique used in the survey is multi-stage cluster sampling. In cluster sampling, the researcher starts the sampling process with sampling clusters first and then sampling either further clusters or population units (Bryman, 2008; Walliman, 2011). In this study, names of geographical locations such as the six cities were sampled first and then 20 participants were randomly sampled from each city since true national random sampling is impossible (Davies, 2007).

The interview sample was composed of three government officials from the Jordanian Ministry of Information and Communication Technology. The sample included His Excellency the Secretary General of the Ministry, a mobile government project coordinator and an electronic government director. Types of informants were selected based on the following criteria which were mentioned by Wengraf (2001):

- The amount of experience they have in the subjects covered by the research subjects.
- Their capacity to express their experience in words.
- Having access to these persons.

3.3.8 Procedures and ethical concerns

The researcher visited the following six Jordanian cities: Amman, Zarqa, Irbid, Balqa, Karak and Mafraq. A self-administrated questionnaire was distributed to a random sample of twenty people willing to participate from each city. The questionnaire took approximately 10 minutes to complete. Three interviews were conducted, lasting from 15 minutes to 25 minutes.

The researcher started the interviews by explaining the study objective and the importance of its results. The questionnaire was supplemented with a cover letter detailing the research subject and objectives. Furthermore, the letters highlighted the importance of

participants' voluntary participation and bring to the attention of participants their right to withdraw from the study without penalty.

The researcher distributed research participant information sheet and ask participants to read and sign statements of informed consent after they agreed to complete the questionnaire.

3.3.9 Data analysis

Descriptive statistics were obtained on all variables through SPSS software in order to describe the sample and get the answer for the following questions:

Are Jordanians aware of electronic government services and how did they rate their E-Government experience?

Are Jordanians using the Internet through mobile devices and how did they rate their experience?

Are Jordanians aware of the launch of the new Jordanian mobile government portal?

Constant comparative method was used to analyse participants' answers for the open-ended questions as themes or categories emerged through constant comparison (Thomas, 2009). Based on the constant comparative method, all data collected from the open-ended questions were coded in order to get participants' comments and suggestions.

In this study, the search for "repetitions" was the way in which themes were identified, an approach suggested by Bryman (2008, p.598), who stated that "*A theme is more likely to be identified the more times the phenomenon it donates occurs in the course of coding*". The frequency of occurrence for themes or categories influenced the elevation of some themes over others.

3.4 Research phase 2

Despite the fact that mobile government benefits are very promising, there are some factors that determine success or failure of mobile government applications. In this research phase, a systematic review of previous studies using a meta-analysis method was undertaken and a conceptual success factors model for mobile government to citizen services (G2C) was created.

3.4.1 Research methods

In this study, a meta-analysis method was used in order to extract knowledge from previous related studies. The meta-analysis method is an optional component of systemic review and can be defined as "*A specific statistical strategy for assembling the results of several studies into a single estimate*" (Green, 2005, p.270) or analysis of analysis (Glass, 1976; Zhao, 1991).

In conducting a meta-analysis, researchers generally undergo the following stages (Wright et al., 2007):

- Defining the primary research question

(Defining accurate research question to minimize bias).

- Defining research protocol

(Defining research terms, dates, inclusion and exclusion criteria).

- Searching literature

(Identifying the suitable previous studies).

- Extracting data

(Extracting the suitable data for the research).

- Analysing data and building the conceptual model

(Analysing data and drawing conclusions).

3.4.2 Primary research question

An accurate research question was developed in order to develop an efficient systematic review and minimize bias. The research question for this study was:

What are the most included success factors for mobile government implementations that relate to government to citizen services?

3.4.3 Research protocol

In this study, the terms "success factors", "success", "barriers" and "limitations" for mobile government were keywords that framed the basis of the literature research. The research covered most of previously published and unpublished studies up to November 13th, 2011. Furthermore, only studies that included success factors related to government to

citizen services' users were included and all other studies were excluded from the analysis.

The Summon Unified Discovery Service, which gives access to many e-Journals and databases, was the main research tool, along with Google Scholar search engine, which was used to search for appropriate published studies. Google search engine was used to search for any unpublished related documents

3.5 Research phase 3

This research phase was conducted to validate and refine the conceptual success factors model concluded in study 2. In this study, the researcher validated the model through a questionnaire distributed to 40 Jordanian academic personnel; the questionnaire is presented in appendix 2. Essential modifications were carried out on the model to ensure its suitability for Jordan.

3.5.1 Research methods

The questionnaire method was chosen based on a question-driven perspective (O'Leary, 2009). Questions were defined and the questionnaire approach was the most suitable approach for answering research questions.

3.5.2 Research questions

This study answered the following research questions:

Is the use of meta-analysis research method to build a success factors model valid?

Is the concluded model valid?

Does the model need refining? If yes, how can the researcher accomplish that?

3.5.3 Data collection methods

Data were collected using self-administrated questionnaire; the questionnaire is presented in appendix 2.

3.5.4 Questionnaire design

Based on the survey purpose, two types of questions were asked: multiple choice questions, to define age range and gender; and numeric scale questions, to validate the concluded conceptual model. In addition, one Likert scale question was used to validate the use of meta-analysis, and open-ended questions were used to get feedback and

suggestions in regard to the use of meta-analysis, proposed model, success factors and their effectiveness in the Jordanian context.

The numeric scale questions tested the importance of the following success factors from the users' perspective:

- Users' data security.
- Gaining users' trust.
- Protecting users' privacy.
- Responsiveness of mobile government applications.
- Mobile payment system.
- Legal issues.
- Usability issues.
- Mobile phones limitations.
- Access speed.
- Lack of personalization.
- Cost of: service, mobile Internet, infrastructure and application.
- Mobile penetration.
- Awareness of M-Government.
- Accessibility.
- Availability of services, network, broadband and content.
- Educating mobile government employees with mobile government benefits.
- Educating users with mobile government usage and benefits.
- Satisfying user needs and preferences.
- Provision of user-friendly applications.
- Reliability of services.
- Mobile digital divide.
- Changing the mobile mind-sets.
- M-Government standards.
- Existence of M-Government framework.
- Dealing with compatibility and interoperability issues.
- Mobile traffic control.
- Open source M-Government applications.
- Early involvement of government employees.
- Business re-engineering.
- Government employees' resistance to organizational change.
- Lack of government vision.

- Public-private sector partnership.
- Cooperation between Government and mobile network operators.
- Accountability of Government.
- Lack of clarity about future M-Government planning.
- Decentralization for local mobile government diffusion.
- Required M-Government infrastructure.
- Existence of M-Government portal.

3.5.5 Sample

Sample characteristics were given to UK Academy prior to defining the sample. Suitable candidates were defined to be academics with the following research backgrounds and interests: M-government, E-government, human computer interaction and the impact of mobile technologies on social behaviour. Therefore participants were selected based on the following criteria cited in Wengraf (2001):

1. The amount of experience they have in the subjects covered by the research subjects.
2. Their capacity to express their experience in words.
3. Having access to these persons.

In this study, purposive sampling was implemented in the survey. The sample included Jordanian academics holding PHD degrees in MIS and IT related fields, since the researcher was seeking participants with knowledge in research methods and information systems terminologies. The sample size can be relatively small in purposive sampling, as participants are chosen to give in-depth, rich information. The questionnaire was completed by 40 academics from different Jordanian universities who were all academics who have met the selection criteria and accepted to complete the questionnaire

This survey has two objectives: validating the use of meta-analysis research method and validating and refining the concluded model from research phase 2. Usually practitioners are good choice to validate such a model but in this case, practitioners are not able to achieve the first objective which is validating the research method. Therefore, only academics can achieve both objectives together.

3.5.6 Procedures and ethical concerns

The researchers contacted Universal Knowledge Academy (UK Academy) which has a joint training program with the university of Jordan. UK academy granted access to academics working with them to help conduct this research.

The questionnaire was supplemented with a cover letter detailing the research subject and objectives. Furthermore, the letter highlights the importance of participants' voluntary participation and draws participants' attention to their right to withdraw from the study at any time without penalty. The researcher distributed the research participant information sheet and asked participants to read and sign statements of informed consent after they agreed to complete the questionnaire.

3.5.7 Data analysis

Descriptive statistics and one sample T-test were obtained on all variables using SPSS for Windows in order to describe the sample and acquire answers to the following questions:

- Is the use of meta-analysis research method to build a success factors model valid?
- Is the concluded model valid?

Thematic analysis was used to analyse participants' answers for qualitative data gathered from the open-ended questions. Thematic analysis is one of the most common approaches to qualitative data analysis (Bryman, 2008). The analysis is a search for themes or categories that emerge as being important to answering the research question. The themes emerged through careful reading and rereading of the data (Fereday and Muir-Cochrane, 2006).

3.6 Research phase 4

Research phase 4 was conducted in order to recommend strategies that will help Jordanian Government implementing successful mobile government applications that will satisfy Jordanian users. Many public organisations have used focus groups to develop policy strategies (Krueger and Casey, 2009). In this research phase, focus group method is used to generate recommendations on how to tackle each success factor of the proposed model concluded in research phase 3, and a framework is devised for implementing successful mobile government in Jordan.

3.6.1 Research methods

Research phase 4 is the initial stage of a large survey study (research phase 5) to determine how the Jordanian Government can implement a successful mobile government initiative taking into consideration users' acceptance. The focus group method was chosen because the topic of tackling success factors related to users in Jordan has not been explored yet: "*Prior to the drafting and piloting of the survey instrument itself, focus groups may be used in the early days of the study for exploratory purposes, to inform the development of the later stages of the study*" (Bloor, 2001, p.9).

Focus groups give researchers access to in-depth information arising from group members' interaction and comments, which facilitates the apprehension of new perspectives by the researcher that would be difficult or impossible for an individual to consider and to articulate in a traditional one-to-one interview (Marrelli, 2008); focus groups thus generate broader data.

3.6.2 Research questions

Research questions were derived from the purpose of the study. Questions were designed to capture suggested recommendations for the Jordanian Government to implement successful mobile government in Jordan, through suggesting solutions that tackle factors defined by the conceptual model. Primary research questions which reflect research goals were open-ended questions to prompt participants into discussion (Hartman, 2004). Therefore, this study answered the following research questions:

- What can the Government do to increase Jordanians' trust in mobile government and ensure Jordanians that their data is secure and their privacy is protected?
- What can the Government do in regard to the cost success factor to ensure that Jordanians will adopt mobile government?
- What is the best mobile payment system that will encourage Jordanians to adopt mobile government?
- What can the Government do to improve responsiveness in mobile government services?
- What can the Government do to increase accessibility of mobile government services?
- What can the Government do to increase availability of mobile government services?
- What should the Government include in the legal system to ensure that Jordanians adopt mobile government services?

- What should the Government do to increase awareness of mobile government?
- What should the Government do to educate Jordanians about mobile government?
- What should the Government do to improve compatibility and interoperability of mobile government applications?
- What should the Government do to improve reliability of mobile government services?
- What should the Government do to tackle the issue of mobile device limitations and usability in mobile government services?

3.6.3 Data collection methods

Data were collected using three focus groups.

3.6.4 Focus groups design

In this study, three focus groups were implemented. Therefore, the same open-ended questions were asked to all groups in order to get different views on how best to tackle mobile government success factors.

3.6.5 Groups composition

In this study, purposive sampling was implemented. The researcher defined the following three categories, since they all might have ideas and experiences in regard to mobile government success factors: experts and professionals of electronic government, mobile operators' employees and IT students. The research plan induced the choice of three focus groups, as the "*Number of focus group will inevitably reflect the research plan including which sub-groups you might want to target, which group views you want to compare*" (Bloor, 2001, p.28).

The researcher identified the specifications for participants based upon the criterion that they should have the suitable information and (more importantly) be willing and able to share such information (Hartman, 2004).The researcher used multiple sources (family members, friends and previous co-workers) for a nomination list to generate a pool of names. Five names were randomly selected for each focus group in order to minimise selection bias (Krueger and Casey, 2009).

Each group consisted of five participants (to allow all participants to fully participate, especially as there were many research questions to cover within 90 to 120 minutes). Furthermore, the topic discussed is still evolving, and many participants were experts and

would feel uncomfortable if they did not have sufficient time to express what they think is important (Morgan, 1995).

Each focus group was homogeneous in terms of participants' profession and past experiences in order to reduce inhibitions among strangers.

3.6.6 Procedure and ethical concerns

All focus groups were hosted by the researcher in his private home at a dining table with snacks and refreshments being distributed during the pre-session introductory talks. Furthermore, audio-recording equipment was provided along with a backup note taker.

Each focus group took approximately two hours to complete, with the researcher acting as the moderator for all groups. The researcher initialized the focus group discussions by introducing members to each other and introducing the purpose and objectives of the study. Furthermore, researcher clarified for participants the importance of their voluntary participation while distributing the predefined conceptual success factors model.

The researcher distributed statements of informed consent and promised confidentiality before starting group discussion by asking the predefined main research questions in the interview guide, and later introduced probing questions when needed. The interview guide was developed based on a general principle defined by Stewart, Shamdasani and Rook (2007), which suggests that questions should be ordered based on their importance to the research agenda. Therefore, the researcher started with research questions that tackle critical success factors and then moved to other questions that tackle high effect success factors.

3.6.7 Data analysis

Framework analysis method was used to analyse the focus groups data. In this research, the following framework analysis five steps were applied: familiarization, identifying a thematic framework, indexing, charting, mapping and interpretation (Ritchie and Spencer, 2002). Familiarisation phase is the initial phase in which the researcher becomes familiarised with the data collected and the key ideas. In this phase, the researcher becomes aware of emerging themes and makes note of them.

In the second phase, the researcher identifies and refines a thematic framework through logical thinking and considering the meaning and importance of the issues raised. In the indexing phase, the researcher identifies pieces of data that relate to themes.

In the fourth stage, the researcher lifts the previously indexed data and places it in charts. Mapping and interpretation is the final stage, involving the analysis of the data in the charts to meet the objective of the analysis. In this applied policy research and throughout the analysis process, the purpose is to guide the focus and lay the path for analysis (Krueger and Casey, 2009).

Framework analysis was chosen because it is suitable for studies that have specific questions, limited time frame, predetermined sample and a priori issues, such as generating recommendations, which is the purpose of this study (Srivastava and Thomson, 2009):

> If the aim of the research is to generate recommendations or outcomes within a limited time period in regards to a given policy or policy issues, with specific a priori issues which maybe in the form of subsidiary research questions and there is a predetermined sample population then framework analysis maybe the appropriate methodology. (p.77)

3.7 Research phase 5

In the previous research phase, the researcher conducted an applied policy research using focus group method. The outcome of research phase 4 was strategies that present a roadmap aiming to assist the Jordanian Government and other governments in tackling mobile government user-related success factors. Research phase 5 will validate these strategies through distributing a questionnaire presented in appendix 3.

3.7.1 Objectives

The aim of this research phase is to validate the proposed strategies and measure the extent to which users believe that the recommended policies will increase their adoption of mobile government in Jordan.

Research methodology

This study used a self-completion questionnaire as a data collection tool.

3.7.2 Questionnaire design

The questionnaire consisted of multiple choice questions to define age range, gender and educational level for comparison reasons, in addition to 51 Likert scale questions designed to assess the validity of the proposed strategies. In addition, open-ended

questions were also included to give participants the opportunity to provide any additional information.

3.7.3 Research and survey questions

In this research, the researcher identified the following major research question: Is the proposed user-centric M-Government framework valid? And the following Likert scale survey questions were judged to be suitable questions to enable the researcher to answer the major question:

Proposed strategies related to user acceptance success factor

1. Government should use simple technology when designing mobile government (M-Government) services.
2. Government should launch small-scale pilot applications prior to launching final applications and test these applications with a sample of end-users.
3. Mobile government applications should detect mobile default language defined by the user (English or Arabic) and display content in that language.
4. Government should conduct a survey to define users' needs and preferences for mobile government applications and services from both remote cities and remote areas.
5. Government should design applications and choosing delivery method based on users' feedback.

Proposed strategies related to security, privacy and trust success factors

6. Government should deploy an incentive program to change Jordanians' attitude towards electronic and mobile transactions. For example, encourage Jordanians to use their credit and debit cards electronically and via mobile devices.
7. Government should provide laws and regulations that tackle the issue of users' data security when transferring information or money through electronic and mobile devices and assure citizens that their data is secure.
8. Government should provide laws and regulations that tackle the issue of users' privacy to assure citizens that their data is protected and will not be sold to any other third party by either the government or the mobile operators.

9. All Government websites should have concise security and privacy policies since users tend not to read these long policies.

10. Government should launch an awareness campaign to ease people's concerns in relation to security, privacy and trust.

Proposed strategies related to cost success factor

11. Users should not pay for M-Government enquiry services.

12. Government should use mobile operators' existing infrastructure when implementing M-Government services in order to keep costs low.

13. Government should encourage mobile operators (MOs) to handle part of the cost of mobile government applications as part of their corporate social responsibility (CSR) campaigns.

14. Government should charge for customized and added value services only.

Proposed strategies related to usability and mobile device limitations success factors

15. Government should keep mobile government applications content short through prioritizing content and keeping only the most important content.

16. Mobile government applications and websites should have limited use of graphics.

17. Mobile government applications and websites should improve people's mobile experience.

18. Mobile government applications and websites should allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard.

19. Mobile government applications and websites should be tested in different mobile browsers and in mobile devices.

Proposed strategies related to availability of services, network and content success factors

20. Government should predefine all services that can be delivered through mobile applications.

21. Government should build the suitable content for all its potential mobile government services.

22. The Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and encourage mobile operators to cover them, especially if they are populated.

23. Government should coordinate the use of the Jordanian police network by mobile operators, since it covers all the unpopulated areas that are not covered by private mobile operators.

Proposed strategies related to accessibility success factor

24. Government should use a multi-channel service delivery approach such as providing its services through the following channels: SMS, mobile Internet (MI) and intelligent voice recognition (IVR).

25. Government should give people the choice between the two most common languages in Jordan (Arabic and English) to access services.

26. Government should build mobile applications with disabled people in mind, with accessible service provision in terms of alternative forms such as video and voice.

27. Government should have a mobile version websites for all its related entities.

28. Mobile version websites should have alternative texts for images in order to ensure that information is available for people who turn off images on their mobiles.

Proposed strategies related to mobile payment system success factor

29. The suitable mobile payment system for mobile government in Jordan is using tax-free phone credit.

30. Government should provide laws and regulations that tackle the issue of money back guarantee for mobile payments.

31. Government should launch an incentive campaign to encourage users to use mobile payment method.

Proposed strategies related to reliability and responsiveness success factor

32. Government should reengineer its process in order to ensure maximum reduction of time between submission time and response time to mobile government services.

33. Government should eliminate the intermediary between government and mobile operators and deal directly with mobile operators and users.

34. Government should adopt a tracking system for mobile government services and users should receive an acknowledgment SMS with a ticket number for tracking purposes.

Proposed strategies related to laws and regulations success factor

35. Government should introduce laws and regulations that regulate electronic and mobile data transfer between the following stakeholders: Government and users, businesses and users and users themselves.

36. Government should provide laws and regulations that tackle the issue of electronic and mobile crimes.

37. Government should provide laws and regulations that tackle the issue of electronic and mobile document in addition to electronic and mobile signature.

Proposed strategies related to awareness success factor

38. Government should use all traditional marketing tools (e.g. newspaper ads, TV promotion, radio etc.) to spread awareness of the M-Government portal in Jordan.

39. Government should send an SMS message to all users in Jordan introducing mobile government services and providing a link to the mobile portal that can be downloaded.

40. Government should include mobile government as an academic subject in Jordanian school and university programs to inform people of the benefits and uses of M-Government.

41. Government should use the existing knowledge stations that are distributed in many parts of the country to spread awareness about M-Government services.

42. Government should launch an incentive program to encourage citizens to use mobile government services.

Proposed strategies related to education success factor

43. Government should educate citizens in regards to mobile government benefits and uses through Ministry of Education (MOE) and knowledge stations.

44. Government should use the existing knowledge stations that are distributed in many parts of the country to conduct specialized training programs and workshops on the benefits of using mobile government services for local communities.

45. Government should educate its employees concerning the benefits of mobile government and the importance of user acceptance in implementing successful applications.

46. Government employees should be assured that mobile technologies will not lead to their replacement.

Proposed strategies related to compatibility and interoperability success factor

47. Government should design applications for universal access (e.g. by low-feature handsets).

48. Government should build its own compatibility and interoperability frameworks that should cover: different operation systems, languages, hardware and transmission protocols

49. Government should collect data on the existing devices with Jordanian users and use this data to build compatible applications.

50. Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then inform users by SMS.

51. Users should be able to download mobile government services application from a central Government website.

Survey questions targeted the suggested success polices to determine if Jordanian users will adopt M-Government based on these polices.

3.7.4 Sampling technique and sample size

Random sampling was implemented in the survey, which is based on probability theory, since the research is seeking to estimate a parameter from a sample of data that is transferable to a larger population (Bernard and Ryan, 2010). The sample included local citizens from six different cities to assess government efforts in promoting new service. The researcher chose an array of cities ranging from main cities to remote areas. This allowed the comparison attitudes between locals in the different regions. The questionnaire was completed by 120 citizens (20 citizens from each city).

The sampling technique used in the survey was multi-stage cluster sampling. In cluster sampling, the researcher starts the sampling process with sampling clusters first and then samples either further clusters or population units (Bryman, 2008; Walliman, 2011). In this

study, names of geographical locations such as the six cities were sampled first and then 20 participants were randomly sampled from each city, since true national random sampling is impossible (Davies, 2007).

3.7.5 Procedure and ethical concerns

The researcher visited the following six Jordanian cities: Amman, Zarqa, Irbid, Balqa, Karak and Mafraq. A self-administrated questionnaire was distributed to a random sample of twenty people willing to participate from each city. The questionnaire took approximately 20 minutes to complete.

The questionnaire was supplemented by a covering letter detailing the research subject and objectives. Furthermore, the letter highlights the importance of participants' voluntary participation and brings to the attention of participants their right to withdraw from the study without penalty. The researcher distributed research participant information sheet and ask participants to read and sign statements of informed consent after they agreed to complete the questionnaire.

3.7.6 Data analysis

In this study, SPSS for windows software was used to test reliability of the scale and obtained data on all variables through SPSS software in order to describe the sample. In addition to that, parametric statistical techniques were undertaken to validate the proposed strategies and acquire answers to the following questions:

- To what extent do Jordanian citizens believe that the recommended polices will increase mobile government adoption among users?
- Are there any differences between groups?

Parametric tests were chosen because they are more powerful than nonparametric tests and the following assumptions listed by Pallant (2010) for using these tests were proven:

- Level of measurement: measures used are continuous and not categorical.
- Random sampling: scores were obtained using a random sample.
- Independence of observations: none of the measurement is influenced by any other measurement.
- Normal distribution.

3.8 Ethical approval

The School of Information Systems, Computing and Mathematics research ethics committee reviewed the ethics of research undertaken in phases 1, 3, 4 and 5 and issued statements of ethical approval, which are presented in appendixes 1, 2 and 3.

3.9 Conclusion

This chapter has provided the rationale for selecting research methods and how the researcher implemented these methods in each research phase. Mixed-method approach was chosen based on a question-driven perspective. The data were collected using the following methods: questionnaires, semi-structured interviews and focus groups. Data were analysed by utilising the analysis methods of SPSS analysis, meta-analysis, thematic analysis and framework thematic analysis. The following chapter presents the findings from research phase 1, which was conducted using semi-structured interviews and questionnaires.

Chapter 4

Mobile Government in Jordan - Is It A Step in the Right Direction?

4.1 Overview

This chapter presents phase 1 of this research, which measures Jordanian citizens' awareness of launching mobile government (M-Government) portal in Jordan and their attitudes towards it. Furthermore, this phase captures the Government perspective in regard to launching the mobile government portal and citizens' awareness of that. Moreover, it identifies the main barriers of using mobile Internet and E-Government services in Jordan.

This chapter is structured as follows: Section 4.2 describes pilot study conducted to test the feasibility of phase 1 research design and methods, including the questionnaire and interview guide. Section 4.3 presents the main study research methods and results. Finally, section 4.4 summaries conclusions and recommendations.

4.2 Pilot study

A small-scale pilot study consisting of Jordanian student participants who are living in the UK was carried out prior to conducting research phase 1, in order to test the feasibility of the chosen research design and methods, including the questionnaire and interview guide. This pilot study was guided by the following three general pilot study objectives defined by Punch (2003):

- Questions and their instructions were tested for comprehension, clarity, ambiguity and difficulty.
- The questionnaire was tested for time to complete.
- The data collection process itself was tested (including ethical issues, covering letter, etc.).

4.2.1 Pilot study research methodology

A questionnaire with a covering letter and the interview questions was distributed to a small sample of Jordanians who live or study in the UK, since their characteristics are similar to those intended to complete the final questionnaire. This small group consisted of 8 people (5% of the final sample number). Participants were asked to fill in the

questionnaire. The researcher was present and observed participants' hesitation, skipped questions and time to complete the questionnaire.

After completing the questionnaire, the pilot participants were asked to answer the following questions:

- Were the instructions clear?
- Did you find any question as unclear?
- Was the layout attractive and clear?
- Please add any other comments:

The researcher altered the questionnaire after collecting and analysing the participants' comments and answers from the feedback form, and making observations while participants were filling in the questionnaire. The pilot study research methodology is illustrated below in figure 4.1:

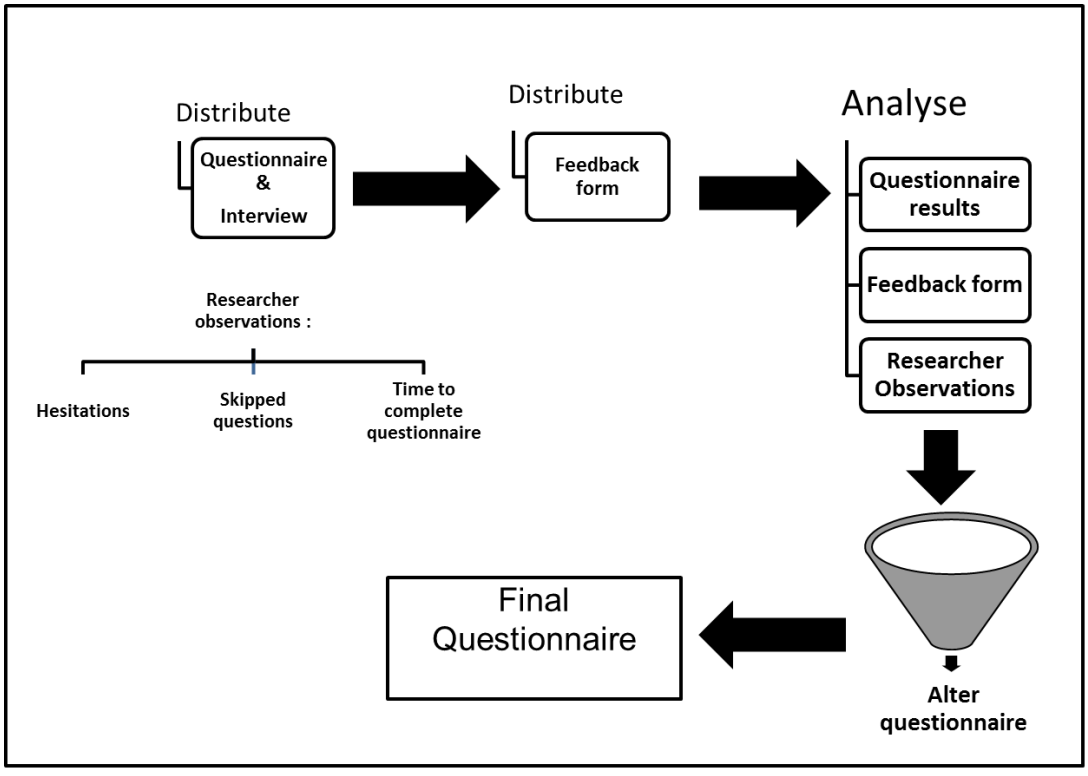


Figure 4.1: Pilot study research methodologies

4.2.2 Pilot study findings

The feedback responses showed that seven out of eight participants considered the instructions to be unclear and in need of improvement. However, participants said that the

questionnaire and interview questions are clear, and all participants agreed that the questionnaire layout is attractive and clear.

There were no specific comments on how to improve the clarity of the instructions except some participant's suggestions to alter cosmetic aspects (e.g. the use of different colouring and an alternate location for the instructions was suggested).

Researcher observations showed that there was no hesitation in answering questions and the question asking for participant name was the only one skipped by most participants. The average time to complete the questionnaire was approximately eight minutes, which was perceived as an acceptable time by the participants. It was observed that the navigation instructions were not noticed by most participants because they were at the end of the question, and most participants started answering the question without reading the navigation instructions.

After analysing the data collected from questionnaires, it was clear that the generated data was suitable for the purpose of measuring Jordanian awareness of electronic and mobile government and that it will also give in-depth information about people's awareness and attitudes towards mobile government.

Based on the pilot study findings, it was decided that the research methods were feasible and the following modifications were implemented to the data collection design:

- Delete the question asking for participant name.
- Change both the location and colour of the navigation instructions.

Table 4.1 lists an example of question before and after the modification:

Table 4.1: Example of question before and after the modification

Before modifications	After modifications
Do you have any experience of browsing internet through mobile device? If no please go to question 10. □ Yes □ No	Do you have any experience of browsing Internet through mobile device? □ Yes □ No (please go to question 10)

4.3 Main study

Following the pilot study, the main study was conducted in order to measure citizens' awareness of launching mobile government portal in Jordan and their knowledge of electronic government in general and mobile government in particular as an emerging phenomenon. Furthermore, this study also captured the Government perspective in regard to launching the mobile government portal and citizens' awareness of that.

4.3.1 Research methods

This study is part of an on-going research project to build a critical success factors model of mobile government from the users' perspective in Jordan and provide a roadmap to implement a user-centric M-government. Given that this area of research has not undertaken in Jordan before and there is only limited research available in the international context relating to this concept, the methodology approach the researcher propose to use is a mixed-method research.

In this study quantitative research was implemented through the distribution of a questionnaire by hand to measure Jordanian citizens' awareness of E-Government and M-Government services and mobile Internet usage. The qualitative research was implemented through conducting interviews with Jordanian officials involved in E-Government and M-Government programs. Research methods used to conduct this research phase are detailed in section 3.3.

4.3.2 Results

The next section presents the results obtained from research phase 1.

Sample description

The sample included 120 Jordanian citizens from six different cities. The demographic statistics indicated that more males (62.5%) than females (37.5%), and more individuals aged between 20-29 years (35%) participated. Furthermore, participants holding undergraduate educational degrees were dominant (47.5%). Breakdowns of the responses are listed below in tables 4.2, 4.3 and 4.4 to clarify the sample characteristics in the variables of gender, age range and educational level.

Table 4.2: Gender breakdown

Gender	Frequency	Percent	Cumulative Percent
Male	75	62.5	62.5
Female	45	37.5	100.0
Total	120	100.0	

Table 4.3: Age breakdown

Age range	Frequency	Percent	Cumulative Percent
Less than 20	8	6.7	6.7
20-29	42	35.0	41.7
30-39	24	20.0	61.7
40-49	20	16.7	78.3
50-59	20	16.7	95.0
60 and over	6	5.0	100.0
Total	120	100.0	

Table 4.4: Educational level breakdown

Educational level	Frequency	Percent	Cumulative Percent
Less than Secondary	20	16.7	16.7
Secondary	17	14.2	30.8
Intermediate Diploma	11	9.2	40.0
Under Graduate	57	47.5	87.5
Post Graduate	15	12.5	100.0
Total	120	100.0	

Electronic government awareness

The data shows that 37.5% of participants are aware of the existence of electronic government in Jordan and only 10.8% of participants had experience with electronic government services. Furthermore, the results indicates that none of the participants who are over the age of 60 were aware of electronic government, and most of the participants who tried the electronic government services rated the quality of the service as average compared to face to face services, as illustrated below in figure 4.2.

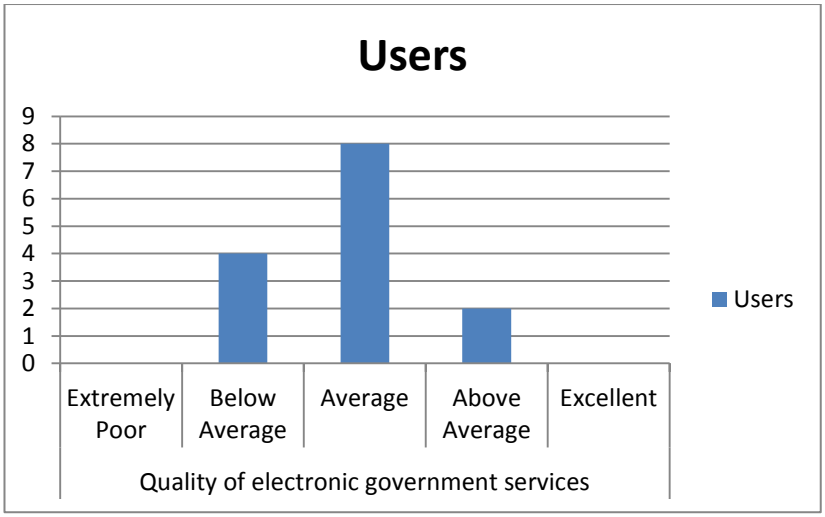


Figure 4.2: Quality of electronic government services

Overall, the survey demonstrates that the majority of participants did not use electronic government services even though they have existed for years. Most of the participants who were aware of the electronic government service expressed that they are aware of the existence of such services but they are unaware of their nature.

Qualitative data analysis: qualitative data were collected through open-ended questions from both survey and interviews were analysed through undertaking thematic analysis approach. Thematic analysis is one of the most common approaches to qualitative data analysis (Bryman, 2008), whereby one searches for themes or categories that emerge as being important to answering the research question. The themes emerge through careful reading and rereading of the data (Fereday and Muir-Cochrane, 2006).

In this study the search for 'repetitions' was the way in which themes were identified, an approach pointed out by Bryman (2008, p.598): "*A theme is more likely to be identified the more times the phenomenon it donates occurs in the course of coding"*. The frequency with which a theme or category occurs influences the elevation of some themes over others.

Thematic analysis was used to determine barriers for not using E-Government services. The main reasons (themes) given by the participants for not using these services are listed in figure 4.3:

- Lack of awareness of either the existence of these services or their type.
- Lack of Internet availability in their homes or work places.
- Lack of trust either of E-Government services or the government's ability in processing these services.
- The offered services were not needed.

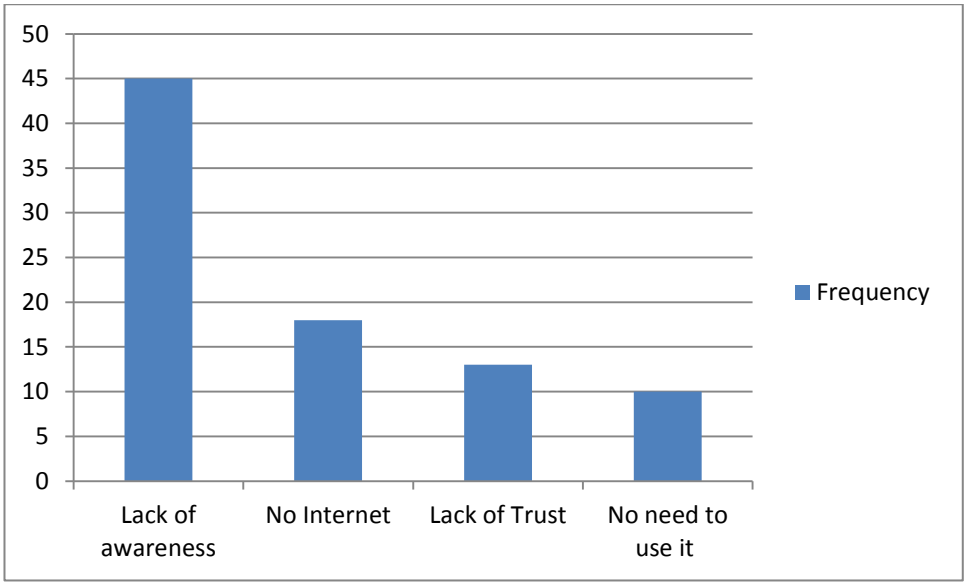


Figure 4.3: Barriers to not using E-Government services in Jordan

Mobile Internet usage

The data shows that 32.5% of participants have used the Internet through their mobile phones and most of the participants who used mobile Internet services described the quality of the service as average, as illustrated below in figure 4.4.

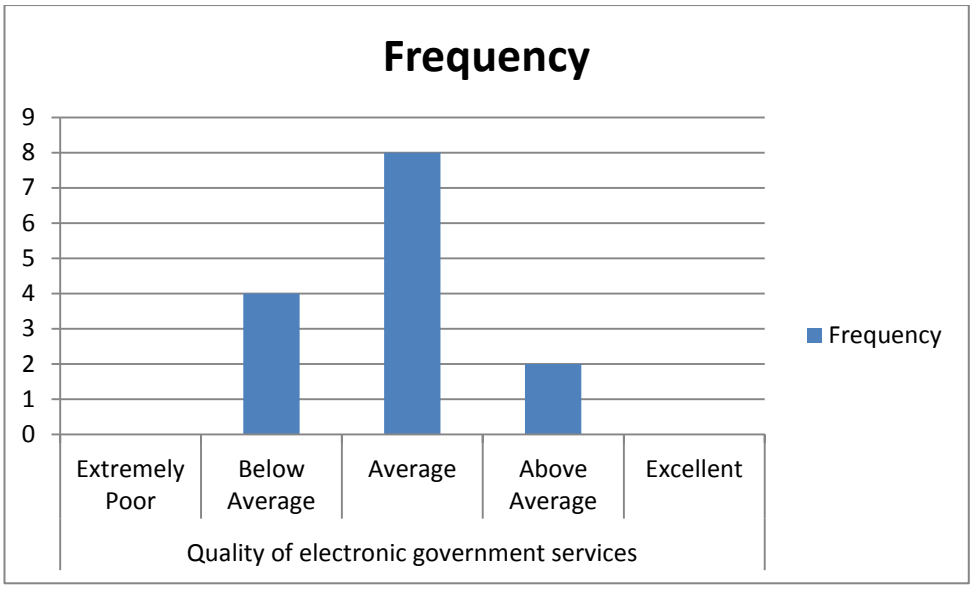


Figure 4.4: Mobile Internet quality of service

Thematic analysis was used to determine reasons for not having Internet experience. Participants who had no Internet experience gave many reasons, which emerged as themes through analysis; the following are the main reasons as illustrated below in figure 4.5:

- Some participants believed that they did not need to use it.
- Some participants stated that cost is the main reason for not using Internet through mobile devices.
- Other participants stated that usability issues are the main reason, such as small screen size.
- Other participants stated that their phones do not support the Internet.

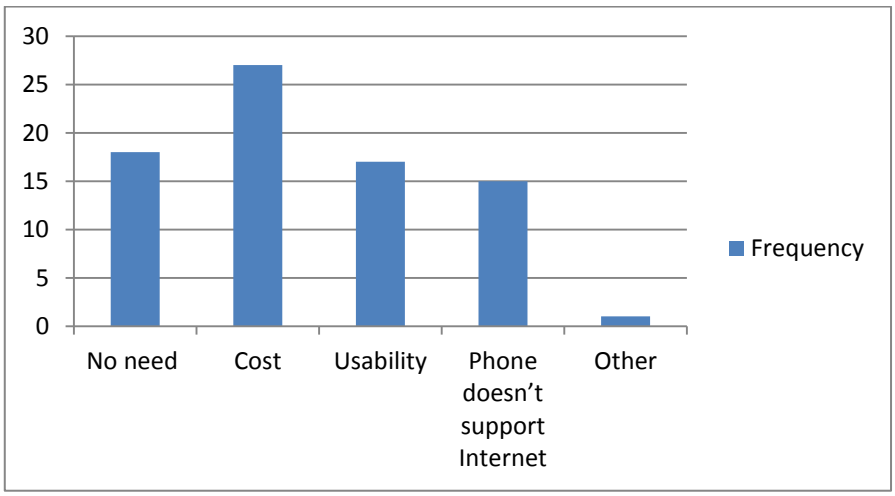


Figure 4.5: Reasons for not having mobile Internet experience

Mobile government portal awareness

The data shows that 90% of participants believe that M-Government services will have a better impact on the quality of information and services delivery channels than traditional E-Government . However, the data shows that 99.2% of participants are not aware of the existence of the mobile government portal in Jordan and none of them had used it, mainly because they were unaware of its existence.

. The results indicate clearly that Jordanians are willing to use mobile government services. Thematic analysis was used to justify participants' opinions and the following themes and categories emerged as participants' justification for their previous opinion, which are illustrated below in figure 4.6:

- Mobile government is a necessity and a solution in Jordan, especially for those who cannot obtain wired Internet access in remote areas.
- Participants believe that mobile government is more accessible and convenient than traditional electronic services.
- Participants believe that it is more affordable to get a mobile device than a PC and using mobile Internet access can be more affordable than getting wired access.

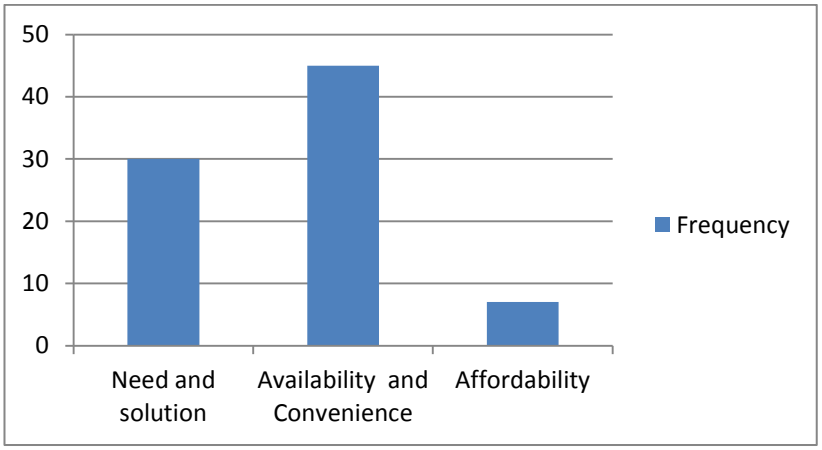


Figure 4.6: Why participants prefer mobile government

When comparing the reasons given by Jordanians who live in the main cities such as Amman, Irbid, Balqa and Zarqa with the reasons given by Jordanians who live in remote areas such as Mafraq and Karak, a significant difference is apparent in both groups' priorities. Figure 4.7 shows clearly how participants from remote areas focused on the need and solution aspect, whereas participants from main cities focused on the

convenience aspect, as the mobile portal represented one out of several available options for getting in contact with the Government.

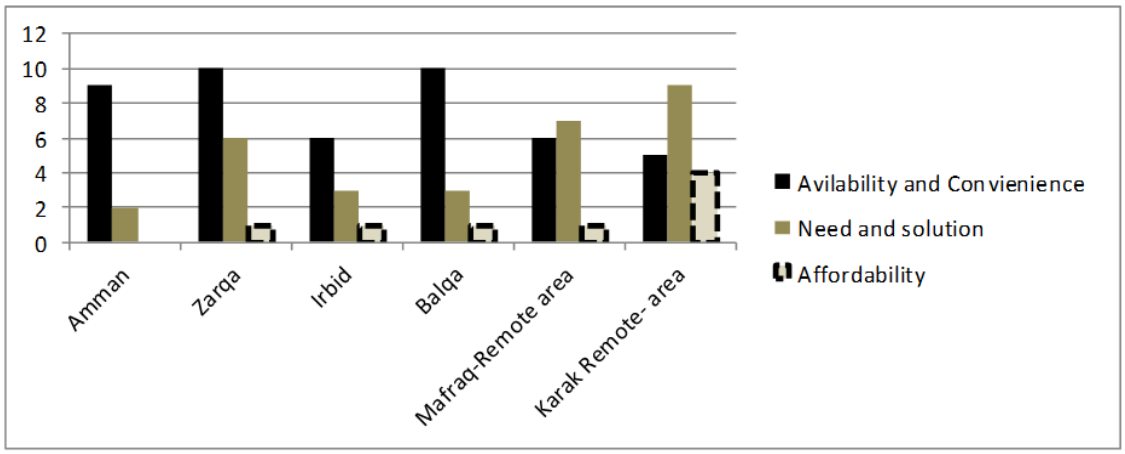


Figure 4.7: Priorities differences between main cities and remote areas

A minority of the participants (10%) do not believe that mobile government in Jordan could improve the service channel delivery and the quality of services more than the traditional electronic government. The following reasons were given to justify this.

Some participants indicated that they trust traditional electronic government more than mobile government. They believe that traditional electronic government services are more secure than mobile government services, because data is transferred over wireless networks in the latter medium.

Other participants believe that the issues of mobile Internet connection speed and reliability are the main reason for being in favour of electronic government services.

Many participants have privacy concerns and believe that the Government should assure citizens that their data is secure and protected and will not be sold for any other third party by either the Government or the mobile operators

Government perspective

When Government officials were asked about the factors that motivate the Jordanian Government to use mobile technology to deliver services, they stated that E-Government programs function to providing services to citizens through various communication channels. One of the most important channels is the SMS service. They also added that mobile phones are currently considered as a necessity, and a powerful form of communication.

They affirmed that in Jordan, mobile phones are the most available communication device. This is due to its affordability, accessibility and simplicity in its usage by the general public, regardless of their literacy level or geographic location. His Excellency the Secretary General for Ministry of Information and Communications Technology stated that "*Mobile phones are easy to use by citizens regardless of their literacy or geographic location*".

Government officials believe that ultimately, as the project objective is to improve communication channels between the Government and its citizens, the quality of Government services provided to citizens and businesses should have increased effectiveness, and that there should be greater accessibility to Government entities through mobile channels.

Government officials stated that promoting the launch of the E-Government mobile portal has been undertaken through various media channels and campaigns in cooperation with the operators, including:

- TV and radio.
- Promotional SMS to operator's subscribers.
- Promotional materials: newspaper ads, flyers, banners, etc.
- Online media (e.g. E-Government portal (jordan.gov.jo), facebook, and the operators' portals).
- Awareness sessions and workshops through knowledge stations.

Officials stated that they consequently rely on the infrastructure of the service providers in the private sector because the telecommunications sector is privatized. They also stated that due to high competitiveness, service providers are working continuously to improve their infrastructure.

When officials were asked if they thought that Jordanian citizens have the required mobile devices to use mobile government portal, they clarified that mobile portal application is built on an application which can be accessed and used by most phones. Additionally, they confirmed that only smart phones and phones without Java applications could not access the portal, an issue that will be resolved in due time. The Electronic Government Director stated that "Only smart phones and phones without Java application cannot access the mobile portal currently and this issue will be solved soon".

Government officials also added that citizens can access mobile services through the 94444 menu from all mobiles. Officials believe that Jordanian citizens are ready to use mobiles for serious matters such as receiving Government information and services,

because the services offered are important. Active services offered to the citizens include customs charges, taxes, traffic violations and enquiries.

Officials believe that Jordanian citizens' responsiveness to launching the new portal was low. They affirmed that the number of citizens who downloaded the mobile portal application on their mobile is continually increasing, but it has yet to meet their expectations.

The officials believe that the level of awareness of mobile government portal is significantly low and more awareness campaigns are needed, which is consistent with the results of the questionnaire. They added that number of citizens who have downloaded the application upon the launch of the portal was less than expected. The Mobile Government Project Coordinator stated that "*Less than 2000 citizens downloaded the application upon the launch of the portal which is not satisfactory but I'm expecting this number to increase as E-Government will be working on more awareness campaigns for this application*".

4.4 Conclusion and recommendations

One can assume that Jordanian level of awareness of electronic government in general and mobile government portal in particular is extremely low. Only 10.8% used electronic government services and no one used the mobile portal. Government officials are aware of the lack of awareness factor and through interviews they indicated that the mobile government team is working on more awareness campaigns for this application.

Government officials stated that a promotional campaign was conducted before launching the mobile portal through numerous media, including TV and radio, promotional SMS, newspaper ads, flyers and banners.

The awareness factor is one of the most critical success factors for electronic and mobile government. Raising awareness of new electronic and mobile government applications will stimulate citizens' adoption of these services, which will increase pressure on Government decision makers to provide new services and applications. Therefore, awareness will lead to continuous adoption and improvement of the offered services and applications, which forms a cycle as illustrated in the proposed awareness cycle in figure 4.8 (below).

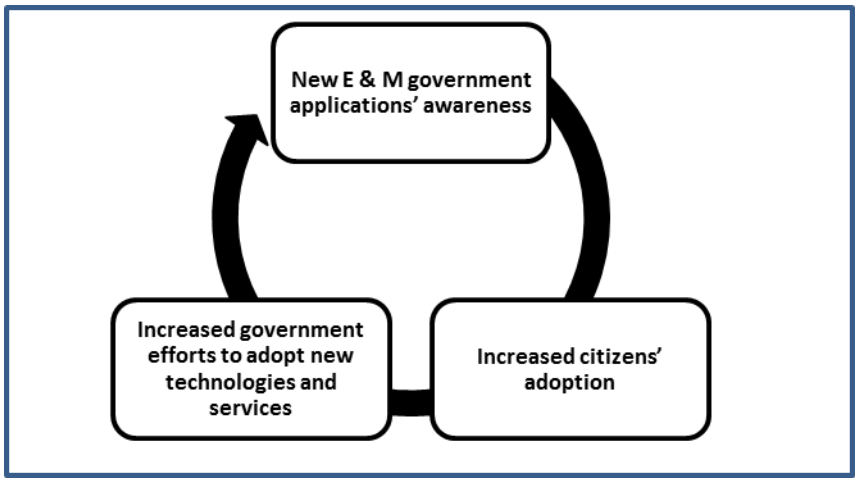


Figure 4.8: Awareness of electronic and mobile government cycle

The results also identified the barriers for using mobile Internet and electronic government services. Many participants were aware of electronic government services, but the following reasons were presented as inhibitors of usage: their lack of knowledge on the services offered, and an absence of trust in the Government ability to oversee these services and the security of the electronic services provided. This affirms the findings of Al-Jaghoub, Al-Yaseen and Al-Hourani (2010), who indicated that many Jordanians know about the existence of E-Government services but most of them are unaware of the nature of these services or how to use them.

However, the results clearly show that Jordanians have a generally positive attitude towards using mobile government for many reasons that vary in terms of priorities between participants of main cities and remote areas.

The results concluded a significant difference in priorities between Jordanians from the main cities and the remote areas. Jordanians from remote areas focused on the need and solution aspect, while for participants from the main cities, the convenience aspect headed their priority list. This issue was noted in many studies especially when comparing the need for mobile government in both developing and developed countries.

Zefferer (2011) compared M-Government in both developing and developed countries, which is similar to comparing main cities that have wired Internet in place and remote cities that have no access to wired Internet. The researcher concluded that mobile government in developed countries is representing one out of many opportunities to get in contact with government. Mobile government represents a solution for developing countries since these countries have many rural areas with no wired Internet.

Ghyasi and Kushchu (2004) argued that M-Government does more good to developing countries than to the developed world, but indicated that despite developed countries having extensive wired infrastructure in existence, mobile and wireless technologies can provide a new supplementary channel for outreach to citizens.

Jordanians from remote areas value this service, since wired Internet is not accessible to them, but with the introduction of the 3G and WIMAX technologies in Jordan, Jordanians stated that mobile government represents a solution to an existing problem. On the other hand, the Jordanian Government is well aware of that problem and Jordan invested in the mobile project with an objective of improving communication channels between the government and its citizens. In Jordan, the government deals with M-Government as a subset of traditional electronic government and a new channel of service delivery.

Jordanians raised concerns about trust, privacy and security, mobile usability and mobile Internet speed and reliability. These issues were concluded in many previous studies conducted internationally (Carroll, 2005; Mengistu, Zo and Rho, 2009; Salkute, Kolhe and Veedhi, 2011). For example, Al Thunibat, Zin and Sahari (2011) investigated the challenges for implementing mobile government in Malaysia, concluding that challenges facing mobile government in the country are trust, mobile usability, privacy protection and interoperability. The previous discussion shows that users from most countries share common concerns regarding implementing electronic and mobile government.

Many drivers have motivated Jordan to endorse mobile government from the Government perspective, particularly the high rate of mobile phone penetration, as mentioned by many previous studies (Kushchu and Kuscu, 2003; Sharma and Gupta, 2004; Gouscos, Drossos and Marias, 2005; Mengistu, Zo and Rho, 2009; Cho and Chun, 2010).

Another mobile government driver is the governmental need to increase the efficiency and effectiveness of service provision; this factor was indicated by Carroll (2005). Complementing existing E-Government applications was another factor found by Kushchu (2009). Finally, mobile phone's technology affordability is another driver identified by the Jordanian Government; this factor was mentioned in Mengistu, Zo and Rho (2009).

Many countries launched electronic and mobile government campaigns, especially in the Middle East, where the same circumstances exist. A very interesting awareness raising campaign took place in the UAE, which won the "Best Electronic Customer" promotional campaign; the Director General of the Dubai E-Government Directorate described the importance and objectives of the program, he stated:

"The importance of the 'Best Electronic Customer' raffles stems from it being a pioneering initiative designed to reward customers who have made ePayment their preferred mode of payment for government transactions, and also to promote eServices on a larger scale"
(Zawaya, 2011, para.3)

Governments all over the world have the responsibility to raise awareness of electronic and mobile government services and stimulate citizens' adoption. It is insufficient merely to launch awareness campaigns only; governments should educate citizens about the services offered and their benefits and more importantly provide incentives for using electronic and mobile government services, as illustrated in the case of the Dubai promotional campaign.

It seems clear from the evidence that Jordanians embrace a positive attitude towards mobile government, but they expressed many reservations with regard to electronic and mobile government implementation and adoption. In order to ensure a satisfactory experience for Jordanians who are willing to use mobile government services, a critical success factors model from the users' perspective should be built and a strategy to tackle these success factors should be identified and tested. Therefore, in the next chapter, research phase 2 will build a user-centric success factors model and research phase 3 will validate and refine that model.

CHAPTER 5

Building a User-Centric Success Factors Model For Mobile Government

5.1 Overview

This chapter illustrates research phases 2 and 3 and presents their findings. Research phase 2 is a systematic review of previous studies using a meta-analysis method in order to build an initial conceptual success factors model for mobile government to users services (G2C). Research phase 3 is a survey with 40 academics to validate the use of meta-analysis and validate and refine the conceptual model.

This chapter is structured as follows: Section 5.2 presents the research design employed in this chapter. Section 5.3 describes meta-analysis conducted to extract knowledge from previous related studies and create the initial success factors model. Section 5.4 presents the model validation research methods and results. Section 5.5 tests research hypotheses. Finally, section 5.6 summaries conclusions and recommendations.

5.2 Research Design

In this chapter, the researcher employed the qualitative and quantitative research methods of systematic review through meta-analysis and survey. There are two rationales for combining quantitative and qualitative research in this chapter (Bryman, 2008):

First, a systematic review using meta-analysis (qualitative) method was used before conducting questionnaire survey (quantitative) in order to inform the design of the survey questions.(Meta-analysis has identified many success factors for M-Government to citizens' services; which were the questionnaire variables in research phase 3)

Second, survey research (quantitative) has been used to test hypotheses generated by qualitative research, which is the systematic review described above.(Survey research was conducted to validate the initial success factors model which was concluded in meta-analysis which is undertaken in research phase 2)

Figure (5.1) below illustrates the research design for the two-phase research approach covered in this chapter which covers research phases 2 and 3.

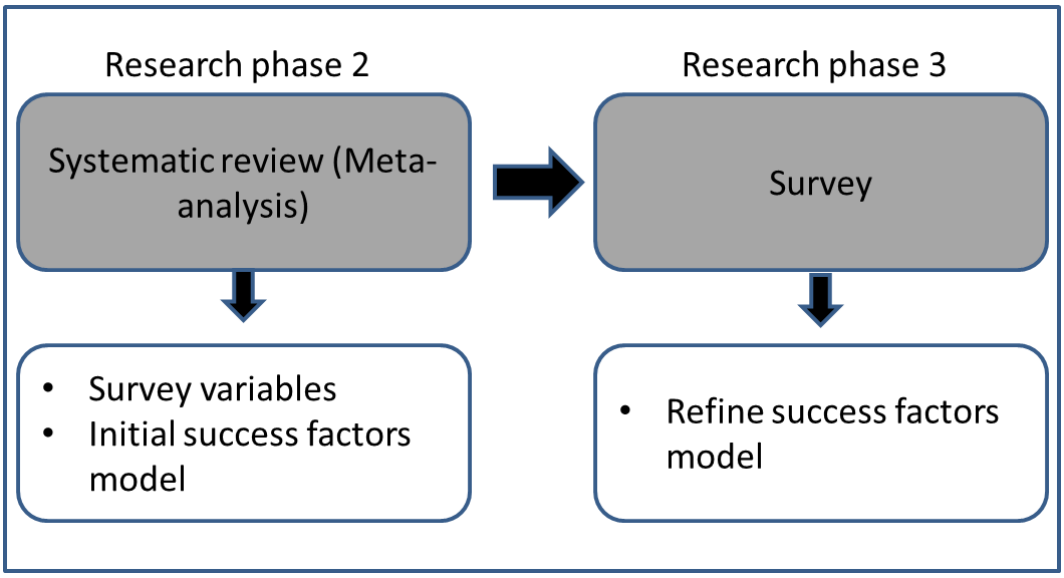


Figure 5.1 Research design for study 2

5.3 Meta-analysis

In this study, a meta-analysis method was used in order to extract knowledge from previous related studies. Research methods used to conduct this research phase are detailed in section 3.4.

This study has explored most of previously studies tell November 13th, 2011 that included success factors for the successful implementation of mobile government to citizens' services. Studies that were included are all available papers that included success factors for mobile government to citizens' services. These papers range from practice papers, research papers and reports, this diversity serves the objective of the meta-analysis which is identifying the broadest range of factors that will form the questionnaire variables.

Furthermore, in these papers researchers explored these factors from different perspectives, using different research methods and in different countries which also help achieving the meta-analysis objective. Systematic review identified all included success factors for mobile government implementations that relate to government to citizen services which formulate survey variables.

The systematic review identified 26 different papers based on the inclusion strategy. These papers show clearly that researchers use different research methods and sampling techniques to help define success factors for mobile government to citizen services as listed below in table 5.1:

Table 5.1: Previous studies included by the systematic review

Study	Title
Ghaysi and Kushchu (2004)	M-Government: Cases of developing countries
Antovski and Gusev (2005)	M-Government Framework
Sandy and McMillan (2005)	A Success Factors Model for M-Government
Carroll (2005)	Risky Business: Will citizens accept m-government in the long term?
El-Kiki and Lawrence (2006a)	Government as a Mobile Enterprise: Real-time, ubiquitous government
Maumbe and Owe (2006)	Bringing M-Government to South African Citizens: Policy framework, delivery challenges and opportunities
Kumar and Sinha (2007)	M-Government - Mobile technology for e-government
Capra, Francalanci and Marinoni (2008)	Soft Success Factors for M-Government
El-kiki (2007)	Mobile User Satisfaction and Usage Analysis Model of M-Government Services
Al-Khamayseh, Elaine and Zmijewska (2006)	Towards Citizen-Centric Mobile Government Services: A roadmap
Bataieneh and Jdaitawi (2008)	M-Government in Jordan: Today and the future
Abu-Samaha and Abdel Samad (2008)	The Prospects of Mobile Government in Jordan: An evaluation of different delivery platforms
Karan and Khoo (2008)	Mobile Diffusion and Development: Issues and challenges of m-government with India in perspective
Hellstrom (2008)	Mobile Phones for Good Governance: Challenges and way forward
Sheng and Trimi (2008)	M-Government: Technologies, applications and challenges
Vincent and Harris (2008)	Effective Use of Mobile Communications in E-Government: How do we reach the tipping point?
Mengistu, Zo and Rho (2009)	M-Government: Opportunities and challenges to deliver mobile government services in developing countries
Naqvi and AL-Shihi (2009)	M-Government Services Initiatives in Oman
Keoduangsine and Goodwin (2009)	User Satisfaction Model for Mobile E-Government Service
Al-Khamayseh and Lawrence (2010)	Mobile Government in Action at Local Councils: A case study
Misra (2011)	Make M-Government an Integral Part of E-Government: An agenda for action
Rannu, Saksing and Mahlakõiv (2011)	Mobile Government: 2010 and beyond
Al-Khamayseh and Lawrence (2011)	A Regional City Council M-Government Case Study: Success factors for acceptance and trust
Salkute, Kolhe and Veedhi (2011)	Implications of Mobile Communication Technologies (MCT) in M-Government: Challenges, technology and applications
GSMA Europe (2011)	M-Government: A new public space for European citizens
Thunibat, Zin and Sahari (2011)	Identifying User Requirements of Mobile Government Services in Malaysia Using Focus Group Method

5.3.3 Data Extraction

This section gives a brief description of each study and outlines the research methods used and the success factors defined in each study. From the previous literature we can clearly see that researchers used different research methods and sampling techniques in defining success factors for mobile government, as listed below in table 5.2.

Table 5.2: Previous success factors studies' comparison/ research methods

Authors	Research Method	Sample/sampling
Ghaysi and Kushchu (2004)	Case studies	A comparative analysis of mobile applications in Turkey, Czech Republic and Philippines
Antovski and Gusev (2005)	Mixed method (authors built a framework through literature review and then conducted electronic survey)	Survey: employees and students at the Institute of Informatics in Skopje, Macedonia
Carroll (2005)	Mixed-method research: focus groups, questionnaires, participant observation and interviews	Three groups: 16 year-olds, postgraduate IT students and IT professionals.
Sandy and McMillan (2005)	Review of available literature	Not applicable
Maumbe and Owe (2006)	Review of available literature	Not applicable
El-Kiki and Lawrence (2006b)	Review of available literature	Not applicable
Al-Khamayseh, Elaine and Zmijewska (2007)	Online survey	Global experts from researchers and industry experts
El-kiki (2007)	Web-based survey	Purposive sampling: university professors and teachers, wireless and mobile researchers
Kumar and Sinha (2007)	Literature review	Not applicable
Capra, Francalanci and Marinoni (2008)	Case studies	Two mobile government applications
Abu-Samaha and Abdel Samad (2008)	Mixed method research: questionnaire, interviews and focus groups	All government employees
Sheng and Trimi (2008)	Reviewing available literature and available mobile government applications	Not applicable
Hellstrom (2008)	Literature review and case studies	Mobile government applications in East African countries
Vincent and Harris (2008)	Case studies	Case Study 1: Push and Pull Text Messaging Services: UK Case Study 2: Internet Access to Government Authorities: Norway, Malaysia, UK Case Study 3: Communicating with Government by Telephone: UK,

Authors	Research Method	Sample/sampling
		USA Case Study 4: Interactive Mobile Bar Coding: Asia Pacific nations (Korea, Singapore and Japan)
Karan and Khoo (2008)	Literature review and a case study	India; authors studied the current Indian electronic and mobile government plans and initiatives
Bataieneh and Jdaitawi (2008)	Review of available literature and government websites	Not applicable
Keoduangsine and Goodwin (2009)	Questionnaire	Purposive sampling: users who have experience with mobile phones and mobile Internet service
Mengistu, Zo and Rho (2009)	International case studies	M-Government applications from Hong Kong, Singapore, Malta, Norway, Japan, Korea, Kenya, Rwanda, Uganda and Tanzania
Naqvi and AL-Shihi (2009)	Interviews were conducted with key personnel in several government organizations.	Purposive sampling: interviewees were chosen according to their job titles
Al-Khamayseh and Lawrence (2010)	Case study	Queensland City Council, Australia
Misra (2011)	Review of available literature	Not applicable
Rannu, Saksing and Mahlakõiv (2011)	Mixed method: telephone interviews and web-based questionnaires	Questionnaire participants were contacts of three Estonian enterprises: 1. Users of EMT m-services 2. Nonstationary selection of the users and non-users of m-services by Norstat Eesti AS 3. Nonstationary selection of the users of m-services by HeiVäl OÜ. 403 participants participated in the study. 150 (37.2%) of them were the users of m-services and 253 (62.8%) did not use m-services)
Al Thunibat, Zin and Sahari (2011)	Mixed method: questionnaire and focus groups	Random sampling for questionnaire and purposive sampling for focus groups
Al-Khamayseh and Lawrence (2011)	Case study	Queensland City Council, Australia
Salkute, Kolhe and Veedhi (2011)	Review of available literature	Not applicable
GSMA Europe(2011)	Report on GSMA Europe “Mobile Meeting Series” (17 March 2011)	Not applicable

The table above indicates that researchers have used a variety of methods to define the critical success factors. Figure 5.2 indicates that the two most used research methods to

define limitations and critical success factors for mobile government are reviewing the existing literature and the case study method.

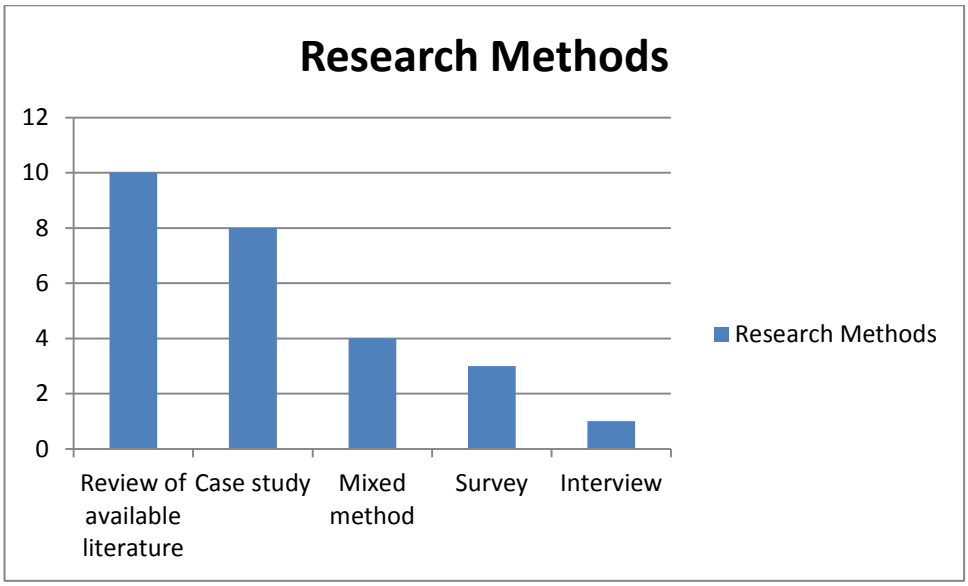


Figure 5.2: Comparison of research methods used in previous studies

Table 5.3 below shows all previous studies and their defined limitations or success factors.

Table 5.3: Previous success factors studies' comparison

Study	Mobile government success factors
Ghaysi and Kushchu (2004)	Citizens should be educated on the services and their benefits Required infrastructure and systems, M-Government applications should be developed based on the requirements of the citizens, user-friendly interface, privacy and security
Antovski and Gusev (2005)	Infrastructure development, mobile payments infrastructures, privacy and security, user-friendly, legal issues, compatibility and interoperability
Carroll (2005)	Availability, user convenience, mobile task simplicity, mobile traffic control, input and output mechanisms, privacy and security concerns
Sandy and McMillan (2005)	Cost, business re-engineering, education, acceptance, security and access
El-Kiki and Lawrence (2006b)	Values for Money group: pricing and content Quality of services group: seven factors - awareness, accessibility, availability, reliability, accuracy, responsiveness, courtesy and helpfulness Efficient transactions group: usability, timeliness, trust of e-commerce, privacy and security Strategic data group: accountability, transparency and usage

Study	Mobile government success factors
Maumbe and Owe (2006)	High access costs, accessibility, broad-based application of open source content to M-Government service, full-scale liberalization of telecommunications to allow new players in network provision, the absence of Best Practice Model to benchmark early M-Government initiatives, security and privacy
Al-Khamayseh, Elaine and Zmijewska (2006)	This study was based on Al-Khamayseh and Lawrence (2006). Success factors: privacy and security, infrastructure, user needs and preferences, quality and user-friendly applications, E-Government, Standards and data exchange protocols, M-Government framework, mobile penetration, infrastructure management, M-Government awareness, access, strategy, IT literacy, M-Government portal, partnership with private sector, legal issues, acceptance and cost
Kumar and Sinha (2007)	Privacy, security and accessibility
El-kiki (2007)	Organisational: lack of leadership, economic and financial issues, legal issues, vision issues Technical: interoperability, open-source, scalability and reliability Social: awareness, pricing, privacy, security, trust and usability Governance: accountability, transparency, openness, accessibility and participation
Capra, Francalanci and Marinoni (2008)	Decentralization for local mobile government diffusion, soft skills such as leaderships and communication, horizontal organizations and early involvement of people
Abu-Samaha and Abdel Samad (2008)	Security and privacy, lack of devices' maturity, bandwidth limitations, limited display capacity and data presentation
Bataieneh and Jdaitawi (2008)	Mobile device limitations, lack of standards for wireless applications, availability, cooperation between government and mobile network operators and the cost of the service for the citizen
Sheng and Trimi (2008)	Security and privacy, accessibility and application infrastructure
Vincent and Harris (2008)	Mobile device display, user input and other mobile device functionality issues
Karan and Khoo (2008)	Infrastructure investment, regulatory and political environment, awareness and acceptance, equitable access, security and privacy
Hellstrom (2008)	Existence of central M-Government portal, trust, privacy, cost, content production and update, usability issues and the limitations of mobile phones – small screens, short messages, complicated commands, interoperability issues between operators and roaming between countries, compatibility and a variety of platforms, mobile penetration and increasing accessibility, regulation and legal aspects of mobile applications
Keoduangsine and Goodwin (2009).	High mean ratings were given for awareness, accessibility, availability, responsiveness and privacy. On the other hand, law mean ratings were given for accuracy, reliability, trust and security

Study	Mobile government success factors
Mengistu, Zo and Rho (2009)	Privacy and security issues: people's readiness, solid legal frameworks for electronic services are not in place. Compatibility: no global standardization of content and the importance of interoperability across different government agencies. Mobile computers' limited power supply Low bandwidth and download speeds High cost of mobile Internet in some countries
Al-Khamayseh and Lawrence (2010)	Citizens' success factors: problem acknowledgment receipt, rapid response, increased trust and convenience, user needs and demands, low cost of service, network coverage, fast service delivery, staff productivity and volume of mobile usage
Misra (2011).	Mobile devices' small screen and limited space, in addition to issues of interoperability, usability and operation
Rannu, Saksing and Mahlakõiv (2011)	The physical limitations of mobile technology (small screen size, limited text input, etc), cost, mobile digital divide, Mobile mind-sets: mobile phones particularly are seen by many as tools for fun and entertainment more than for serious activities Privacy and security Responsibly managing exponential amounts of information and data Resistance to organizational change Lack of clarity around forward planning strategies Lack of mobile technology standards Existence of global accepted standards
Al Thunibat, Zin and Sahari (2011)	Security and privacy, mobile usability issues, access speed, quality of service, lack of personalization and high cost of mobile access and services
Al-Khamayseh and Lawrence (2011)	Citizens' success factors: broadband availability, mobile penetration and usage, easiness and readability of G2C services and G2C services to mimic real life process
Salkute, Kolhe and Veedhi (2011)	Security and privacy Accessibility Usability issues such as: small screens, small keypads, short battery life, limited computing power, input capabilities and limited graphical capabilities Application infrastructure issues because there are different platforms for wired and wireless Internet access
GSMA Europe (2011)	Services need to be designed around users' needs. Services need to be interoperable across the single market. Mobile broadband needs to be delivered to every region of the EU

Study	Mobile government success factors
Rannu, Saksing and Mahlakõiv (2011)	Physical limitations of mobile devices which will result into information amount's limitations Cost of implementing mobile applications Mobile digital divide since some parts of the public will not be able to use this technology such as older and poorer people Changing the mobile mind-sets since most people believe that mobile phones are mainly a tool made for fun more than for serious activities Overcoming privacy and security concerns Managing mobile data overload Government employees' resistance for organizational change Lack of clarity about future M-Government planning Lack of mobile technology standards Lack of global telecommunication standards

As can be seen from this review, researchers have defined many success factors for electronic and mobile government. It is evident that there are similarities and differences in their findings which is due to the fact that researchers explored these factors from different perspectives and in different countries.

5.3.4 User-centric success factors model

The research proposed a wide range of success factors with different importance levels. Frequency of the factors has been calculated based on the meaning of the words through undertaking a thematic analysis approach which is explained in section 3.5.7.Figure 5.3 illustrates the success factors and their frequency in the previous studies.

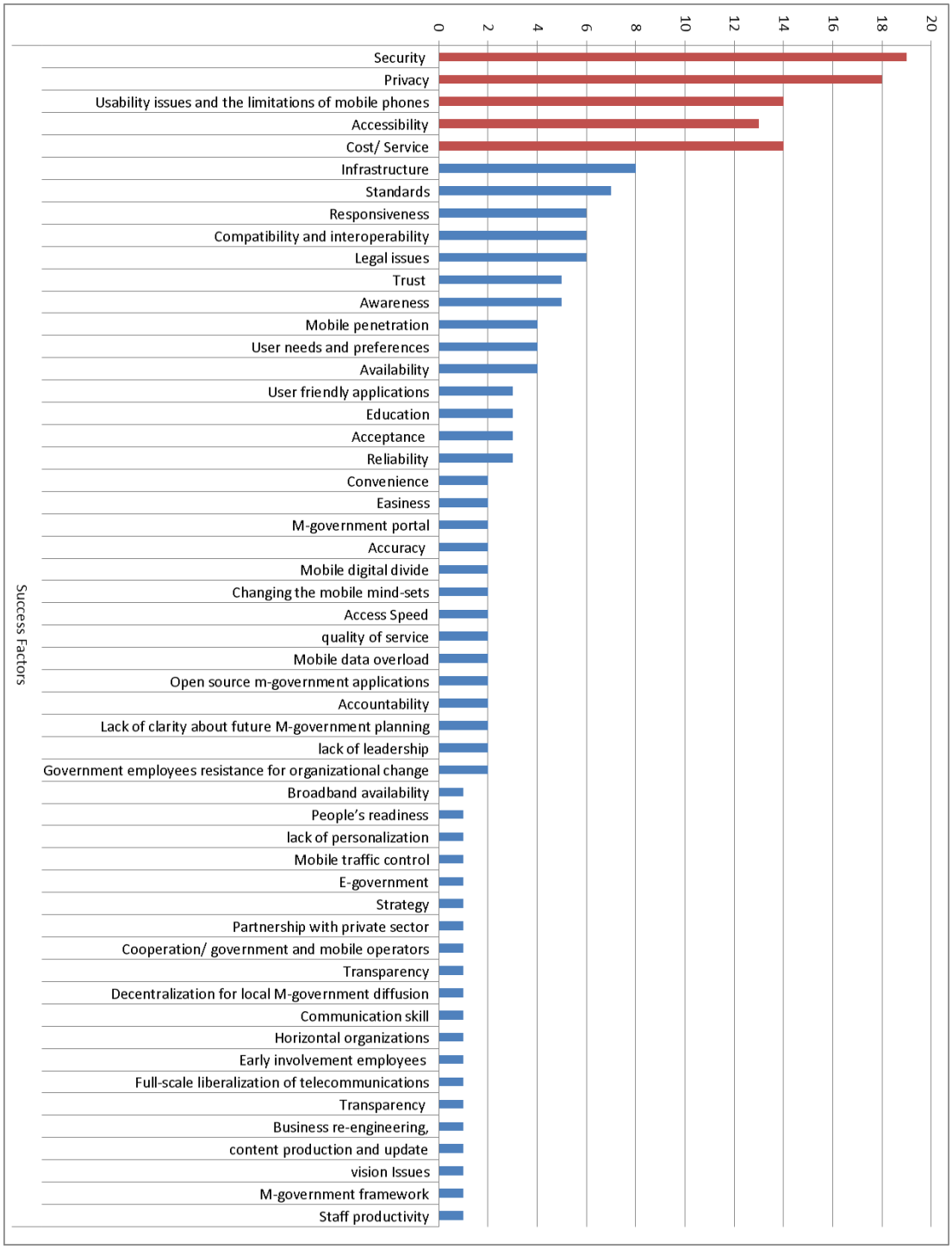


Figure 5.3: Success factors and their frequency

The proposed critical success factors model classifies success factors into three levels according to percentage of frequency on previous studies. Frequency percentage reflects the perceived importance of the factors which were tested using different methods, perspectives and countries. Therefore, the new model suggests that all factors that were included in equal or more than half of previous studies are critical to the success of mobile government uptake.

There are many factors that are related to quality of service such as accessibility, availability, reliability, accuracy, responsiveness of service. Therefore, in this research it was decided to focus on the factors that contribute to the quality of service rather than the quality of service itself.

All factors included in more that 50% of previous studies are considered to be critical success factors. Furthermore, all factors that were included in less than 50% and more than 10% of previous studies are considered to be high effect success factors, while those factors identified by less than 10% are considered to be low effect success factors, and all factors that were only mentioned in one study were eliminated. Therefore, the proposed effect levels are:

Critical success factors: security, privacy, cost, accessibility, usability and mobile device limitations scored the highest in the frequency test, and therefore they were considered as critical factors for the success of mobile G2C applications and services. Figure 5.4 illustrates the proposed success factor model.

High effect success factors: infrastructure, standards, responsiveness and interoperability, legal issues, trust, awareness, mobile penetration, user needs and preferences, availability, user-friendly applications, education, users' acceptance and reliability scored high right after the critical factors, and therefore they were considered high effect factors.

In addition to the previously mentioned factors, high effect success factors group includes many factors. The research proposes the following M-Government success factors model for G2C services illustrated in figure 5.4.

Low effect success factors: all other factors that were only mentioned in two studies or less were considered low effect factors. Based on the frequency percentages, the research proposes the following M-Government success factors model for G2C services illustrated in figure 5.4.

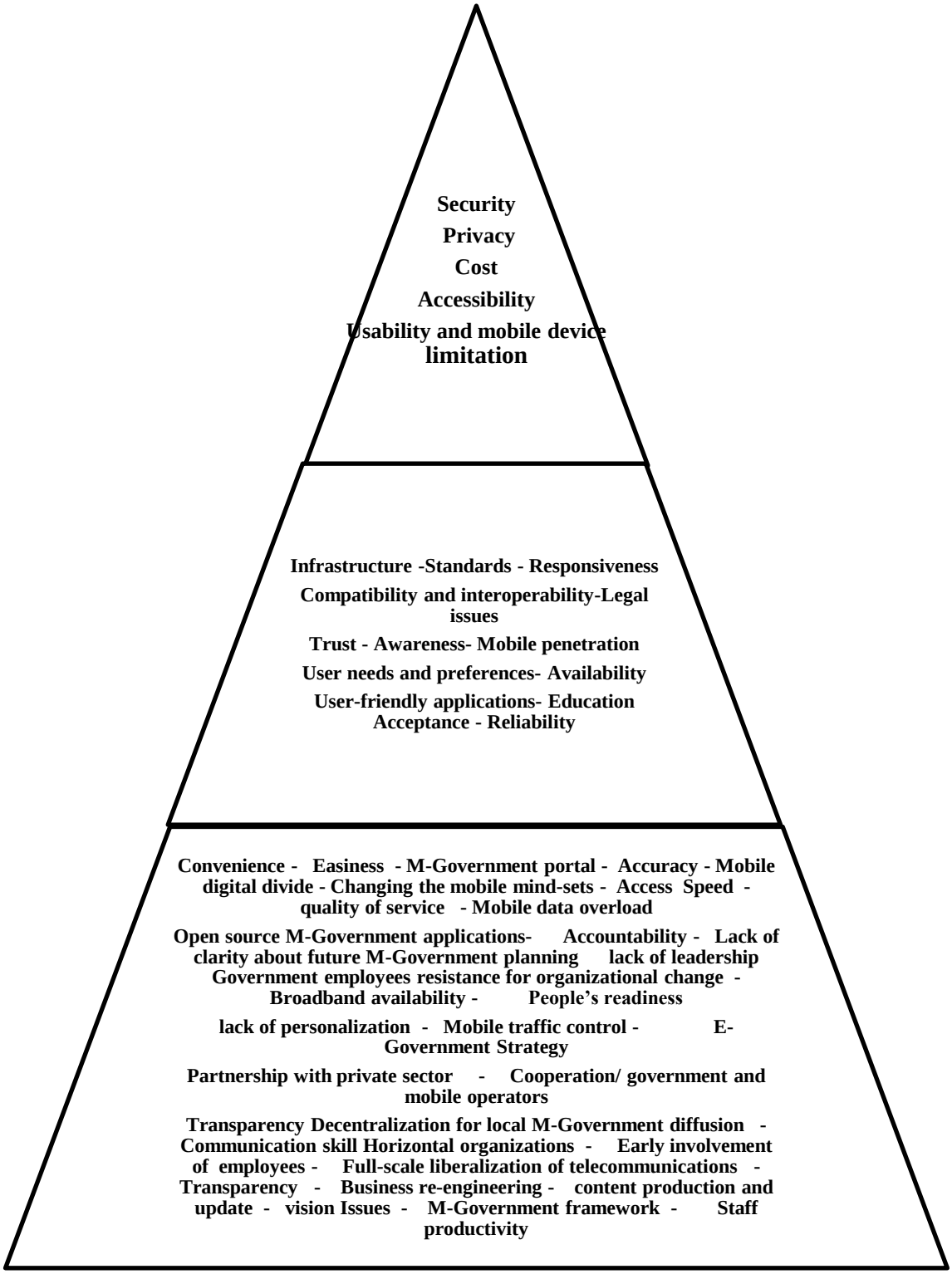


Figure 5.4: M-Government G2C Success factors model

The main objective of this thesis is to present a roadmap for implementing user-centric M-Government successfully, therefore the researcher proposes the following initial user-centric success factors model which is illustrated below in figure 5.5.The proposed model is based on the previous model presented in figure 5.4 but with a focus on success factors that relate to the user.

The remainder of this chapter explains meta-analysis findings in addition to the survey study and its findings.

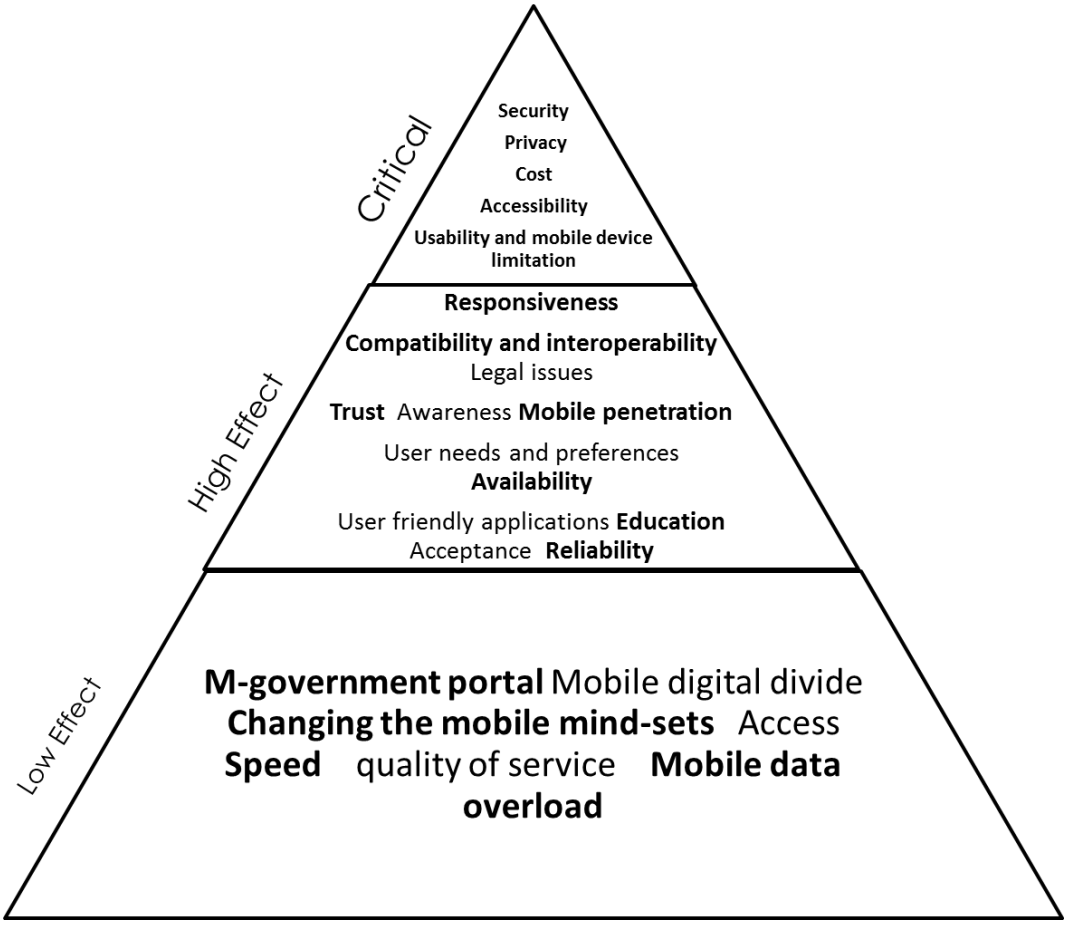


Figure 5.5: User-centric M-Government G2C success factors model

5.3.5 Meta-analysis findings

This study has explored most previously published studies related to the success factors for the successful implementation of M-Government services. This meta-analysis has indicated that researchers have used a variety of research methods and have identified a wide range of success factors. The analysis concluded that there were three groups of success factors that affect mobile G2C services: socio economic, technical and governance.

On the basis of this meta-analysis, a user-centric success factors model was also proposed. The model classifies success factors into three effect levels according to percentage of frequency on previous studies as follows: critical, high and low effect factors. This model is unique and contributes to the knowledge of mobile government by having a wide range of success factors grouped into different groups and ranked based on an effect level which was calculated according to factors frequency of occurrence in all

previous studies used in the meta-analysis. The model suggests that the more the success factor was included, the more it is likely to have a significant effect on the successful implementation of mobile government services.

5.4 Model validation

Research phase 3 was conducted to validate the initial success factors model which was concluded in meta-analysis, as demonstrated above in figure 5.4. In this study, the researcher validated the model through a questionnaire distributed to 40 Jordanian academic personnel. Essential modifications were carried out on the model to ensure its suitability for Jordan. Figure 5.6 illustrates the research process conducted in the survey study.

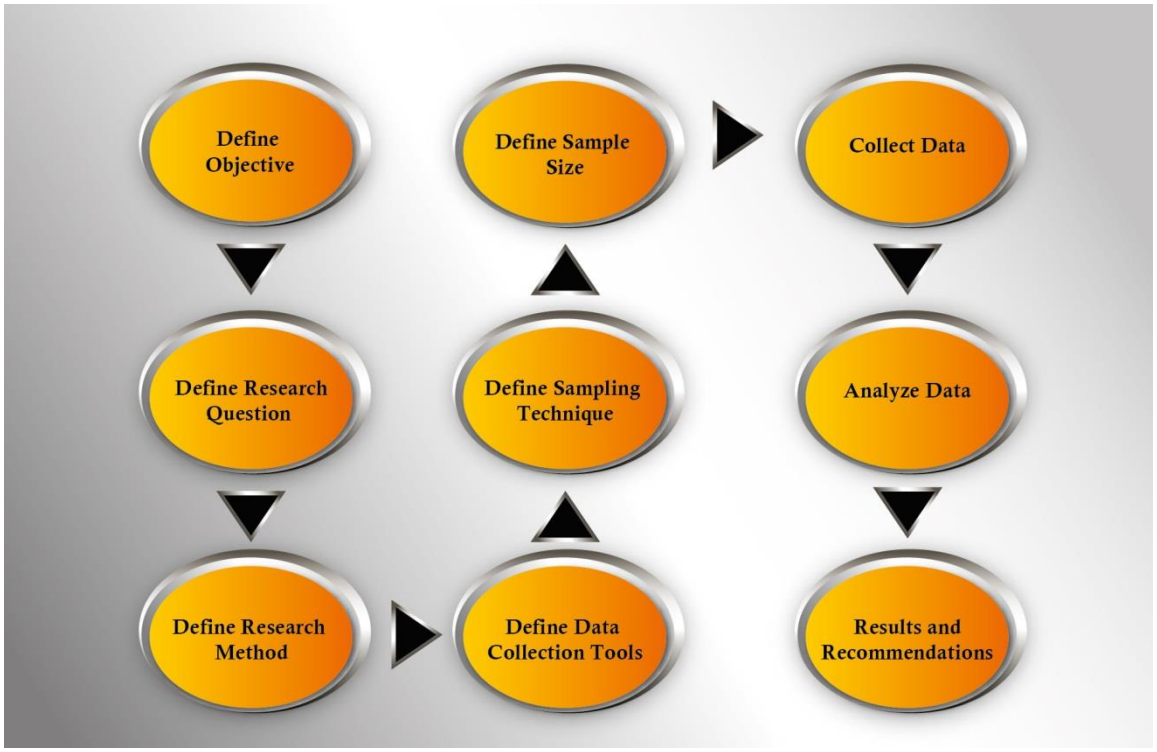


Figure 5.6: Research process for survey study

5.4.1 Pilot study

A small-scale pilot study was conducted on Jordanian PHD students reading MIS and IT in the UK. This study took place prior to conducting research phase 3, mainly to foresee the feasibility of the chosen research design and questionnaire method. The pilot study was guided by the following three general pilot study objectives as defined by Punch (2003):

- Questions and their instructions were tested for comprehension, clarity, ambiguity and difficulty.
- The questionnaire was tested for the duration of time to complete.
- Data collection process was tested to make sure that it covers ethical issues such as having covering letter and so on.

Pilot study research methodology

A questionnaire with a covering letter and interview questions were distributed to a small sample of Jordanian PHD students who are currently studying MIS- and IT-related fields in the UK, since their characteristics are similar to those of participants intended to complete the final questionnaire. The group consisted of 4 people (10% of the final sample number) who were requested to complete the questionnaire. The researcher observed participants' hesitation, omissions and the duration for the completion of the questionnaire.

Subsequently, participants were asked to answer the following questions:

- Were the instructions clear?
- Did you find any question unclear?
- Was the layout attractive and clear?
- Were there any other comments that the participant wanted to add?

The questionnaire was further modified after collecting and analysing the participants' comments and answers from the feedback form in addition to the researcher's observations while participants were filling the questionnaire.

Pilot study findings

The feedback responses showed that participants believed the instructions were clear. Participants further remarked that the questionnaire questions were comprehensible and all participants agreed that the questionnaire layout was attractive and simple.

Feedback from all the responses unanimously showed that participants agreed on the clarity of the instructions, simplicity of the questions and finally the attractiveness of the questionnaire layout.

Pilot participants proposed modifications to the questionnaire to be more suitable for the Jordanian context. Participants recommended the following alterations:

Mobile payment system is very important for the future of mobile government and mobile commerce in Jordan. Therefore, they suggested adding mobile payment system as a

success factor. They supported their argument by stating that E-payment is a big obstacle that currently faces electronic government in Jordan; therefore it should be a success factor for mobile government.

Participants believe that the researcher must shorten the list of factors by regrouping related factors. For example, because of their interrelatedness, they suggested adding availability of content to the availability variable.

The researcher's observations showed that all the participants did not hesitate while answering the questions, and no questions were omitted from the questionnaire. The average time required to complete the questionnaire was approximately twenty minutes; all participants unanimously perceived it as acceptable time.

After analysing the data collected from the questionnaires, it was clear that the generated data was suitable for the purpose of validating and refining the model.

Based on the pilot study findings, the researcher decided that the research methods were feasible and the suggested participants' alterations in regards to factors regrouping should be implemented to the questionnaire.

5.4.2 Main study

The questionnaire in the main study was altered based on the pilot study findings such as adding mobile payment system as a success factor and regrouping some related factors because of their interrelatedness. Research methods used to conduct this research phase are detailed in section 3.5.

Reliability and validity

The questionnaire used in this study was validated using a content validity approach based on the results of the meta-analysis of all previously studies that identified success factors for mobile government to citizens' services, which in turn formed the survey variables. Content validity refers to "*The adequacy with which a measure or a scale has sampled from the intended universe or domain of content*" (Pallant, 2010, p.7).

The results derived their reliability through using purposive sampling. Academics who validated the model and completed the questionnaire have the required knowledge in this subject. Therefore, informants have high reliability and competency which gives reliable and robust results.

"*Purposive sampling can provide reliable and robust data*" (Tongco, 2007, p.154)

Results

The next section presents the results obtained from the main study.

Sample description

The sample included 40 Jordanian academics in order to validate the research method used and the proposed conceptual success factors model. The demographic statistics indicate more male (72.5%) than female (27.5%) participants, as shown in the gender breakdown below (table 5.4).

Table 5.4: Gender breakdown/ research phase 3

	Frequency	Percent	Cumulative Percent
Male	29	72.5	72.5
Female	11	27.5	100.0
Total	40	100.0	

Data indicate that Individuals aged between 30-39 years were dominant among participants (52.5%), as illustrated in the age breakdown below in table 5.5.

Table 5.5: Age breakdown/ research phase 3

	Frequency	Percent	Cumulative Percent
20-29	3	7.5	7.5
30-39	21	52.5	60.0
40-49	11	27.5	87.5
More than 50	5	12.5	100.0
Total	40	100.0	

Research method validation

The data show that 82.5% of participants agree that research method used (Meta-analysis) is a valid research method and can conclude reliable results as illustrated below in table 5.6.

Table 5.6: Meta-analysis validation

	Frequency	Percent	Cumulative Percent
Agree	33	82.5	92.5
Neutral	7	17.5	100.0
Total	40	100.0	

Even though results demonstrate that the majority of participants agreed with using meta-analysis method, some academics believe that the suggested model could be more valid if the researcher tried to collect more data through a separate study, even if it was only a short survey. They also questioned the dates of the studies that were included in the analysis (some factors may no longer be valid from older studies).

There is general academic consensus that although this method is usually used in the medical field, it is appropriate to the evolving field of mobile government research. Therefore, building upon other researchers experiences is valid and the frequency of factors in other studies is a valid method (if all factors remain valid). They believe that the model which will be derived out of this survey can act as a general model and as a first step that have to be validated for each country by a sample that represents that particular country. They also suggest that users should be part of researcher next research to validate the current research results.

Model validation

The purpose of this study is to validate and refine the conceptual success factors model; therefore the research utilised the most used measure of central tendency which is the mean as a statistical model of the data. The mean was used because data are numerical and do not include extreme scores (Salkind, 2009).

The mean in this case reflects the average importance of each success factor. The research also calculated the standard deviation, which is the most common measure of variability in order to describe characteristics of distribution (Salkind, 2009). Through descriptive statistics, table 5.7 shows the mean and standard deviation for all variables.

Table 5.7: Factors mean and standard deviation/ research phase 3

Success factors	Importance Mean	Std. Deviation
Provision of user-friendly applications	4.88	.335
Mobile phone limitations	4.75	.439
Privacy	4.70	.464
Satisfying user needs and preferences	4.68	.474
Security	4.60	.496
Usability Issues	4.58	.501
Cost of service, mobile Internet, infrastructure and application	4.50	.506
Trust	4.48	.506
Availability of service and network	4.13	.563
Accessibility	3.87	.563
Reliability of services	3.85	.483
Legal issues	3.80	.564
Compatibility and interoperability	3.77	.577
Mobile payment system	3.73	.452
Awareness	3.65	.622
Educating users with mobile government usage and benefit	3.42	.549
Educating government employees with mobile government usage and benefits	3.33	.526
Responsiveness	3.13	.335
Mobile penetration	2.65	.533
Access speed	2.53	.506
Lack of personalisation	1.40	.496
Accountability	1.35	.483
M-Government portal	1.30	.464
Government employees resistance for organizational change	1.30	.464
Infrastructure	1.25	.439

Business re-engineering	1.25	.439
Decentralization for local mobile government diffusion	1.20	.405
Mobile digital divide	1.20	.405
M-Government standards	1.20	.405
M-Government framework	1.18	.385
Lack of clarity about future M-Government planning	1.15	.362
Changing the mobile mind-sets	1.10	.304
Lack of government vision	1.10	.304
Early involvement of employees	1.05	.221
Cooperation between government and mobile network operators	1.05	.221
Mobile traffic control	1.05	.221
Partnership with private sector	1.03	.158
Open source M-Government applications	1.03	.158

5.5 Hypotheses testing

This research used one sample T-test in SPSS software to test the research hypotheses. A one sample T-test is the most suitable test for hypotheses concerning the mean: "*If you want to test a hypothesis concerning a mean, you cannot go wrong if you use the one-sample T-test*" (Diamantopoulos and Schlegelmilch, 2000, p.161).

The one sample T-test tested the following two hypotheses:

Hypothesis One: High effect and critical factors from the initial model have importance mean that is bigger than the scale mean, which is 3.

Hypothesis Two: Low effect factors from the initial model have importance mean that is smaller than the scale mean, which is 3.

The one sample T-test computes the difference between the sample mean and a hypothesized value if the population mean is unknown (Diamantopoulos and Schlegelmilch, 2000), which is in this case 3, the mean of the scale from 1 to 5 (Foster, 2001).

The normality of the distribution of means for the sample as whole was assessed using Kolmogorov-Smirnov test. The test of normality results were .51 as illustrated below in table 5.8, which does not violate the assumption of normality since test value is more than .05 (Pallant, 2010).

Table 5.8: Test of normality

Tests of Normality

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Sample means	.139	40	.051	.970	40	.356

a. Lilliefors Significance Correction

The previous result is supported by an inspection of normal probability plots where the observed value of each score is plotted against the expected value from the normal distribution. Figure 5.7 shows a reasonably straight line which suggests a normal distribution (Pallant, 2010).

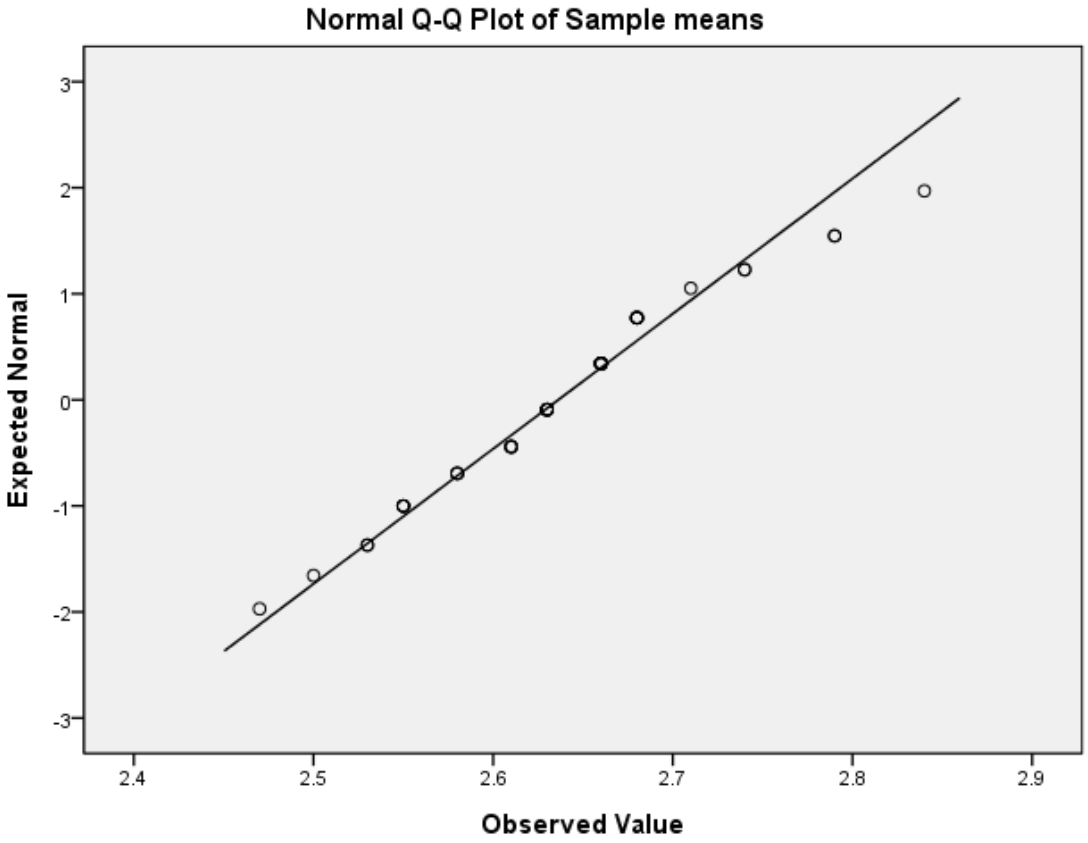


Figure 5.7: Inspection of normal probability plots

The research stated null and alternative hypotheses to test each one of the above research hypotheses. In order to test hypothesis one, the research stated the following hypotheses:

The null hypothesis (H0): mean is equal or less than scale mean, which can be written as H0: μ1 ≤ 3

Where:

H0 = the null hypothesis

μ1 = the mean of high effect and critical success factors importance

3 = the mean of the scale from 1-5

The alternative hypothesis for testing hypothesis one (H1): mean is bigger than the scale mean, which can be written as H1: μ1 > 3

In this research the significance level alpha is 0.05. The following table 5.9 lists the one sample T-test with a confidence interval for μ of 95%.

Table 5.9: Results of hypothesis one test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Critical and high effect factors mean	18	4.1044	.54976	.12958

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Critical and high effect factors mean	8.523	17	.000	1.10444	.8311	1.3778

The results showed that absolute value of the t statistics for critical and high effect variables is high and probability value is less than alpha: P > 0.05; therefore the null hypothesis Ho is rejected and the alternative hypothesis H1 is accepted, because the mean for the high effect and critical factors is more than 3 and T Sig. (0.000) Is less than (0.05), which strongly supports the initial model.

In order to test hypothesis two, the research stated the following hypotheses:

The null hypotheses (H0): mean is equal or more than scale mean, which can be written as H0: $\mu 1 \geq 3$

Where:

H0 = the null hypothesis

μ1 = the mean low effect success factors importance

3 = the mean of the scale from 1-5

The alternative hypothesis for testing hypothesis two (H1): mean is less than normal distribution mean, which can be written as H1: $\mu 1 < 3$

In this research the significance level alpha is 0.05. The following table 5.10 lists the one sample T-test with a confidence interval for μ of 95%.

Table 5.10: Results of hypothesis two test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Low effect factors mean	20	1.3175	.44847	.10028

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Low effect factors mean	-16.778	19	.000	-1.68250	-1.8924	-1.4726

The results showed that low effect factors mean is less than 3 and probability value is less than alpha: P > 0.05; therefore, the null hypothesis Ho is rejected and the alternative hypothesis H1 is accepted, because the mean for the low effect factors is less than 3 and T Sig. (0.000) is less than (0.05), which strongly supports the initial model.

Results showed that all high effect and critical factors scored more than 3, the average of the scale from 1 to 5. Therefore all these factors have a mean between 3 and 5. Thus 4 is the mean for the high effect and critical factors scale. In order to support this factors classification in the initial model, the following research hypotheses were tested:

Hypothesis three: critical factors from the initial model have importance mean that is equal or more than the high effect and critical factors scale mean, which is 4.

Hypothesis four: High effect factors from the initial model have importance mean that is less than the high effect and critical factors scale mean, which is 4.

The research stated two hypotheses null and alternative to test each one of the above research hypotheses. In order to test hypothesis three, the research stated the following hypotheses:

The null hypothesis (H0): each one of the critical factors means is less than high effect and critical scale mean, which can be written as H0: $\mu 1 < 4$

Where:

H0 = the null hypothesis

μ1 = the mean of critical success factors importance

4 = the mean of the scale from 3-5

The alternative hypothesis for testing hypothesis three (H1): each one of the critical factors means is equal or more than high effect and critical factors scale mean, which can be written as H1: μ1 ≥ 4.

In this research the significance level alpha is 0.05. The following table 5.11 lists the one sample T-test with a confidence interval for μ of 95%.

Table 5.11: Results of hypothesis three test

	Mean	Std. Deviation	Std. Error Mean
Security	4.60	.496	.078
Privacy	4.70	.464	.073
Cost of service, mobile Internet, infrastructure and application	4.50	.506	.080
Usability Issues	4.58	.501	.079
Mobile phone limitations	4.75	.439	.069
Accessibility	3.88	.563	.089

	Test Value = 4					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
	Lower	Upper	Lower	Upper	Lower	Upper
Security	7.649	39	.000	.600	.44	.76
Privacy	9.539	39	.000	.700	.55	.85
Cost of service, mobile Internet, infrastructure and application	6.245	39	.000	.500	.34	.66

Usability Issues	7.264	39	.000	.575	.41	.74
Mobile phone limitations	10.817	39	.000	.750	.61	.89
Accessibility	-1.403	39	.168	-.125	-.31	.06

The results showed that all absolute values of the t statistics for all for critical effect variables are high and all probability values are less than alpha: P > 0.05 except for accessibility; therefore the null hypothesis Ho is rejected for all critical factors except for accessibility, and the alternative hypothesis H1 is accepted for all critical factors except for accessibility. Previous results strongly support the initial model and propose minor modifications.

In order to test hypothesis four, the research stated the following hypotheses:

The null hypothesis (H0): each one of the high effect factors means is equal or more than high effect and critical factors scale mean, which can be written as H0: $\mu 1 \geq 4$

Where:

H0 = the null hypothesis

$\mu 1$ = the mean of high effect factors importance

4 = the mean of the scale from 3-5

The alternative hypothesis for testing hypothesis four (H1): each one of the high effect factors means is less than high effect and critical factors scale mean, which can be written as H1: $\mu 1 < 4$.

In this research the significance level alpha is 0.05. The following table 5.12 lists the one sample T-test with a confidence interval for μ of 95%.

The results also showed that all high effect factors means are less than 4 except for availability user friendly applications, satisfying user needs and preferences and trust, and all probability values are less than alpha: P > 0.05 except for availability and reliability; therefore the null hypothesis Ho is rejected and the alternative hypothesis H1 is accepted for all high effect variables except for availability and trust. Reliability stays as part of the high effect factors because t value is negative and factor mean is less than 4. Previous results strongly support the initial model and propose minor modifications.

Table 5.12: Results of hypothesis four test/ one sample T-test

	Mean	Std. Deviation	Std. Error Mean
Responsiveness	3.13	.335	.053
Provision of user-friendly applications	4.88	.335	.053
Satisfying user needs and preferences	4.68	.474	.075
Legal issues	3.80	.564	.089
Mobile payment system	3.73	.452	.071
Awareness	3.65	.622	.098
Availability of service and network	4.13	.563	.089
Trust	4.48	.506	.080
Educating government employees with mobile government usage and benefits	3.33	.526	.083
Educating users with mobile government usage and benefit	3.43	.549	.087
Reliability of services	3.85	.483	.076
Compatibility and interoperability	3.78	.577	.091

	Test Value = 4					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
	Lower	Upper	Lower	Upper	Lower	Upper
Responsiveness	-16.523	39	.000	-.875	-.98	-.77
Provision of user friendly applications	35.406	39	.000	1.875	1.77	1.98
Satisfying user needs and preferences	22.333	39	.000	1.675	1.52	1.83
Legal issues	-2.243	39	.031	-.200	-.38	-.02
Mobile payment system	-3.846	39	.000	-.275	-.42	-.13
Awareness	-3.557	39	.001	-.350	-.55	-.15
Availability of service and network	1.403	39	.168	.125	-.06	.31
Trust	5.940	39	.000	.475	.31	.64
Educating government employees with mobile government usage and benefits	-8.122	39	.000	-.675	-.84	-.51

Educating users with mobile government usage and benefit	-6.618	39	.000	-.575	-.75	-.40
Reliability of services	-1.964	39	.057	-.150	-.30	.00
Compatibility and interoperability	-2.467	39	.018	-.225	-.41	-.04

Results show that all previously defined high effect factors from the proposed model scored less than 4 in the importance rating except availability , user friendly applications, satisfying user needs and preferences and trust. Moreover, results indicate that all critical success factors except accessibility scored above 4 in the importance rating, as illustrated below in table 5.13.

Table 5.13: Importance ratings for critical and high effect factors

Success Factor	Importance Mean
Provision of user-friendly applications	4.88
Mobile phone limitations	4.75
Privacy	4.70
Satisfying user needs and preferences	4.68
Security	4.60
Usability Issues	4.58
Cost of service, mobile Internet, infrastructure and application	4.50
Trust	4.48
Availability of service and network	4.13
Accessibility	3.87
Reliability of services	3.85
Legal issues	3.80
Compatibility and interoperability	3.77
Mobile payment system	3.73
Awareness	3.65
Educating users with mobile government usage and benefit	3.42
Educating government employees with mobile government usage and benefits	3.33
Responsiveness	3.13

Academics stated that all factors are important and they rated variables from the user's perspective in Jordan, therefore many important governance factors scored low in the importance rating.

Academics believe that the researcher must shorten the list of factors by regrouping related factors. For example, because of their interrelatedness, they suggested regrouping some factors such as satisfying user needs and provision of user-friendly application to be included in user acceptance of technology factor since achieving them will achieve users' acceptance. Furthermore, they suggested regrouping educating user and educating government employees in one variable. Participants also suggested regrouping mobile usability issues and mobile phone limitations in one variable. Moreover, it was suggested that privacy, security and trust should be grouped in one variable.

5.6 Conclusion and recommendations

It seems clear from the evidence that the majority of academics agree that the use of meta-analysis research method is valid in this area of research. Results also indicated that the proposed model is valid. Furthermore, the research results also highlighted specific modifications to improve the model in order to fit the Jordanian context, such as:

- Mobile payment system was added as a high effect success factor.
- Availability of services, broadband and content was moved from the high effect factors to the critical factors.
- Trust factor was moved from the high effect factors to the critical factors to join the security and privacy group.
- User acceptance became a critical success factor which has the following two sub-categories: user-friendly applications and user needs and preferences, because both sub-factors will lead to user acceptance of service.
- The researcher regrouped educating user and educating government employees' factors in one variable.
- The researcher regrouped mobile usability issues and mobile phone limitations in one variable.
- Accessibility factor was moved from the critical success factors to the high effect success factors.
- All low effect success factors which scored below 3 in the importance rating were removed from the model and only high effect and critical success factors were kept.

The refined model includes the following success factors as illustrated below in figure 5.8:

Critical success factors

User acceptance

Satisfying user needs and preferences

Provision of user-friendly applications

Security, privacy and trust

Cost

Mobile device limitations and usability

Availability of services, broadband and content

High effect success factors

Mobile payment system

Accessibility

Awareness

Education

Educating mobile government employees with mobile government usage and benefits

Educating users with mobile government usage and benefits

Reliability

Legal issues

Mobile penetration

Figure 5.8: Refined user-centric mobile government success factors model

This model derived its uniqueness and reliability from the following research process, which is illustrated below in figure 5.9: first, systematic review was conducted for all previously published studies which included mobile government to citizens' services. Through conducting meta-analysis, the researcher built initial model through calculating frequency percentages which reflects the perceived importance of the factors that were tested using different methods, perspectives and countries.

The research validated and refined the initial model through MIS and IT academics who have the required knowledge in this subject area. Therefore, informants have high reliability and competency which gives reliable and robust results.

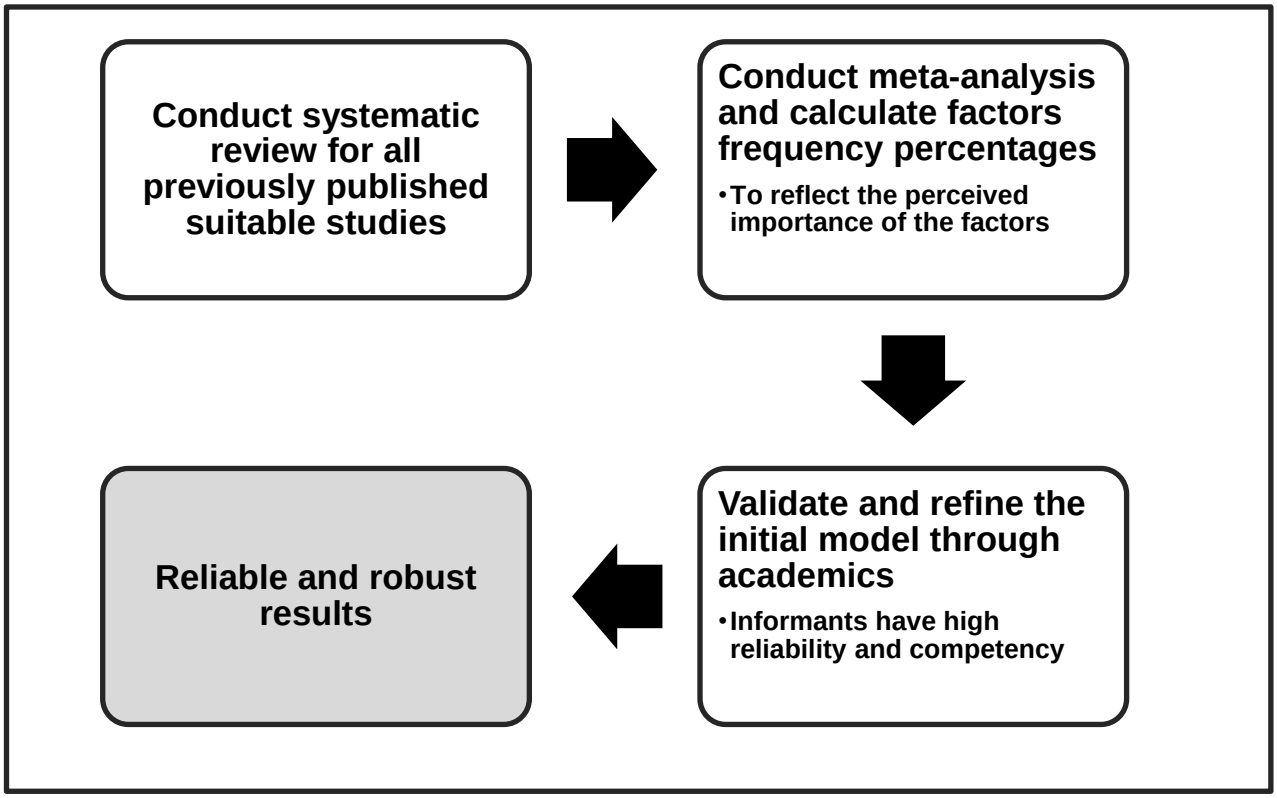


Figure 5.9: Research process

Overall, this model can serve as a general model that could help countries; especially developing countries that have same set of circumstances as Jordan to successfully implement user-centred M-government applications.

This study is part of an on-going research programme which seeks to present a practical roadmap to implement M-Government successfully and gain users' acceptance.

This study defined a user-centric M-Government success factors model. A strategy to tackle these important success factors should be identified. Therefore, in the next chapter,

research phase 4 defines practical strategies that tackle each success factor, and research phase 5 validates these strategies using ordinary citizens.

Chapter 6

Implementing Mobile Government in Jordan - Strategies for success

6.1 Overview

In the previous chapter, a general success factors model from the user's perspective was concluded through validating and refining a conceptual model which was a result of conducting a meta-analysis method.

This chapter illustrates research phases 4 and 5 and presents their findings. Research phase 4 is an applied policy research using focus groups method to develop strategies which will present an M-Government success framework.

Ritchie and Spencer (1994) defined four categories of applied policy research: contextual, diagnostic, evaluative and strategic. The goal of contextual research is to identify the existing nature. Diagnostic research examines reasons for an existing situation. Evaluative research evaluates the existing situation and strategic research identifies new theories, plans and polices. In this study, applied policy research is strategic. Figure 6.1 illustrates the research process which was conducted in research phase 4.

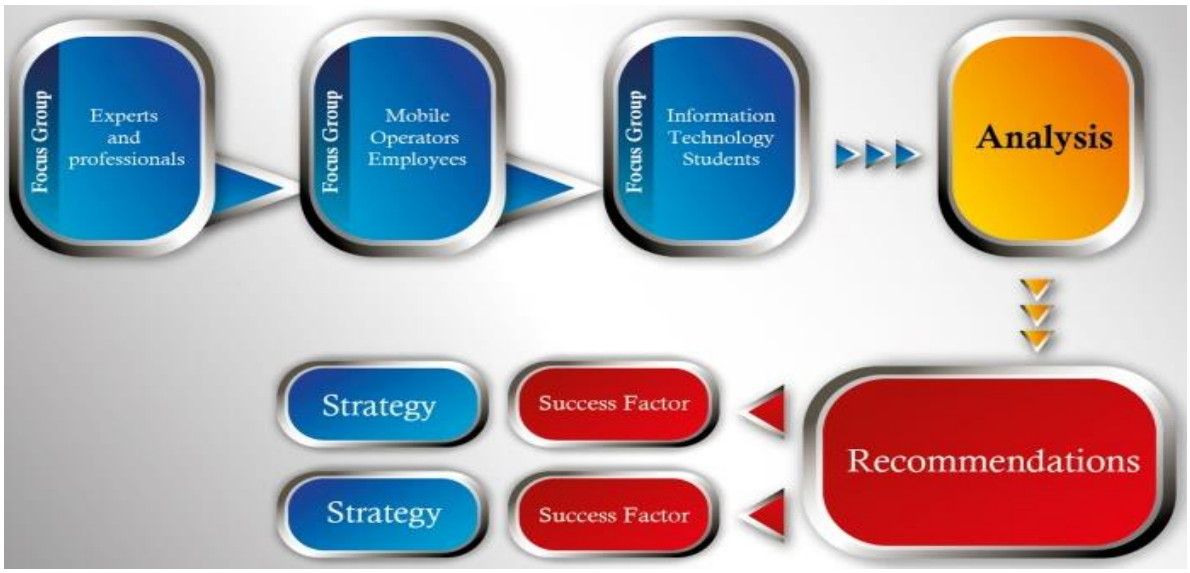


Figure 6.1: Research process for research phase 4

Research phase 5 is a survey that validates recommended polices and their effect on the end-users' acceptance of M-Government services. This chapter is structured as follows: Section 6.2 describes pilot study conducted to test the feasibility of the focus groups

procedures and questions. Section 6.3 presents the focus groups research methods and results. Section 6.4 presents the main study conducted to validate recommended polices. Furthermore, this section clarifies pilot test study, research methods and results for that main study. Section 6.5 tests research hypothesis. Finally, section 6.6 summarises the conclusions and recommendations.

6.2 Pilot study

A small-scale pilot study consisting of Jordanian PHD students who are living in the UK was carried out prior to conducting focus groups, in order to test the feasibility of the focus groups procedures and questions. Jordanian students were chosen because their characteristics are similar to participants' characteristics in the actual groups; "*When practical, it is highly desirable to carry out the pretesting with respondents who are representative of those who will participate in the actual focus groups*" (Stewart, Shamdasani and Rook, 2007,p.66).

6.2.1 Pilot study research methodology

A pilot focus group consisting of four people was conducted, moderated by the researcher. After conducting the focus group, the pilot participants were asked to answer the following questions:

- Did you find any question unclear?
- Was the seating arrangement comfortable?
- Do you think that group timing was adequate?
- Please add any other comments:

The researcher analysed participants' comments and answers from the feedback form. The pilot study research methodology is illustrated below in figure 6.2.

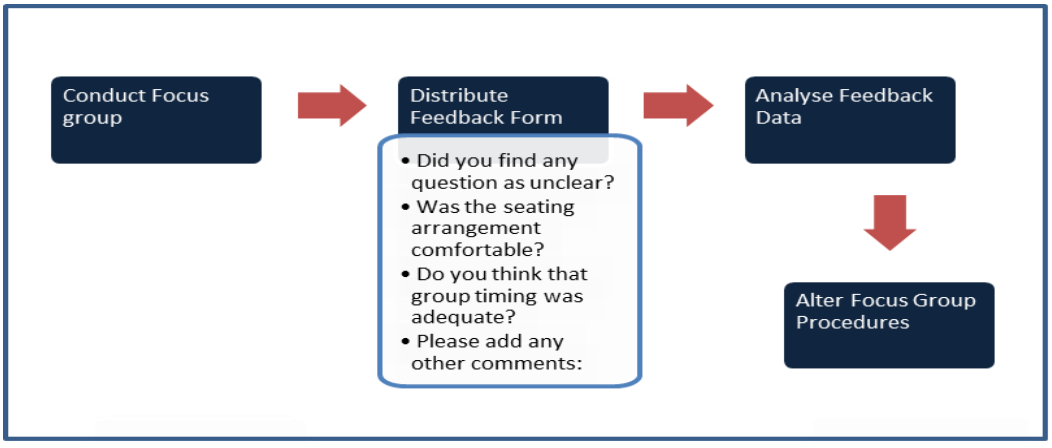


Figure 6.2: Pilot study research methodologies

6.2.2 Pilot study findings

The feedback responses showed that participants believe that questions were clear. Participants further said that 90 minutes was an adequate time for a small group and all participants agreed that the seating arrangement was comfortable.

Participants found focus group procedures were clear, and recommended the presence of a note-taker in case any group member disagreed with being audio-recorded. Some participants believe that in Jordanian culture, audio-recording is unwelcome. Furthermore, participants suggested providing stimulus materials such as the conceptual model illustrated earlier in figure 5.8 to encourage participants' elaboration.

After analysing the data collected from pilot focus group, it was clear that the focus group method will elicit data which will generate in-depth information about how to implement successful mobile government in Jordan.

Based on the pilot study findings, it was decided that the research method is feasible and no modifications were implemented to the data collection design except having a note-taker as a backup and adding stimulus materials.

6.3 Main study

Following the pilot study, the main study was conducted in order to recommend strategies that will help Jordanian Government implementing successful mobile government applications that will satisfy Jordanian users.

6.3.1 Research methods

This study is the initial phase of a large survey study to determine how the Jordanian Government can implement a successful mobile government initiative taking into consideration users' acceptance. The focus group method was chosen based on a question-driven perspective (O'Leary, 2009) and because the topic of tackling success factors related to users has not been explored yet: "*Focus groups may be used in the early days of the study for exploratory purposes, to inform the development of the later stages of the study*" (Bloor, 2001, p.9). Research questions were defined and focus group method was the most suitable method for answering research questions, as "*Methods need to fall from questions*" (O'Leary 2009, p.92). Focus groups provide the researcher with in-depth information, in addition to group members' interaction and comments which will lead to new perspectives that are difficult to be concluded by any individual alone (Marrelli, 2008).

Research questions

Research questions were derived from the purpose of the study. Questions were designed to capture suggested recommendations for the Jordanian Government to implement successful mobile government in Jordan, through suggesting solutions that tackle factors defined by the conceptual model. Primary research questions which reflect research goals were open-ended questions to prompt into discussion (Hartman, 2004). Therefore, this study answered the following research questions:

- What can the Government do to increase Jordanians' trust in mobile government and assure them that their data is secure and their privacy is protected?
- What can the Government do in regard to the cost success factor to ensure that Jordanians will adopt mobile government?
- What is the best mobile payment system that will encourage Jordanians to adopt mobile government?
- What can the Government do to improve responsiveness in mobile government services?
- What can the Government do to increase the accessibility of mobile government services?
- What can the Government do to increase the availability of mobile government services?
- What should the Government include in the legal system to ensure that Jordanians adopt mobile government services?
- What should the Government do to increase awareness of mobile government?
- What should the Government do to educate both Jordanian citizens and government employees of mobile government benefits and usage?
- What should the Government do to improve compatibility and interoperability of mobile government applications?
- What should the Government do to improve reliability of mobile government services?
- What should the Government do to tackle the issue of mobile device limitations and usability in mobile government services?

Data collection methods

Data were collected using three focus groups.

Focus groups design

In this study, three focus groups were implemented. Therefore, the same open-ended questions were asked to all groups in order to have different views on how to best tackle mobile government success factors.

Groups' composition

Purposive sampling was implemented. Participants' selection criterion was informed by the research overall goals, therefore, the researcher defined the following three categories since they all might have ideas and experiences in regards to mobile government success factors: experts and professionals of electronic government, mobile operators' employees and IT students. The number of focus groups "*Will inevitably reflect the research plan including which sub-groups you might want to target, which group views you want to compare*" (Bloor, 2001, p.28).

Three groups were chosen to produce valid results, to reach a point of saturation after which no new information is being generated, to find out if there are any differences between the different groups and make sure that all voices are heard. In this study focus groups were more structured because the moderator controlled the topics discussed and tried to get everyone to participate in the discussion equally (Morgan, 1996).

The researcher identified the specifications for participants based upon the criterion that they should have the suitable information and (more importantly) be willing and able to share such information (Hartman, 2004).The researcher used multiple sources for a nomination list to generate a pool of names. Five names were randomly selected for each focus group in order to minimise selection bias (Krueger and Casey, 2009).

Each group consisted of five participants, to allow all of them to fully participate, especially given the many research questions to be covered within 90 to 120 minutes. Furthermore, the topic discussed was still evolving, and many participants were experts and would feel uncomfortable if they did not have sufficient time in which to express their thoughts (Morgan, 1995). Each focus group was homogeneous in terms of participants' profession and past experiences in order to reduce inhibitions common among strangers.

Fifteen people participated in the three focus groups, of whom 27% were female and 73% were male. The focus group participants ranged in age from 18 to 59 years. Table 6.1 demonstrates these ranges.

Table 6.1: Focus groups/ participants' age range

Age range	Percentage
18 to 19 years	13.3
20 to 29 years	33.3
30 to 39 years	33.3
40 to 49 years	13.3
50 to 59 years	6.6
60 and above	0

Procedures and ethical concerns

All focus groups were hosted by the researcher in a private home at a dining table with snacks and refreshments being distributed during the precession introductory talks. Furthermore, audio-recording equipment was provided along with a backup note-taker.

Each focus group took approximately two hours to complete. The researcher initiated the focus groups by introducing members to each other and introducing the purpose and objectives of the study. Furthermore, the researcher clarified the importance of participants' voluntary contribution to the study and distributed the predefined conceptual success factors model.

The researcher distributed statements of informed consent and promised confidentiality before starting group discussion by asking the predefined main research questions in the interview guide and interfered later on with probe questions when needed. The interview guide was developed based on a general principle defined by Stewart, Shamdasani and Rook (2007), which suggests that questions in interview guide should be ordered based on their importance to the research agenda. Therefore, researcher started with research questions that tackle critical success factors and then moved to other questions that tackle high effect success factors.

Data analysis

Framework analysis method was used to analyse focus groups data. In this research, the following framework analysis five steps were applied: familiarization, identifying a thematic framework, indexing, charting, mapping and interpretation (Ritchie and Spencer 1994).

Familiarisation phase is the initial phase in which the researcher becomes familiarised with the data collected and the key ideas. In this phase, the researcher becomes aware of emerging themes and makes note of them.

In the second phase, the researcher identifies and refines a thematic framework through logical thinking and considering the meaning and importance of the raised issues. In the indexing phase, the researcher identifies pieces of data that relates to themes.

In the fourth stage, the researcher lifts the previously indexed data and places it in charts. Mapping and interpretation is the final stage, which involves the analysis of the data in the charts to meet the objective of the analysis. In this applied policy research and throughout the analysis process, the purpose was guiding the focus and laying the path for analysis (Krueger and Casey, 2009).

Framework analysis was chosen because it is suitable for studies that have specific questions, limited time frame, predetermined sample and a priori issues, such as generating recommendations which is the purpose of this study (Srivastava and Thomson, 2009, p.77): "*If the aim of the research is to generate recommendations or outcomes within a limited time period in regards to a given policy or policy issues, with specific a priori issues which maybe in the form of subsidiary research questions and there is a predetermined sample population then framework analysis maybe the appropriate methodology*".

6.3.2 Results

The section covers each success factor and the recommendations derived from focus groups analysis.

User acceptance

This factor consists of two sub-factors - user-friendly applications and users' needs and preferences - both of which will lead to user acceptance of M-Government services

- **User-friendly applications**

Results indicate that in order to build user-friendly applications, government should use simple technology, especially at the current stage, because the market retains old mobile devices and there are different educational levels among users. One participant stated that "*Currently market still have some simple mobile devices, therefore government should use simple technology*".

Results also show that launching small scale pilot applications prior to launching final applications is very important to ensure that applications are user-friendly. Furthermore,

these applications should be tested by a sample of end-users before final launch. One participant stated that the Government "*should test small scaled pilot applications before final launch to ensure that application is user-friendly, governments can conduct focus groups such as this one and test pilot applications*". A practical example of this is that of the City of Stockholm, which launched many small pilot applications to test applications and ensure their user-friendliness, which enabled the City to develop successful sustainable systems that satisfy end-users (Hallin and Lundevall, 2007).

Results also indicate that adding language detection ability to mobile government applications is considered to be an important signal of being a user-friendly application. Language detection ability means detecting the language which is used by the user's mobile phone to auto switch mobile government portal to that corresponding language, which is either English or Arabic in the case of Jordan.

- **Users' needs and preferences**

Results indicate that in order to ensure that mobile government applications satisfy users' needs and preferences, government should first define all services that can be delivered through mobile applications. As one participant stated: "*I think government should first ask all its departments to try to define all services that can be delivered through mobile applications and then conduct a survey with these services to define users' needs and preferences*".

In addition to that, the Government should collect users' needs and preferences from both main cities and remote areas in terms of preferred services and service provision method. The last step will be designing applications and choosing provision method based on users' feedback. As one participant stated: "*Government has to collect feedback from users on their needs and preferences and then design applications based on their feedback*".

It was clear from the evidence that increasing the level of personalization will increase user's acceptance, as a participant stated: "*Personalisation will increase users' adoption to mobile services especially with the rapid spread of smartphones in the market*".

Applying the previous recommendations will ensure user-friendly applications and satisfy users' needs and preferences, which will result in greater user acceptance of mobile government applications.

According to Peinel (2007), government to citizen electronic services are not fully successful because they are mainly created to satisfy demands of legislations and not citizens. Hallin and Lundevall (2007, p.27) supported this, observing that "*To start with people rather than with technology or with the organization, is an important prerequisite for success*".

Taking these perspectives into account, it is clear that there are some factors that should take place in the pre-design stage of M-Government applications: defining all potential mobile applicable services, collecting user needs and preferences, using simple technology and adding language detection ability to these applications. These factors should be implemented prior to designing applications. It is critical to launch small-scale pilot applications and test them before the final launch.

Security, trust and privacy

Results show that the cultural aspect is very important when it comes to security, privacy and trust success factors; therefore the Government should deploy an incentive program as a solution to change Jordanians' attitudes towards electronic and mobile transactions (e.g. to encourage Jordanians to use their credit and debit cards electronically and through mobile devices). One participant observed that the "*Government have to work hard on changing the attitude of not trusting electronic and mobile transactions*".

Hofstede's approach may be the most used approach to study the effects of culture. The uncertainty avoidance dimension of Hofsede's model indicates the extent to which a user feels uncomfortable in unstructured situations (Al-gahtani, Hubona and Wang, 2007), which may explain Jordanians avoidance to use their credit and debit cards electronically and through mobile devices, due to the collectivist and uncertainty avoidance culture characteristic of Arab countries (Hofstede, 1984). Many researchers examined the effect of culture on user acceptance of information technology and concluded that culture plays an important role in technology acceptance (Bandyopadhyay and Fraccastoro, 2007; Al-gahtani, Hubona and Wang, 2007), which supports this study's findings.

Participants believe that privacy concerns are greater currently with the rapid spread of location based services (LBS), even though they acknowledge the great opportunities that LBS provide for mobile government. Results also show that in order to increase trust in Government, legal systems that cover the regulation of the data security and privacy should be introduced especially if the service provided includes handling payments: "*I agree that we need legal systems that cover the regulation of the data security and privacy which will increase trust in Government*".

One of the main concerns is data security and protection. Therefore, it was recommended that laws and regulations should assure citizens that their data is secure and protected. One participant stated that "*Regulations should assure citizens that their data is secure and*

protected and will not be sold for any other third party by either the Government or the mobile operators".

It was also recommended that laws and regulations should regulate electronic and mobile data transfer between the following stakeholders (Government and users, businesses and users, mobile operators and users themselves): "*I believe that these regulations should clarify the responsibilities and the rights of each one of the involved stake holders*".

Results also recommend having concise security and privacy policies for all Government websites, since users tend not to read long-winded legalese. One participant commented that the Government must "*shorten the policies and provide the users with the information that satisfy their concerns only because we all agree that the main reason for not reading the policies is their length*".

Furthermore, results show that an awareness campaign should follow the previous steps to inform users with the changes and ease their concerns in regards to security, privacy and trust: "*In another way, you want to say that after implementing security measures and generating suitable laws, Government should inform users with the change*".

Participants believe that even if the Government implemented the best security and privacy measures, users would hesitate to use these services unless they were aware of their existence: "*Even if Government have the best security measures, users will not adopt their services if they didn't know that such measures exist*". Thus, an awareness campaign is needed to inform users of the occurring change and ease users' concerns.

Cost

Results show that participants believe that the current pricing of mobile government enquiry services is not suitable. Participants recommended that users should not pay for such services that are freely available via wired Internet, and if they have to pay, they should pay a token fee, since SMS cost is very low: "*Why should I pay for enquiry services that I can get for free through Internet?*"

Currently, the price of the final message is JD0.09, which seems irrational since Jordanians can get 9 minutes of calling at the same price (Bataineh, Abu-Shanab and Jdaitawi, 2005). Participants agreed that users will consent to pay for customized and added value services, and recommended that the Government should encourage MOs to assume part of the cost as part of their corporate social responsibility (CSR) obligations: "*I recommend offering enquiry services for free and charge only for added value customized services*".

Participants believe that successful mobile government will reduce the workload of Government employees, which will lead to more productivity and efficiency. Therefore, participants believe that there are intangible benefits for the Government as a result of adopting mobile government, which should be a justification for the Government to underwrite most or some of the cost: "*Not to forget that user adoption for M-Government services will decrease the workload on the government employees, which will lead to increased effectiveness. I believe that this is a justification for Government to handle part of the cost*".

Furthermore, participants recommended that the Government should "*Use the sophisticated existing ICT infrastructure of mobile operators in order to keep the investment cost minimal in future applications*".

Usability and mobile device limitations

Results show that the Government should use simple technology. Furthermore, results indicate that the following usability requirements be imposed on application designers when designing Government applications and mobile version websites:

- Keep content short through prioritizing content and keeping only the most important content.
- Use limited vertical scrolling and avoids horizontal scrolling.
- Limited use of graphics
- Minimal navigation at the top of the page
- Using a single column layout since space is limited
- Allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard to facilitate using portal while mobile.
- All other usability international standards such as the ones introduced by W3C.

One participant stated that "*There are rules of thumb when designing for mobile; keep it short, limited scrolling, limited use of graphics and minimal navigation at the top of the page*". Another added*:" Scrolling also should be in one side and only first level navigation should be in top of the page and if there are second level navigation links, then they should be added to the bottom of the page*".

Results also indicate that applications and websites should be tested in deferent mobile browsers and in mobile devices with some features disabled. One participant stated that "*Testing websites in deferent mobile browsers is even more critical than testing websites for desktop browsers, mobile browsers acts differently*". Another added: "*Testing should include testing mobile devices with some features disabled such as using the text only mode*".

Availability

Results indicate that, in order to ensure availability of service, the Government should define all potential mobile government services and build content. Furthermore, the Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and stimulate MOs to cover them, especially if they are populated, in order to ensure network availability.

Results indicate that since building towers in such areas will not be profitable for mobile operators, the Government should coordinate the use of the Jordanian police network, which covers all of the unpopulated areas not covered by private mobile operators to increase availability. One participant from the mobile operators' focus group stated that "*It's unprofitable for us as mobile operators to cover unpopulated areas, but it happened in the past that we rented police network that covers all of their stations which are covering all the unpopulated border areas in the desert*".

Accessibility

Results indicate that in order to maximize accessibility, the Government should use a multi-channel service delivery approach. It was suggested that the Government should provide its services through the channels of SMS, mobile Internet (MI) and intelligent voice recognition (IVR): "*Another interesting channel is intelligent voice recognition; it is good for visually impaired users and people on the move too*".

Germanakos, Samaras and Christodoulou (2007, p.296) argued that users nowadays expect a variety in service delivery methods from the public sector. Furthermore, they believed that service delivery channels are able to change users' view of a service: "*When a user has a free choice between different channels to access a service, they will choose the channel that realizes the highest relative value for them*".

Participants also recommended giving the choice between the two most common languages in Jordan (Arabic and English) to access services. Currently services are provided in Arabic, even though some services are intended for residents who may not speak Arabic: "*How come the mobile government portal provides services for non-citizen residents in Arabic? English language should be added at least in the non-citizen residents' related services. I guess this is a good example of not studying users' needs*".

Participants also recommended that the Government should build mobile applications with disabled people in mind, such as by providing services in alternative forms, such as video and voice for example. Furthermore, it was recommended that the Government should build mobile version websites for all its related entities.

Results also indicate that mobile version websites should be built from scratch and a link that goes to either version of the website should be added. Also participants recommended having alternative texts for images in order to ensure that information is available for people who turn off images in their mobiles: "*Many people turn off images in their mobile phones to speed download or lower bandwidth charges, therefore mobile websites should have alternative text for images to allow these people of getting the information or services they need*".

Mobile payment system

Results show that the best mobile payment system for mobile government in Jordan is using tax-free phone credit, since this is considered a safe method by Jordanians. Furthermore, participants insisted that an awareness and incentive campaign should be adopted by the Government to encourage users to use mobile payment method: "*Users shouldn't pay credits taxes for paying government services; a tax free credit should be used*".

Responsiveness

Results indicate that the Jordanian Government should reengineer its process by eliminating intermediaries in order to ensure maximum reduction of time between submission time and response time. Currently, the Government is using one company from the private sector as an intermediary between government and mobile operators. One participant stated that "*In this case, Government should study the process and try to reduce time between receiving enquiry and answering back*". Another participant observed that "*With the existence of intermediary, response time will be more*".

Results also indicate that in order to ensure responsiveness, the Government should adopt a tracking system and users should receive acknowledgment SMS immediately, with a ticket number for tracking purposes: "*Government should assure users that they got their request by sending acknowledgment SMS right away and should assure users that they can track that request*".

Legal aspect

Results indicate that the Government should regulate both electronic and mobile transactions in addition to mobile and electronic government services through providing laws and regulations that tackle the following issues:

- Users' data security: "*I think legislators should cover users' data security when transferring information or money through electronic and mobile devices*".

- Users' privacy: "*Also the laws should cover users' privacy when conducting electronic and mobile transaction and exchanging opinions with the government*".
- Money back guarantee for mobile payments.
- Electronic and mobile crimes.
- Electronic and mobile document in addition to electronic and mobile signature: "*Laws should cover mobile document and mobile signature*".

Reliability

Results indicate that government should do the following to ensure reliability of service:

- Follow a pilot test approach prior to launching any application.
- Eliminate intermediary of service and deal directly with mobile operators or contract two intermediaries: "*Currently there is an intermediary between government and mobile operators even though government can educated IT staff and handle this part without the need of intermediary, therefore government can have more control on the service and its quality*".

Participants also brought to attention the risk of relying on one intermediary. One participant queried "*What will happen if the intermediary suddenly went out of business for any reason, I'm sure the service will stop, therefore Government should have back up even for the intermediary*".

Awareness

Results indicate that a comprehensive campaign is a must since most Jordanians are not aware of the existence of mobile government services. One participant stated: "*I do not think that Jordanians are aware of this service existence*". Another commented: "*It's really important at this stage to use all available promotional tools to inform people*".

The Government should use all traditional marketing tools such as newspaper ads, TV promotion, radio etc. Furthermore, results indicated that the Government should take advantage of the high mobile penetration in Jordan and send SMS messages to all users in Jordan explaining this service and providing links for the mobile portal to be downloaded: "*Most Jordanians have mobile phones; Government should take advantage of that mobile penetration in promoting mobile government services through broadcasting a simple SMS to all users*".

Results indicate that the Government should include the subject of mobile government in Jordanian school and university programs. Furthermore, results indicate that the Government should utilise the existing knowledge stations that are distributed in many

parts of the country to spread awareness through specialized training programs and workshops for the local societies: "*Many governmental entities can help in that such as knowledge stations that cover many parts of Jordan through training citizens*".

Results also show the importance of having an incentives program to spread awareness. Many countries launched electronic and mobile government campaigns, especially in the Middle East, where the same circumstances exist. A very interesting awareness raising campaign took place in the UAE, as discussed previously, which rewards customers who have made electronic payment their preferred mode of payment for Government transactions (Zawaya, 2011).

Education

Results indicate that both citizens and government employees should be educated on mobile government.

- **Educating citizens**

Results indicate that Ministry of Education (MOE) and knowledge stations should be the responsible units for educating citizens. MOE was chosen due to the fact that each village in Jordan has school and each school has a computer lab, in addition to the fact that MOE has its own network that connects all schools: "*Ok, I know but the responsible entity should be existed in all locations even rural areas and should have the adequate infrastructure*". Another participant commented: "*Now each village in Jordan has school and each school has a computer lab therefore Ministry of Education (MOE) could be the best entity for education*".

Knowledge stations were chosen because they exist in many parts of Jordan and can plan training programs and workshops. Furthermore results indicate that teachers who will perform that should attend a workshop that will explain for them the message and the objective of the program which is educating citizens on how to use applications and their benefits. One participant stated that: "*Of course, teachers are capable, but they have to be trained first to deliver same message*".

- **Educating Government employees**

Results indicate that the Government should educate its employees in the benefits of mobile government and the importance of user acceptance in implementing successful applications. Furthermore, Government employees should be assured that mobile technologies will not lead to their replacement. One participant stated that: "*Most government employees will resist adopting such technologies unless they were assured that these technologies will not lead to their replacement*".

Compatibility and Interoperability

Results show that government should design applications for universal low features handsets and build its own compatibility and interoperability frameworks. One participant stated: "*Usually countries develop their own compatibility and interoperability frameworks that should cover different operating systems, hardware and language".*

The Government should collect data on the existing devices with Jordanian users, and based on that they should build its own frameworks that should cover the following aspects: different operating systems, languages, hardware and transmission protocols.

Results also show that the Government should follow one of the following options to bypass the different operating systems issue: firstly, they can develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then inform users through SMS: "*Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores, such as Apple, Android, Blackberry and Nokia stores. Users can be informed through SMS*".

Secondly, the Government can publish all applications through a website and users can download the suitable application for their mobile device. Furthermore, the Government can develop web-based applications which allow all people with Internet access to get the service, regardless of their mobile operating system: "*In order to bypass the different operating systems issue, Government can develop a web-based application*".

It was also recommended that the Government can use one or more of the previous suggestions based on available financial resources.

A user-centric M-Government success framework

Taking focus groups results into account, the researcher created an M-Government user-centric success framework to assist Jordanian Government and other governments that have similar characteristics in implementing successful mobile government. The proposed framework shows all success factors included on the proposed success factors model and recommended strategies to tackle each factor, as illustrated below in table 6.2.

Table 6.2: Success factors and their proposed strategies

Factor	Cost
Strategies	Free enquiry services
	Charge for customized services only
	Mobile operators to handle part of the cost as part of their CSR campaigns.
Factor	Security, trust and privacy
Strategies	Incentive program to change culture
	Provision of suitable legal systems
	Concise security and privacy policies in all Government websites
Factor	Mobile payment system
Strategies	Tax-free phone credit
	Awareness and incentive campaign
Factor	Responsiveness
Strategies	Eliminating intermediary
	Tracking system
	Acknowledgment SMS with a ticket number
Factor	User Acceptance
Strategies	User's friendly applications
	- Use simple technology
	- Launch small scale pilot applications first
	- Language detection ability
	User needs and preferences
	- Define mobile applicable services
	- Collect user needs and preferences
	- Design applications based on users' feedback.
Factor	Accessibility
Strategies	Use a multi-channel service delivery approach:
	- SMS solution
	- Mobile Internet (MI)
	- Intelligent Voice Recognition (IVR)
	Add English language
	Alternative service delivery forms
	Mobile version websites
Factor	Legal Aspect
Strategies	Users' data security
	Users privacy
	Money back guarantee
	Electronic and mobile crimes
	Electronic and mobile documents
	Electronic and mobile Signature
Factor	Reliability
Strategies	Pilot test approach
	Eliminate intermediary or
	Contract two intermediaries.
Factor	Awareness
Strategies	Comprehensive campaign
	Incentives program
	Schools and universities programs
	Existing knowledge stations to spread awareness

Factor	Education
Strategies	Educating citizens
	- (MOU) and knowledge stations responsibility
	- Trainers should be trained first
	Educating Government employees
	- Government should educate employees
Factor	Usability and mobile device limitations
Strategies	Use simple technology
	Usability requirements:
	Keep it short
	Limited scrolling
	Limited use of graphics
	Minimal navigation at the top of the page
	Using a single column layout
	Using simple navigation options
	Allow for different input modalities
	All other usability international standards
	Test in different mobile browsers
	Test in mobile devices with some features disabled
Factor	Compatibility and interoperability
Strategies	Design for universal low features handsets
	Build compatibility and interoperability frameworks.
	Collect data on the existing devices
	Build compatibility and interoperability frameworks to cover:
	- Different operating systems
	- Languages
	- Hardware
	- Transmission protocols
	Dealing with different operating systems:
	Develop applications and publish in the main mobile devices stores.
	Publish applications through a website with a download link
	Develop web based application
	Use all previous suggestions.
Factor	Availability
Strategies	Define all potential services and build content
	Define dead zones
	Stimulate MOs to cover populated areas
	Coordinate the use of Jordanian police network

6.4 Strategies for success validation

This section covers the pilot study and the main study which validated recommended polices and their effect on the end-users' acceptance of mobile government services.

6.4.1 Pilot study

A small-scale pilot study was conducted on Jordanian students residing in the UK. This study took place prior to conducting main study, mainly to foresee the feasibility of the

questionnaire method and test the following pilot study objectives defined by Punch (2003):

- Questions and their instructions were tested for comprehension, clarity, ambiguity and difficulty.
- The questionnaire was tested for the duration of time to complete.
- Data collection process was tested to make sure that it covers ethical issues (e.g. having a covering letter etc.).

Pilot study research methodology

Questionnaires with covering letters were distributed to a small sample of Jordanian students since their characteristics are similar to those who completed the final questionnaire. The group consisted of ten people in which participants were requested to complete the questionnaire. The researcher observed participants' hesitation, omissions and the duration for the completion of the questionnaire.

Subsequently, participants were asked to answer the following questions:

- Were the instructions clear?
- Did you find any question unclear?
- Was the layout attractive and clear?
- Were there any other comments that the participant wanted to add?

The researcher further modified the questionnaire after collecting and analysing the participants' comments and answers from the feedback form in addition to the researcher's observations while participants were filling the questionnaire.

Pilot study findings

Feedback from all the responses unanimously showed that participants agreed on the clarity of the instructions, simplicity of the questions and finally the attractiveness of the questionnaire layout.

Furthermore, the researcher's observations showed that all the participants did not hesitate while answering the questions, and no questions were omitted. The average time required to complete the questionnaire was approximately twenty minutes; all participants unanimously perceived it as acceptable time.

After analysing the data collected from the questionnaires, it was clear that the generated data is suitable for the purpose of validating the recommended polices. Based on the pilot study findings, the researcher decided that the research method is feasible.

6.4.2 Main study

Following the pilot study, the main study was conducted.

Research methods

Data were collected using the method of self-administrated questionnaire.

Questionnaire design

The questionnaire consisted of multiple choice questions to define age range, gender and education level for comparison reasons, in addition to 51 Likert scale questions designed to assess the validity of the proposed strategies. In the previous research phase, focus groups were employed to develop questionnaire variables (Likert statements).In addition, one open-ended question was included to give participants the opportunity to provide any additional information.

Research questions

In this research, the researcher defined the following major research question: is the proposed user-centric M-Government framework valid? Therefore, survey questions targeted the suggested success polices to determine whether Jordanian users would adopt M-Government based on these polices. The statements that were used in the survey and the success factors they target are presented in section 3.7.3 .

Reliability and validity

The questionnaire variables are the proposed strategies which are a result of three focus groups conducted with E-Government professionals and experts, mobile operators' employees and IT students. Therefore, scale derived its validity from content validity (Field, 2009) since participants have high reliability and competency and were purposively sampled.

To calculate the reliability in this study, the split-half reliability (Spearman–Brown coefficient) method was used, giving a coefficient of 0·837 which indicates good reliability, as shown below in table 6.3.

Table 6.3: Spearman-Brown split-half results/ study3

Cronbach's Alpha	Part 1	Value	.899
		N of Items	26(a)
	Part 2	Value	.704
		N of Items	25(b)
	Total N of Items		51
Correlation Between Forms			.720
Spearman-Brown Coefficient		Equal Length	.837
		Unequal Length	.837
Guttman Split-Half Coefficient			.805

Data analysis

Descriptive statistics were obtained on all variables through SPSS software in order to describe the sample.

Parametric statistical techniques were undertaken to validate the proposed strategies and acquire answers to the following questions:

- To what extent do Jordanian citizens believe that the recommended polices will increase mobile government adoption among users?
- Are there any differences between groups?

Parametric tests were chosen because they are more powerful than nonparametric tests and the following assumptions listed by Pallant (2010) for using these tests were proven:

- Level of measurement: measures used are continuous and not categorical.
- Random sampling: scores were obtained using a random sample.
- Independence of observations: none of the measurement is influenced by any other measurement.
- Normal distribution

Results

The next section presents the results obtained from the main study.

Sample description

The sample included 120 Jordanian citizens from six different cities that represent main cities and remote areas. The demographic statistics indicate that male (70.8%) was more than female (29.2%) as we can see in the gender breakdown below in table 6.4.

Table 6.4: Gender breakdown/ research phase 5

Gender	Frequency	Percent
Male	85	70.8
Female	35	29.2
Total	120	100.0

Data indicate that Individuals aged between (20-29) years and (30-39) years were dominant among participants (31.7%) for each group as illustrated in the age breakdown below in table 6.5.

Table 6.5: Age breakdown/ research phase 5

Age	Frequency	Percent
10-19	12	10.0
20-29	38	31.7
30-39	38	31.7
40-49	22	18.3
50-59	10	8.3
Total	120	100.0

Data indicate that Individuals with an undergraduate degree were dominant among participants (47.5%), as illustrated in educational level breakdown illustrated below in table 6.6.

Table 6.6: Educational level breakdown/ research phase 5

Educational level	Frequency	Percent
Less than secondary	22	18.3
Secondary	14	11.7
Intermediate diploma	7	5.8
Undergraduate	57	47.5
Post graduate	20	16.7
Total	120	100.0

Policies acceptance

The purpose of this study is to validate the M-Government success framework which recommends 51 polices; therefore the research utilised the most used measure of central tendency which is the mean as a statistical model of the data (Salkind, 2009).

The mean in this case reflects the average level of agreement with each recommended policy. The research also calculated the standard deviation, which is the most common measure of variability in order to describe characteristics of distribution (Salkind, 2009). Through descriptive statistics, the table in appendix 10 was generated which shows the mean and standard deviation for all variables.

6.5 Hypotheses testing

The research used Likert scale from 1 to 5. An example of the format used in this study is illustrated below in figure 6.5.

Government should launch small scale pilot applications prior to launching final applications

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Figure 6.5: Example of Likert statement used in study 3

This research tested the following research hypothesis:

Jordanians agree with the proposed strategies and believe that implementing these strategies will increase users' adoption of M-Government.

Number 4 represents agreement level, as we can see clearly below in figure 6.6; therefore the research used number 4 to be compared with the mean of the proposed strategies Since this hypothesis is a hypothesis concerning a mean, T-test is the most suitable test to be used (Diamantopoulos and Schlegelmilch, 2000).

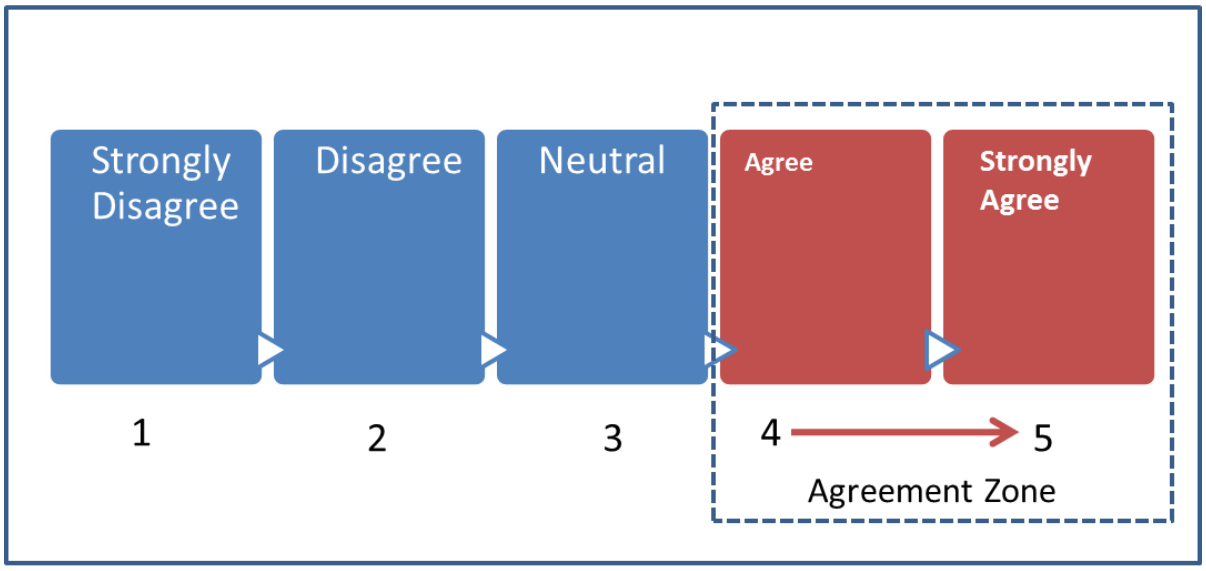


Figure 6.6: Agreement zone in the scale used in study 3

In order to test research hypothesis, the research stated the following hypotheses:

The null hypotheses (H0): strategies mean is less than agreement value, which can be written as H0: $\mu 1 < 4$

Where:

H0 = the null hypothesis

$\mu 1$ = the mean of proposed strategies

4 = Represents users agreement value in the scale from 1-5.

The alternative hypothesis for testing hypothesis one (H1): strategies mean is equal or more than agreement value which can be written as H1: $\mu 1 \geq 4$

Where:

H0 = the null hypothesis

$\mu 1$ = the mean of proposed strategies

4 = Represents users agreement value in the scale from 1-5.

The research assessed normality of the distribution of means for the sample as whole through Kolmogorov-Smirnov statistics. The test of normality results were (.200) as illustrated below in table 6.7 which does not violate the assumption of normality, since the test value is not less than .05 (Pallant, 2010).

Table 6.7: Test of normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Proposed strategies mean	.101	51	.200(*)	.957	51	.060

* This is a lower bound of the true significance.

The Deterneded Normal Q-Q Plots were obtained in order to support Kolmogorov-Smirnov results. There was no real clustering of points and most points were collected around zero line which supports normality of distribution, as illustrated in figure 6.7.

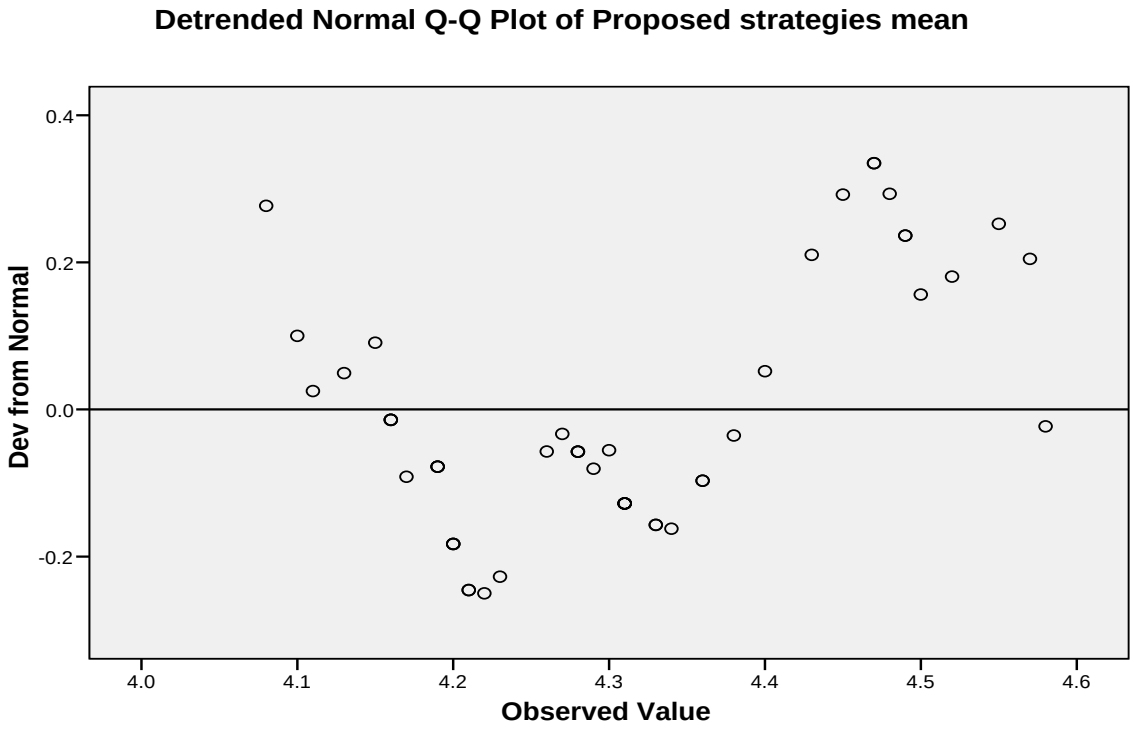


Figure 6.7: The Deterneded Normal Q-Q Plots/study3

Kolmogorov-Smirnov results are also supported by inspection of normal probability plots where the observed value of each score is plotted against the expected value from the

normal distribution. Figure 6.8 shows a reasonably straight line which suggests a normal distribution (Pallant, 2010).

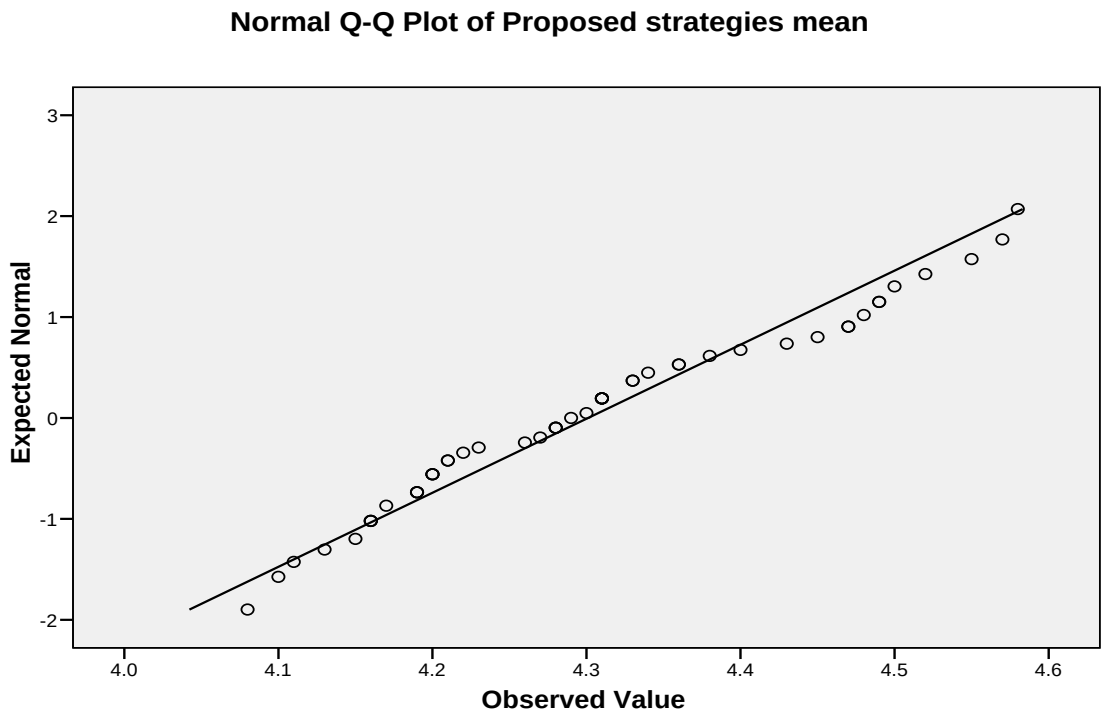


Figure 6.8: Inspection of normal probability plots

In this research the significance level alpha is 0.05. The table in appendix 11 lists the one sample T-test with a confidence interval for μ of 95%.

The results show that all probability values are less than alpha: P > 0.05; therefore the research rejects the null hypotheses and accepts the alternative hypotheses, which strongly supports users' high level of agreement with the proposed strategies.

Results show clearly that there was law variability among each factor. Furthermore, results indicate that all of the proposed strategies means scored more than 4 in the scale from 1 to 5, where 4 represent participants' agreement.

One way analysis of variance (ANOVA) allows a comparison between more than just two groups (Pallant, 2010). In this study, ANOVA was used to test for differences between the six cities in regards to agreeing whether implementing these strategies will increase users' adoption of M-Government or not. The table in appendix 12 illustrates one way ANOVA results. ANOVA results show that there were no statistically significant differences between cities because sig. value (this is p value) for each variable is not less than or equal to .05 (Pallant, 2010).

ANOVA test was used also to test for differences between different age groups in regards to agreeing whether implementing these strategies will increase users' adoption of M-Government or not; the table in appendix 13 lists the results. ANOVA results indicate that there were no differences between different age groups because significance level for each variable is not less than or equal to .05 (Pallant, 2010).

Independent-samples T-test was used to test for differences between males and females in regard to agreeing whether implementing these strategies will increase users' adoption of M-Government. The table in appendix 14 lists results for independent-samples T-test. Independent-samples T-test results show that there were no statistically significant differences between males and females, because probability value (p) for each variable is not less than or equal to .05 (Pallant, 2010).

6.6 Conclusion and recommendations

Results confirm that participants agree with the framework that recommends strategies and polices derived from the experiences of focus group participants who were purposively sampled based on their knowledge and experiences. They also show that there were no statistically significant differences between different cities, between males and females, or between different age groups in regard to agreeing that implementing these strategies will increase users' adoption of M-Government.

6.6.1 M-Government user-centric roadmap

The issue of implementing M-Government can be a complex one. Therefore, there is a need to create a roadmap with implementation stage, and to create a roadmap, implementation stages have to be defined first. There are some strategies that should take place prior to other strategies, for example, strategies that involve data collection should come first since collected data will facilitate building polices and designing applications, therefore, this stage is the data collection stage. After data collection, Government should develop the required polices, therefore, this stage is the policies formulation stage.

Government should then prepare the ground for designing the application. Government should implement some of the proposed strategies in this pre- design stage such as deciding what services to include based on the first phase feedback and preparing application content. Government should then design mobile government applications taking into consideration all technical proposed strategies. After designing applications and websites, Government should test these applications and websites. Finally, When

launching M-Government applications, a comprehensive awareness campaign is essential at this stage which is the launching stage.

Taking the previous results into account, the researcher generated an M-Government roadmap that has six implementation stages: data collection, polices formulation, pre-design, design, testing and launching stages. The roadmap is illustrated below in figure 6.9.

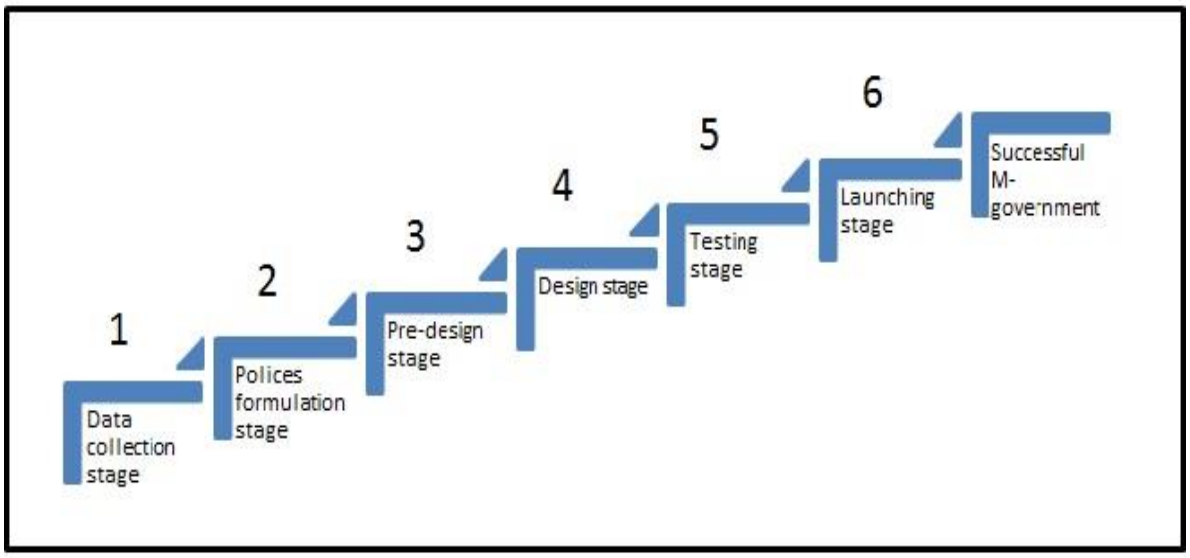


Figure 6.9: M-Government roadmap

Stage 1: Data collection stage

In this stage, the Government collects data that will facilitate building polices and designing applications. The Government has to collect the following data in this phase:

- Define all government services that can be delivered through mobile applications including location-based services (LBS).
- Users' needs and preferences from both main cities and remote areas in terms of preferred services and service provision method.
- Government should collect data on the existing mobile devices with Jordanian users.
- Define dead zones (areas that have no network).

Stage 2: Policy formulation stage

In this stage the Government develops the required polices for success. The following polices should be determined by Government at this stage:

- Government should choose the best provision method/methods based on users' feedback from the first phase.
- Government should develop a reasonable pricing policy that will cover pricing of enquiry services through SMS and pricing for any future customized and added value services.
- Government should decide on how best it can deploy an incentive program as a solution to change Jordanians' attitude towards electronic and mobile transactions and to encourage users to use mobile payment method.
- Government should obligate all its departments to build mobile version websites, and include short security and privacy policies in their websites since users tend not to read long privacy and security policies.
- Government should decide on the best mobile payment system for mobile government. In Jordan the best mobile payment system is using tax-free phone credit, since it is considered a safe method from Jordanians' point of view.
- The Jordanian Government should reengineer its process by eliminating intermediary of service and deal directly with mobile operators.
- Government should make a decision on including mobile government subject in the Jordanian schools and universities programs. Furthermore, the Government should use the existing knowledge stations to spread awareness through specialized training programs and workshops for the local societies.
- Government should develop its own compatibility and interoperability frameworks based on the results of the data gathering phase, covering the following aspects: different operating systems, languages, hardware and transmission protocols.
- Based on the first phase data, Government should encourage MOs to cover all dead zones, especially if they are populated, in order to ensure network availability. Furthermore, the Government should coordinate the usage of the Jordanian police network, which covers all the unpopulated areas that are not covered by private mobile operators, to increase availability of network.
- Government should develop education policy to educate both citizens and government employees on mobile government benefits and added value.
- Government should regulate electronic and mobile data transfer between the following stakeholders: government and users, businesses and users and users

them self. Legislators should provide laws and regulations that tackle the following issues:

- Users data security when transferring information or money through electronic and mobile devices.
- Users' privacy when conducting electronic and mobile transaction and exchanging opinions with the government.
- Money back guarantee for mobile payments.
- Electronic and mobile crimes.
- Electronic and mobile document in addition to electronic and mobile signature.

Stage 3: Pre-design stage

In this stage the Government should decide on what services to include based on the first phase feedback. Furthermore, the Government should build websites and services content, and launch an awareness campaign to inform users with the occurring changes and ease their concerns in regards to security, privacy and trust.

Stage 4: Design stage

This stage covers all technical recommendations. The Government should use simple technology and design applications for universal low features handsets, and impose the following usability requirements on application designers when designing government applications and mobile version websites:

- Keep content short through prioritizing content and keeping only the most important content.
- Use limited vertical scrolling and avoids horizontal scrolling.
- Limited use of graphics.
- Minimal navigation, concentrated at the top of the page.
- Using a single column layout, since space is limited.
- Allow for different input modalities, such as touch screen, spoken commands, keypad and virtual keyboard to facilitate using portal while mobile.
- All other usability international standards such as the ones introduced by W3C.

Government should use a multi-channel service delivery approach including SMS, MI and IVR. Designed applications should give the choice between the two most common languages in Jordan (Arabic and English) to access services. Furthermore, design applications should offer access in alternative forms such as video and voice.

Mobile version websites should be built from scratch and a link that goes to either version of the website should be added. Furthermore, designed websites and applications should have alternative texts for images in order to ensure that information is available for people who turn off images in their mobiles. Moreover, designers should add language detection ability to mobile government applications.

Designed applications should have a tracking system which allows users to receive acknowledgment SMS right away that have a ticket number for tracking purposes.

Applications designers should follow one of the following options to bypass the different operating systems issue: firstly they can develop applications for the existing operating systems and publish these applications in the main mobile devices stores, such as Apple, Android, Blackberry and Nokia OVI stores, and then inform users through SMS.

Secondly they can publish all applications through a website and users download the suitable application for their mobile device. Furthermore, they can develop web-based applications to allow all people with Internet access to get the service regardless of the mobile operating system. They can also use all or some of the previous suggestions based on the Government preferences.

Stage 5: Testing stage

In this stage, applications and websites should be tested in deferent mobile browsers and in mobile devices with some features disabled such as using the text only mode. After initial testing, the Government should launch pilot test applications and have some end-users to try these applications. Based on users' feedback, the Government can either launch the application or bring it back to designers for refining.

Stage 6: Launching stage

When launching M-Government applications, a comprehensive campaign is essential, since most Jordanians are unaware of the existence of mobile government services. The Government should use all traditional marketing tools, such as newspaper ads, TV promotion, radio etc. and take advantage of the high mobile penetration in Jordan by sending SMS messages to all users in the country, explaining this service and providing link for the mobile portal to be downloaded.

Uniqueness of roadmap

Many researchers investigated the successful implementation of mobile government. The table in appendix 15 lists most of these studies. All of the previous studies focused on concluding success factors but none of them concluded a practical roadmap that

proposes practical polices to tackle each success factor individually and development stages to ensure success.

Previous literature shows only one suggested roadmap which was developed by Al-Khamayseh and Lawrence (2006) through analysing 29 experts' answers for two open-ended questions. They argued that mobile and wireless technologies improvements will increase people adoption and demand for new services. Therefore, content developers will be pressured to satisfy users' needs which will stimulate businesses to take advantage of mobile applications. They anticipated that government will follow businesses and adopt mobile technology. Al-Khamayseh and Lawrence's (2006) road map is illustrated below in figure 6.10.

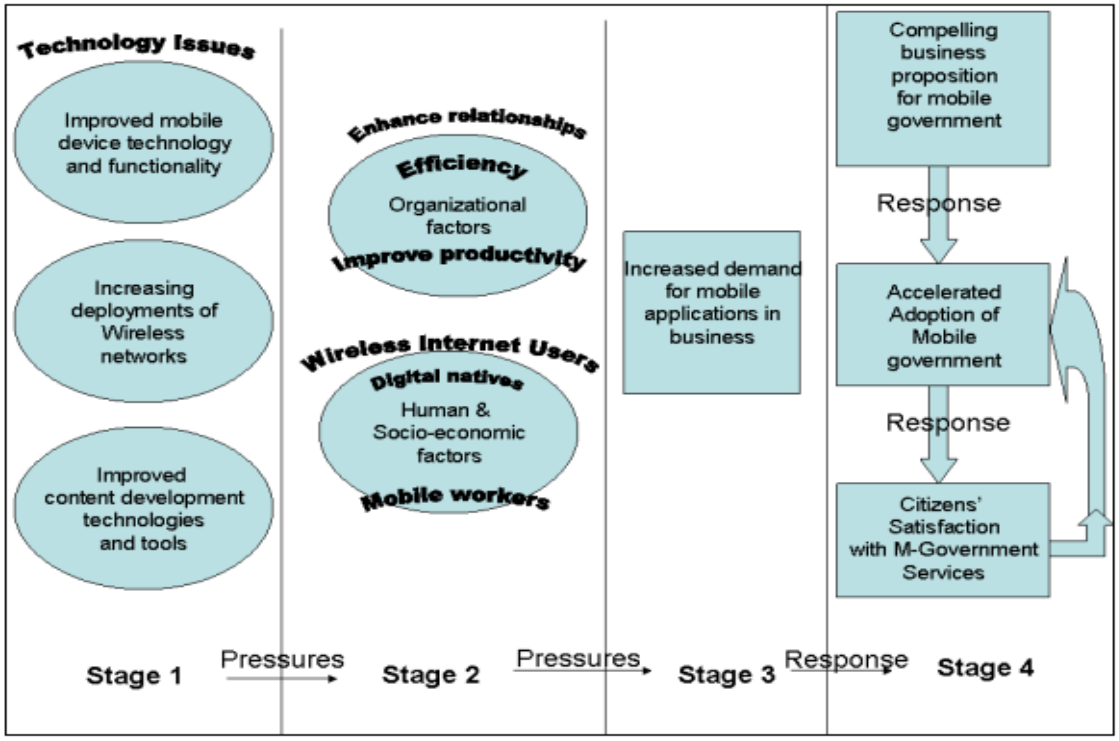


Figure 6.10: Pressure leading to mobile government- a preliminary roadmap

Source: Al-Khamayseh and Lawrence (2006).

Previous literature shows only one plan to overcome challenges for only smartphone M-Government service, suggested by Zefferer and Teufel (2011). The plan consists of the following recommendations: development of accepted smartphone-based M-Government services, handling of different smartphone platform and guarantee security and services.

The previous road map and the suggested plan neither provide solutions for success factors nor provide practical strategies to assist governments. Hence, in order to

implement M-Government successfully, practical solutions must be presented to portray these success factors following clear predefined development stages.

This study recommended polices and strategies for the Jordanian Government and other governments to overcome mobile government success factors. Results were derived through conducting three focus groups that included electronic government experts, mobile operators' employees and IT student. The outcome of this study is a roadmap for the Jordanian Government and other governments that have similar characteristics to implement mobile government successfully and gain users acceptance.

It seems clear from the evidence that the proposed framework and roadmap can act as a general model that fits and helps many countries to focus on tackling these success factors in order to implement users' centric successful M-Government applications.

Chapter 7

Conclusion

7.1 Overview

This chapter provides conclusions that were reached based on the accumulated evidence of this study. It starts by summarising the work undertaken in the thesis, and then highlights the key contributions made by this study. Furthermore, it discusses study limitations to suggest future research directions.

This chapter is structured as follows: Section 7.2 provides thesis summary. Section 7.3 highlights main contributions made by this study. Section 7.4 demonstrates how research objective were achieved in this study. Section 7.5 describes the research limitations. Section 7.6 suggests areas for further research. Finally, section 7.7 highlights the critical reflection on the research process and learning

7.2 Thesis summary

This study began by highlighting that Jordan has realized the opportunity represented by M-Government and started implementing these services without studying success factors that encourage users to adopt such services.

Chapter 2 described M-Government as an emerging phenomenon and distinguished between its implementation in both developing and developed countries. Furthermore this chapter described the Jordanian implementation of M-Government and the progress so far. A synthesis of the literature suggests that Jordan and developing countries have the required drivers for M-Government, which represents an opportunity for governments in these countries to improve their outreach to citizens, especially in rural areas.

The literature also suggests that there are no studies about users' acceptance of M-Government in Jordan since the launch of Jordan M-Government portal. Furthermore, the literature suggests that there are no studies that provide practical solutions for M-Government success factors nor that suggest a roadmap with practical solutions to help developing countries to implement user-centric M-Government.

Chapter 3 described how the study employed five research phases through mixed-method research design to meet research objectives and answer research questions.

Chapter 4 described how the study explored M-Government in Jordan and decided whether it is a step in the right direction by conducting research phases 1 and 2. The survey showed that even though most Jordanians are unaware of the existence of such services and their nature, they have a positive attitude about them. Interviews of Government officials showed that decision makers are aware of the low public awareness, and are planning to overcome this issue.

Chapter 5 described the process by which a user-centric success factors model for M-Government was created through conducting research phase 2 (systematic analysis using meta-analysis). Furthermore, this chapter described the process by which this conceptual model was validated and refined through undertaking research phase 3 (surveying academics).

Chapter 6 described research phases 4 and 5 and their findings. This chapter presented the use of focus groups (phase 4) to create an M-Government success framework, which suggests practical strategies to overcome success factors from the proposed conceptual model. Furthermore, this chapter also presented the framework validation process through conducting a survey (phase 5).

7.3 Research contributions

Contribution 1: The use of meta-analysis to define success factors

Analysing systematic review through meta-analysis to define success factors which are ranked based on an effect level that is calculated according to factors frequency of occurrence is unique and contributes to the knowledge of mobile government. This approach derives its strength from the assumption that frequency percentage reflects the perceived importance of the factors which were tested using different methods, perspectives and countries.

The use of this new approach which was validated by academics in the fields of MIS and IT, suggesting that the more the success factor is included in previous studies, the more it is likely to have significant effect on the successful implementation of mobile government services. This approach can be also applied by other researchers in other similar fields.

Contribution 2: Meta-analysis findings

Meta-analysis has identified all success factors for M-Government to citizens' services defined by previous studies.. Presenting all these factors in one study is unique and will help other researchers in the field of M-Government. Other researchers can conduct

surveys to rate the importance of these factors in different countries and draw comparative analysis of M-government implementation success factors in these countries.

Contribution 3: The user-centric M-Government success factors model

This study validated and refined the initial model which is concluded from meta-analysis, through MIS and IT academics who have the required knowledge in this subject. Therefore, informants have high reliability and competency, which gives reliable and robust results. This model defines two categories of success factors ranked based on their importance: critical and high importance success factors.

User acceptance of technology is a critical factor; this factor includes two sub-factors: satisfying user needs and preferences and provision of user-friendly applications. Another critical factor is security, privacy and trust factor. Furthermore, availability of services, broadband and content, cost, mobile device limitations and usability are all critical factors.

The high effect success factors group consists of the following: mobile payment system, accessibility, awareness, reliability, mobile penetration, provision of legal systems and education factor which has to sub-factors: educating mobile government employees with mobile government usage and benefits, and educating users with mobile government usage and benefits. Figure 7.1 illustrates the conceptual model.

Figure 7.1: Refined user-centric mobile government success factors model

This model is unique and contributes to the knowledge of M-Government. Furthermore, this model serves as a general model that fits and helps many developing countries other than Jordan to focus on tackling these success factors in order to implement successful user-centric M-Government applications.

Contribution 4: M-Government user-centric success framework

This framework is unique because it is the only framework that provides practical solutions that tackle each success factor individually. The user-centric success framework defined 51 practical strategies, which are presented previously in table 6.2 .

Previous literature shows only one plan to overcome challenges for only smartphone M-Government service suggested by Zefferer and Teufel (2011). The plan consists of the following recommendations: development of accepted smartphone-based M-Government services, handling of different smartphone platform and guarantee security and services.

The previous plan neither provides solutions for success factors nor provides practical strategies to assist governments. Hence, in order to implement M-Government successfully, practical solutions such as those defined in the concluded user-centric success framework must be presented to portray these success factors.

Contribution 5: M-Government user-centric success roadmap

This study generated M-Government user-centric success roadmap with six implementation stages: data collection, polices formulation, pre-design, design, testing and launching stages. The roadmap is described thoroughly in section 6.11.1 and illustrated below in figure 7.2.

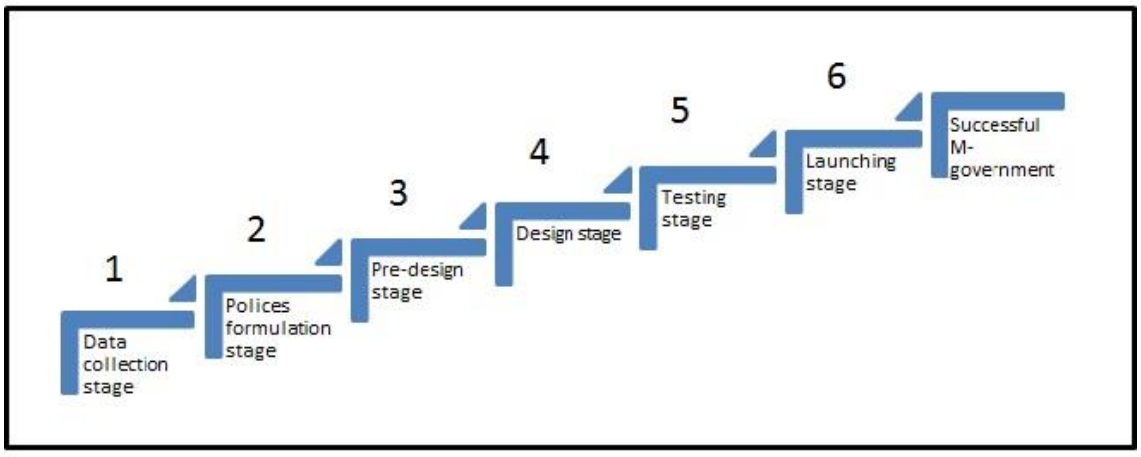


Figure 7.2: M-Government user-centric success roadmap

Previous literature shows only one suggested roadmap which was developed by Al-Khamayseh and Lawrence (2006) through analysing 29 experts' answers for two open-ended questions. Authors argued that mobile and wireless technologies improvements will increase people adoption and demand for new services. Therefore, content developers will be pressured to satisfy users' needs which will stimulate businesses to take advantage of mobile applications. They anticipated that governments would follow businesses and adopt mobile technology.

The previous road map neither provides solutions for success factors nor provides development stages to assist governments in implementing M-Government successfully.

This success framework is credible because evidence was derived through conducting three focus groups that included electronic government experts, mobile operators' employees and IT students. The proposed framework and roadmap can act as general models that can fit and help many countries especially developing countries to focus on tackling these success factors in order to implement users-centric successful M-Government applications.

7.4 Meeting the research objectives

Five objectives of the research were identified in section 1.4 to support the research aim, which is creating a roadmap for implementing successful user-centric M-Government in Jordan. These objectives have been achieved through undertaking the five research phases, where each phase targeted on objective.

Objective 1: Measure awareness of M-Government and capture people's attitudes towards that, and capture the Government perspective in regard to launching the mobile government portal and citizens' awareness of that.

This objective was achieved through conducting phase 1 in chapter 4 through conducting survey and interviews. Chapter 4 identified a low level of awareness of M-Government and captured a positive attitude towards M-Government among citizens. Furthermore, chapter 4 also captured the government perspective.

Objective 2: Create a user-centric success factors model for mobile government to citizen services (G2C).

This objective was achieved through conducting phase 2 in Chapter 5. Through undertaking a systematic review using meta-analysis, chapter 5 created a user-centric M-Government success factors model.

Objective 3: Validate and refine the user-centric success factors model.

This objective was achieved through conducting phase 3 in chapter 5. Through surveying 40 academics, the proposed model was validated and refined.

Objective 4: Generate recommendations for government strategies that tackle each success factor of the proposed model.

This objective was achieved through conducting phase 4 in chapter 6. In this phase, focus groups results formulated an M-Government success factors framework which suggests practical strategies that tackle each success factor included in the proposed model.

Objective 5: Validate the suggested success polices and determine if Jordanian users will adopt M-Government based on these polices.

This objective was achieved through conducting phase 5 in Chapter 6. The proposed success framework was validated based on surveying users from different Jordanian cities.

7.5 Research limitations

There are four chief limitations for this study, which are discussed in this section. The limitations include not testing design guidelines in practice, conducting small number of focus groups (three only) , some of the proposed strategies may not be adequate for the complex nature of some of the success factors and not being able to test M-Government success roadmap.

The first limitation concerns the proposed design guidelines for M-Government applications. The research identifies design guidelines for M-Government applications and validated users' acceptance of these guidelines through a questionnaire. These design guidelines were not tested in practice through experiment design which can enhance the confidence of such findings.

The second limitation concerns the M-Government proposed user-centric roadmap. Although research presented a roadmap for implementing M-Government through identifying implementation stages with clear practical strategies, this roadmap has not been tested. There is no way to test this road map, unless government applied it, which is a limitation for this study.

Third limitation concerns the number of focus groups. Conducting three focus groups is not enough and if more focus groups were conducted; results will be more robust. Finally, even though all proposed strategies together are adequate for the Jordanian Government to implement a user-centric M-government, but some strategies shown may not be adequate for the complex nature of some of the factors.

7.6 Further research

To improve on the limitations of this study, future research should focus on testing smaller parts of the suggested roadmap such as testing the efficiency of M-Government applications design guidelines. Researchers can design mobile applications prototypes that meet these design guidelines and conduct experiment studies to test users' acceptance of such guidelines. Based on the proposed user-centric success framework, future research may develop an evaluation framework for M-Government applications user acceptance.

A further recommendation is to target each one of the proposed critical success factors in a separate study in order to expand on the suggested strategies that might affect the users'intention to adopt M-government in Jordan as well as other developing countries. Researchers can replicate this research in different countries through rating the importance of the concluding success factors and conduct focus groups to tackle the most

important ones. Furthermore, this study can be extended to other developing countries, and draw comparative analysis of M-government implementation success factors.

7.7 Critical reflection on the research process and learning

To the best of the researcher knowledge, this research is the first study that addresses the issue of M-government implementation and citizens' adoption of M-government services in Jordan. Some of the success factors studied in this research has complex nature, therefore they weren't fully explored in this research due to the time constrains.

This research has investigated M-government success factors and the strategies to tackle these factors from the users' perspective. The Jordanian Government may have different judgments and considerations of these success factors when developing M-governments. It would have been more interesting if this research explored Government perspective in regards to the proposed strategies. The results can be compared with the current results from the users' perspective which will improve our understanding of M-government implementation.

As a critical reflection on the research process, I would conduct this research in a better way by focusing on fewer numbers of research phases rather than conducting many research phases, the reason being that with fewer studies I can spend more time on data analysis which will allow for richer findings.

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Appendix 1: Questionnaire/ research phase 1

Measuring the Jordanian citizens' awareness of launching mobile government and attitude towards it

July 26, 2011

Dear participant,

I am a PHD student at Brunel University and I am conducting a study of mobile government awareness in Jordan. The objective of this research project is to attempt to measure Jordanians awareness of mobile government portal in Jordan and Jordanians' attitudes towards it.

Enclosed with this letter is a questionnaire that asks few questions about your awareness and attitudes toward mobile government services in Jordan.

I hope you will take a few minutes to complete this questionnaire. Without the help of people like you, research could not be conducted. Your participation is voluntary and you can withdraw from the study at any time. The data will be anonymised when it comes to analysis and presentation of the results.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at (00962) 079-5151658 or at cspgsaa@brunel.ac.uk.

Sincerely,

Sultan Al-masaeed

Ph.D. student

Information Systems, Computing and Mathematics College

Brunel University

1. Please state your gender and city name:

Gender_____

City name _____

2. Please indicate how old you are:

□ 10-19

□ 20-29,

□ 30-39

□ 40-49

□ 50-59

□ 60 and over

3. Please indicate your educational level:

□ Less than secondary

□ Secondary

□ Intermediate diploma

□ Undergraduate

□ Postgraduate

4. Are you aware of Jordan's E-Government program?

□ Yes

□ No

If yes, what do you know about it?

---

5. Do you have any experience of the Jordanian E-Government program (did you use their services)?

□ Yes (please explain your answer)

□ No **(If no please go to question 7)**

---

6. You have indicated in the previous question that you have experience of the Jordanian E-Government program, please circle the statement that best describes the quality of the service:

□ Extremely Poor

☐ Below Average ☐ Average ☐ Above Average ☐ Excellent **Please go to question 8**
7. You have indicated that you have no experience of the Jordanian E-Government program; please state the reason/reasons that you have not used the E-Government services: --- --- ---
8. Do you have any experience of browsing Internet through a mobile device? ☐ Yes ☐ No **(If no please go to question 10)**
9. You have indicated in the previous question that you have experience of browsing Internet through mobile device, please circle the statement that best describes the quality of the service: ☐ Extremely Poor ☐ Below Average ☐ Average ☐ Above Average ☐ Excellent **Please go to question 11**
10. You have indicated that you have no experience of browsing the Internet through a mobile device; please state the reason/reasons that you have not browsed the Internet through a mobile device: --- --- --- ---
11. Are you aware of Jordan's M-Government program? ☐ Yes ☐ No
12. Do you have any experience in using Jordan M-Government portal (did you use their services)?

☐ Yes ☐ No **(If no please go to question 14)**
13. You have indicated in the previous question that you have experience of the Jordanian mobile government program; please circle the statement that best describes the quality of the service: ☐ Extremely Poor ☐ Below Average ☐ Average ☐ Above Average ☐ Excellent **Please go to question 15**
14. You have indicated that you have no experience of the Jordanian Mobile government portal; please state the reason/reasons that you did not try the Mobile government services: --- --- --- ---
15. Do you think that M-Government services will have a better impact on the quality of information and services delivery than the traditional E-Government services? ☐ Yes ☐ No Please explain your answer --- --- --- --- ---

Appendix 2: Questionnaire/ research phase 3

Dear participant,

I am a PHD student at Brunel University and I am conducting a research project in order to validate and refine a proposed user-centric success factors model.

The model is the result of a systematic review of previous studies using a meta-analysis method which was undertaken to review success factors for mobile government to citizen services (G2C).

Enclosed with this letter is a questionnaire that asks few questions about your thoughts toward mobile government success factors, you will rate the importance of mobile government success factors from the user's perspective in a Jordanian context.

I hope that you will take a few minutes to complete this questionnaire. Without the help of people like you, research could not be conducted. Your participation is voluntary and there is no penalty if you do not participate. The information you provide will be entirely confidential and will not be shared with any people not directly connected with this research. Your contribution is highly appreciated.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at (00962) 079-5151658 or at cspgsaa@brunel.ac.uk.

Sincerely,

Sultan Al-masaeed

Ph.D. student

Information Systems, Computing and Mathematics College

Brunel University

1. Please state your gender:

1. Male
2. Female

2. Please indicate your age:

1. 10-19
2. 20-29,
3. 30-39
4. 40-49
5. 50-59
6. 60 and over

On a scale of one to five, how would you rate the importance of the following M-Government success factors from the user's perspective in Jordan? Please take into consideration that 5 represents the highest importance and 1 represents the least importance.

(Please circle the appropriate number)

1. Users' data security	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
2. Gaining users' trust	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
3. Protecting users' privacy	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
4. Responsiveness of mobile government applications	1	2	3	4	5

(indicates the speed with which M-service requests are manipulated, pages are browsed, commands are achieved and acknowledgments are displayed)					
Optional: If you wish, please explain your answer --- --- ---					
5. Legal issues	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
6. Usability issues	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
7. Mobile phones limitations	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
8. Access speed	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
9. Provision of user-friendly applications	1	2	3	4	5

Optional: If you wish, please explain your answer --- --- ---						
10. Lack of personalization	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---						
11. Cost of: service, mobile Internet, infrastructure and application	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---						
12. Availability of services, network, broadband and content	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---						
13. Mobile penetration	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---						
14. Awareness of M-Government	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---						
15. Accessibility	1	2	3	4	5
Optional: If you wish, please explain your answer --- ---						

----------					
16. Educating users with mobile government usage and benefits	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
17. Educating government employees with the importance of mobile government services	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
18. Reliability of services	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
19. Mobile payment system	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
20. Changing the mobile mind-sets (changing users' perception that mobile phones particularly are tools for fun and entertainment more than for serious activities)	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
21. Satisfying user needs and preferences	1	2	3	4	5
Optional: If you wish, please explain your answer					

--- --- ---					
22. Provision of user-friendly applications	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
23. M-Government standards	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
24. Existence of M-Government framework	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
25. Dealing with compatibility and interoperability issues	1	2	3	4	5
Optional: If you wish, please explain your answer --- --- ---					
26. Mobile traffic control (users want to control the traffic on their devices and limit incoming information to meet their local, real-time needs)	1	2	3	4	5
Optional: If you wish, please explain your answer --- ---					

----------					
27. Open source M-Government applications	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
28. Early involvement of government employees	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
29. Business re-engineering	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
30. Government employees resistance for organizational change	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
31. Lack of Government vision	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
32. Public-private sector partnership.	1	2	3	4	5
Optional: If you wish, please explain your answer ----------					
33. Cooperation between Government and mobile network operators	1	2	3	4	5

	Optional: If you wish, please explain your answer --- --- ---					
34.	Accountability of Government	1	2	3	4	5
	Optional: If you wish, please explain your answer --- --- ---					
35.	Lack of clarity about future M-Government planning	1	2	3	4	5
	Optional: If you wish, please explain your answer --- --- ---					
36.	Decentralization for local mobile government diffusion	1	2	3	4	5
	Optional: If you wish, please explain your answer --- --- ---					
37.	Required M-Government infrastructure (M-Government infrastructure is made up of wireless networks and mobile access devices)	1	2	3	4	5
	Optional: If you wish, please explain your answer --- --- ---					
38.	Existence of M-Government portal	1	2	3	4	5
	Optional: If you wish, please explain your answer --- --- ---					

Please feel free to provide any additional information, comments or suggestions:

Appendix 3: Questionnaire/ research phase 5

Dear participant,

I am a PHD student at Brunel University and I am conducting a research project in order to validate proposed strategies that may assist the Jordanian Government in implementing mobile government in Jordan successfully.

Enclosed with this letter is a questionnaire that asks few questions about your thoughts toward the proposed policies and strategies. I hope that you will take a few minutes to complete this questionnaire. Without the help of people like you, research could not be conducted.

Your participation is voluntary and there is no penalty if you do not participate or decided to withdraw at any time even after signing the consent form. The information you provide will be entirely confidential and will not be shared with any people not directly connected with this research. Your contribution is highly appreciated.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at (00962) 079-5151658 or at cspgsaa@brunel.ac.uk.

Sincerely,

Sultan Al-masaeed

Ph.D. student

Information Systems, Computing and Mathematics College

Brunel University

1. Please state your gender:

- ☐ Male
- ☐ Female

2. Please indicate how old you are:

- ☐ 10-19
- ☐ 20-29,
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60 and over

3. Please indicate your educational level:

- ☐ Less than secondary
- ☐ Secondary
- ☐ Intermediate diploma
- ☐ Undergraduate
- ☐ Post Graduate

In the following section, please indicate to what extents you believe that the following policies and strategies will increase users' adoption of mobile government services on scale of 1-5 (1=strongly agree, 2=Agree, 3=Neutral, 4=disagree and 5=strongly disagree).

Please circle the appropriate number

1. Government should use simple technology when designing mobile government (M-Government) services.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

2. Government should launch small scale pilot applications prior to launching final applications and test these applications with a sample of end-users.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

3. Mobile government applications should detect mobile default language defined by the user (English or Arabic) and display content in that language.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

4. Government should conduct a survey to define users' needs and preferences for M-Government applications and services from both remote cities and remote areas.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

5. Government should design applications and choosing delivery method based on users' feedback.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

6. Government should deploy an incentive program to change Jordanians' attitude towards electronic and mobile transactions. For example, encourage Jordanians to use their credit and debit cards electronically and via mobile devices.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

7. Government should provide laws and regulations that tackle the issue of users' data security when transferring information or money through electronic and mobile devices and assure citizens that their data is secure.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

8. Government should provide laws and regulations that tackle the issue of users' privacy to assure citizens that their data is protected and will not be sold to any other third party by either the government or the mobile operators.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

9. All Government websites should have concise security and privacy policies since users tend not to read these long policies.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

10. Government should launch an awareness campaign to ease people's concerns in relation to security, privacy and trust.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

11. Users should not pay for M-Government enquiry services.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

12. Government should use mobile operators' existing infrastructure when implementing M-Government services in order to keep the cost low.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

13. Government should encourage mobile operators (MOs) to handle part of the cost of mobile government applications as part of their corporate social responsibility (CSR) campaigns.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

14. Government should charge for customized services only.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

15. Government should keep mobile government applications content short through prioritizing content and keeping only the most important content.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

16. Mobile government applications and websites should have limited use of graphics.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

17. Mobile government applications and websites should improve people's mobile experience.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

1	2	3	4	5

18. Mobile government applications and websites should allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

19. Mobile government applications and websites should be tested in different mobile browsers and in mobile devices.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

20. Government should predefine all services that can be delivered through mobile applications.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

21. Government should build the suitable content for all its potential mobile government services.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

22. Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and encourage mobile operators to cover them, especially if they are populated.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

23. Government should coordinate the use of Jordanian police network by mobile operators since it covers all the unpopulated areas that are not covered by private mobile operators.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

24. Government should use a multi-channel service delivery approach such as providing its services through the following channels: SMS solution, mobile Internet (MI) and intelligent voice recognition (IVR).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

25. Government should give people the choice between the two most common languages in Jordan (Arabic and English) to access services.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

26. Government should build mobile applications with disabled people in mind. Therefore, Government should offer access to its services in alternative forms such as video and voice.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

27. Government should have mobile version websites for all its related entities.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

28. Mobile version websites should have alternative texts for images in order to ensure that information is available for people who turn off images on their mobiles.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

29. The suitable mobile payment system for mobile government in Jordan is using tax-free phone credit.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

30. Government should provide laws and regulations that tackle the issue of money back guarantee for mobile payments.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

31. Government should launch an incentive campaign to encourage users to use mobile payment method.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

1	2	3	4	5

32. Government should reengineer its process in order to ensure maximum reduction of time between submission time and response time to mobile government services.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

33. Government should eliminate the intermediary between government and mobile operators and deal directly with mobile operators and users.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

34. Government should adopt a tracking system for mobile government services and users should receive an acknowledgment SMS with a ticket number for tracking purposes.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

35. Government should introduce laws and regulations that regulate electronic and mobile data transfer between the following stakeholders: Government and users, businesses and users and users themselves.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

36. Government should provide laws and regulations that tackle the issue of electronic and mobile crimes

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

37. Government should provide laws and regulations that tackle the issue of electronic and mobile document in addition to electronic and mobile signature.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

38. Government should use all traditional marketing tools such as newspaper ads, T.V promotion, radio etc. to spread awareness of M-Government portal in Jordan.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

39. Government should send an SMS message to all users in Jordan introducing mobile government services and providing a link to the mobile portal that can be downloaded.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

40. Government should include mobile government as an academic subject in the Jordanian schools and universities programs to inform people of the benefits and uses of M-Government.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

41. Government should use the existing knowledge stations that are distributed in many parts of the country to spread awareness about M-Government services.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

42. Government should launch an incentive program to encourage citizens to use mobile government services.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

43. Government should educate citizens in regards to mobile government benefits and uses through Ministry of Education (MOE) and knowledge stations.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

44. Government should use the existing knowledge stations that are distributed in many parts of the country to conduct specialized training programs and workshops on the benefits of using mobile government services for local communities.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

45. Government should educate its employees on the benefits of mobile government and the importance of user acceptance in implementing successful applications.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

46. Government employees should be assured that mobile technologies will not lead to their replacement.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

47. Government should design applications for universal low features handsets.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

48. Government should build its own compatibility and interoperability frameworks that should cover: different operation systems, languages, hardware and transmission protocols.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

49. Government should collect data on the existing devices with Jordanian users and use this data to build compatible applications.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

50. Users should be able to download mobile government services application from a central Government website.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

51. Government should develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then government can inform users through SMS.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

Please feel free to add any comments:

Appendix 4: Ethical approval for research phase 1

Date: 10th February 2012

STATEMENT OF ETHICS APPROVAL

Proposer: Sultan Al-masaeed

Title: Measuring the Jordanian citizens' awareness of launching mobile government and attitude towards it

The school's research ethics committee has considered the proposal recently submitted by you. Acting under delegated authority, the committee is satisfied that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform the committee of any change of plans in relations to the information provided in the application form.

Yours sincerely,

Professor Zidong Wang
Chair of the Research Ethics Committee
SISCM

Appendix 5: Ethical approval for research phases 3 and 4

Date: 2nd April 2012

STATEMENT OF ETHICS APPROVAL

Proposer: Sultan Al-masaeed

Title: Building a critical success factors model for mobile government

The school's research ethics committee has considered the proposal recently submitted by you. Acting under delegated authority, the committee is satisfied that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform the committee of any change of plans in relations to the information provided in the application form.

Yours sincerely,

Professor Zidong Wang
Chair of the Research Ethics Committee
SISCM

Appendix 6: Ethical approval for research phase 5

Date: 26th July 2012

STATEMENT OF ETHICS APPROVAL

Proposer: Sultan Al-masaeed
Title: Towards a user-centric mobile government in Jordan

The school's research ethics committee has considered the proposal recently submitted by you. Acting under delegated authority, the committee is satisfied that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform the committee of any change of plans in relations to the information provided in the application form.

Yours sincerely,

Professor Zidong Wang
Chair of the Research Ethics Committee
SISCM

Appendix 7: All themes and sub-themes derived from the electronic government experts and professionals group:

Success factor	Themes and subthemes
Privacy, security and trust	Provision of laws and regulations that cover the following aspects: Mobile government services User data security User data privacy Stake holders' responsibility clarification
	Awareness campaign with incentives to change Jordanians attitude in regards to security, privacy and trust concerns
	Short privacy and security polices for all government websites
	Privacy concerns are greater currently with the rapid spread of location based services (LBS), even though they provide great opportunities for mobile government
Cost	The current price for SMS to get enquiry service is very high
	Enquiry services should be provided for free
	Users can pay for customized services
	User adoption of M-Government services will lead to increased effectiveness among government
	Government should encourage mobile operators to handle some of the cost as part of their Social Corporate Responsibility (SCR) initiatives
Mobile payment system	Users can pay for services using their phone credits
	Users shouldn't pay taxes when they top up
	Tax free credit should be used to pay for Government services
	Jordanians are familiar with that system
Accessibility	Mobile broadband access to all cities specially rural areas
	Applications should consider disabled people and offer access to services in alternative forms
	English language should be added
Mobile device limitations and usability	People still have old phones
	Government should be careful and should use simple technology
	Government should impose usability requirements on application designers
	Designers should follow international standards in regards to usability

Success factor	Themes and subthemes
	issues especially the ones introduced by W3C
Responsiveness	Government should study thoroughly the current processes and reengineer if necessary
Availability	Government should make sure that mobile services content, network signals and services are available
	Government should define dead zones and motivate mobile operators to cover them
legal system	legal systems have to cover privacy and security
	Legal systems have to regulate electronic and mobile transactions
	Money back guarantees
Awareness	Multi phases campaign based on the service simplest and not geographical bases
	Government should start with basic services that require basic knowledge and move later on to more advance applications in order to build awareness among users
	Promotion campaign to raise awareness
Education	Government should educate people on how to use these services and what are the benefits of these services
	Schools should be used for educating citizens because they have required facilities, computers and computing teachers how can handle this task
	Teachers who will educate citizens have to be trained first to deliver same message
	Government has to educate employee on the importance of mobile government and the importance of customer satisfaction
	Government must assure employees that they will not be replaced and mobile government will reduce workload and increase their effectiveness
Users' acceptance	To ensure user's friendly applications Government should use simple technology
	Government should launch small scale pilot applications and test them by the users
	Government should first define all services that can be delivered through mobile applications
	To satisfy users need and preferences, Government should conduct a

Success factor	Themes and subthemes
	survey to identify the most needed services by users from both main cities and remote areas
	Government should collect data in terms of preferred services and service provision method and then design applications and choose provision method based on users' feedback
	Personalisation will increase users' adoption to mobile services
Compatibility and interoperability	Applications should be tested on the following operating systems: Nokia, Apple, Android
	simple technology is the solution and applications should be designed for universal low features handsets
	Testing in different devices is critical in the case of M-Government
Reliability	The best solution is to follow a pilot test approach prior application

Appendix 8: All themes and sub-themes derived from the IT students' focus group

Success factor	Themes and sub-themes
Privacy, security and trust	Government should develop laws that regulate electronic and mobile data transfer between government and users and users themselves
	Regulations should assure citizens that their data will not be sold for any other third party and its secured
	Government should clarify in this regulation the punishment of any one try to hack electronic and/or mobile data
	Government websites should have privacy and security polices
Cost	Government should consider the provision of M-Government services for free for the following reasons: Most users having law income Government should offer the services for free since they are free through Internet
	People may accept to pay for location based services or specialized services
Mobile payment system	The best mobile payment system is paying for services using phone credits
	Mobile version websites should be built from scratch then.
	intelligent voice recognition is good for visually impaired users and people on the move too
	Government should obligate designers to build mobile version websites with disabled people in mind.
	Mobile websites should have alternative text for images
Mobile device limitations and usability	Government should control the design of mobile government applications through defining comprehensive usability requirements
	Design requirements: Keep content short Limited scrolling Limited use of graphics Minimal navigation at the top of the page Scrolling should be in one side Only first level navigation should be in top of the page If there are second level navigation links, they should be added to the bottom of the page

	Add alternative text to all graphical component or non-text elements. When designing for mobile device, designers should use a single column layout since space is limited Designers should use simple navigation options Government should allow for different input modalities such as touch screen, keypad and virtual keyboard Spoken commands should be added to facilitate using portal while mobile. Testing Testing websites in deferent mobile browsers is even more critical than testing websites for desktop browsers, mobile browsers acts differently Testing should include testing mobile devices with some features disabled such as using the text only mode.
Responsiveness	Government should assure users that they got their request by sending acknowledgment SMS right away
	Government should assure users that they can track service request
	Some services should have instant response and some of them need time
	Tracking system: Tracking number should be included in the acknowledgment SMS
Availability	Wireless networks and WIMAX technology is increasing availability of network
	government has the responsibility to insure availability of network in all populated area in Jordan especially desert and semi desert areas
	Government should define all uncovered areas and then build a strategy to cover them
	TRC should convince mobile operators to cover as much as they can especially from the populated areas
Legal Systems	Government should regulate mobile data transfer and transactions
	Laws should cover users' data security when transferring information or money through electronic and mobile devices
	Laws should cover users' privacy when conducting electronic and mobile transaction and exchanging opinions with the government.
	Laws should cover mobile contracts and mobile signatures.
Awareness	Jordanians are not aware of M-Government services existence
	Government should have taken advantage of high mobile penetration and disseminate mobile portal link to all Jordanians
	Government should use all available promotional tools to inform people
Education	Education should start from schools and universities

	Government can add a topic easily to educational programmes for schools and universities
	Education should also be given to government employees because: They will process users requests at the end and having employees believe in the importance of this topic is very fundamental
	Both citizens and government employees should be educated on the benefits and uses of M-Government
Users' acceptance: Users' needs and preferences, User-friendly applications	Government should use simple technology and simple interface
	Currently market still have some simple mobile devices and there are different educational levels among users
	Government should add language detection ability because in Jordan some of the people use Arabic language as the default language in their mobile device and other people use English language as the default language, so adding language detection ability will safe users time and the inconvenience of changing language options
	Government should test small scaled pilot applications before final launch to ensure that applications are user-friendly
	The issue of user needs and preferences is usually neglected in developing countries, governments think about the technology and its uses but never think about what users need from that technology
	The need to collect feedback from users on their needs and preferences and then design applications based on their feedback.
Compatibility and Interoperability	Compatibility and interoperability issue come from the existence of deferent mobile devices, networks and applications.
	Applications should be designed to work in most devices
	Government can develop web based applications which will allow all people with Internet access to get the service disregards of the mobile operating system.
	Government should collect data on the existing devices with Jordanian users and based on that government should build its own frameworks
	The Ministry of Information and Communication Technology should define its compatibility and interoperability frameworks
Reliability	Reliability of service and outcome is important in all developing countries because people usually have no trust with government accuracy
	Government should ensure reliability by testing applications before launching them
	Government should test the reliability and accuracy of the service and not

	just the application

Appendix 9: All themes and sub-themes derived from the mobile operators' employees focus group

Success factors	Themes and sub-themes
Security, privacy and trust	Mobile government and electronic government haven't been regulated yet.
	Legal systems should cover the regulation of the data security and privacy which will increase trust in Government.
	Government should encourage people to change their perspective about security and privacy especially when conducting financial transactions.
	After implementing security measures and generating suitable laws, government should inform users with the change
	Government should inform people on what they will do with their data
	Government should assure users that their data are kept in safe place and will not be shared with any third party
	Privacy policies in websites
Cost	The current cost of the SMS solution is less than 0,01 JD
	Government charge 0,09 JD for enquiry services
	Intangible benefits of mobile government
	Government should use the sophisticated existed ICT infrastructure of mobile operators in order to keep the investment cost minimal in future applications.
	Having an intermediary between government and mobile operators increases the cost
mobile payment system	Currently one mobile operator has an M money system
	Another MO is working on a similar project that will be launched soon.
	Incentive campaign will encourage people to try M money
	There will be huge benefits for users to use mobile payment system
	Promoting these services should be done through sending SMS for users introducing these services and their benefits after launching them
	Users shouldn't pay tax for government to top up

Accessibility	Government must design mobile versions of their websites
	Users should be giving the choice between more than one language
	Government should use the following delivery channels: mobile Internet, SMS and IVR
Mobile device limitations and usability	Government should use simple technology
	Government should design applications with mobile device limitations in mind
	Testing in deferent mobile devices is very important prior to launching applications.
Responsiveness	Government should study the process and try to reduce time between receiving enquiry and answering back
	Eliminating intermediary will increase responsiveness
	Government has the qualified staff to deal directly with MOs
Availability	Mobile operators in Jordan cover 99% of the populated area
	Mobile government is very important for rural areas and some of these areas are not really populated
	It is unprofitable for mobile operators to cover unpopulated areas
	Government can coordinate the use of the police network which covers all unpopulated areas
Legal systems	Legal frameworks for mobile services and electronic services are needed
	Regulations for mobile government and mobile commerce are needed too
	Laws should cover mobile document and mobile signature
	Laws should cover privacy and security
	Government should inform people with change when it occurs
Awareness	A comprehensive campaign is needed after establishing the ground for technology acceptance
	Many governmental entities can help in that such as: Knowledge stations that cover many parts of Jordan Schools and universities
	Government should also think about traditional promotional channels such as newspapers, radio and TV
Education	One entity should be responsible for education
	The responsible entity should exist in all locations even rural

	areas and should have the adequate infrastructure
	Ministry of Education (MOE) is the best entity for education since it exists in all locations and has its own network that connects all schools
	Government employees should be educated to ease their concerns and overcome their resistance
Users' acceptance for mobile government services	Government should test all its applications by end-users
	Government should collect data from users and design their services based on users feed back
	Government can use either surveys, group interviews or even focus groups to collect data from users
Compatibility and interoperability	Testing applications in different devices and different operating systems will overcome this issue
	Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores, such as Apple, Android, Blackberry and Nokia OVI stores. Users can be informed through SMS
	Government also can publish all applications through a website then users can download the suitable application for their mobile device
	In order to bypass the different operating systems issue, Government can develop a web based application
	Government can also use all or some of the previous suggestions
Reliability of M-Government services	Currently there is an intermediary for the following reasons: Government wouldn't like to be the sole responsible entity Government wouldn't like to invest in some infrastructure and hire employees
	Government can eliminate intermediary and educated IT staff to handle this part
	Government should have back up even for the intermediary

Appendix 10: Mean and standard deviation for all variables/ research phase 5

	Mean	Std. Deviation
Government should use a multi-channel service delivery approach such as providing its services through the following channels: SMS solution, mobile Internet (MI) and intelligent voice recognition (IVR)	4.28	.453
Government should give people the choice between the two most common languages in Jordan (Arabic and English) to access services	4.16	.367
Government should build mobile applications with disabled people in mind. Therefore government should offer access to its services in alternative forms such as video and voice	4.31	.464
Government should have mobile version websites for all its related entities	4.22	.414
Mobile version websites should have alternative texts for images in order to ensure that information is available for people who turn off images on their mobiles	4.20	.402
Government should predefine all services that can be delivered through mobile applications	4.31	.464
Government should build the suitable content for all its potential mobile government services	4.20	.402

	Mean	Std. Deviation
Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and encourage mobile operators to cover them especially if they were populated	4.23	.425
Government should coordinate the use of Jordanian police network by mobile operators since it covers all the unpopulated areas that are not covered by private mobile operators	4.19	.395
Government should use all traditional marketing tools such as newspaper ads, TV promotion, radio etc. to spread awareness of M-Government portal in Jordan	4.34	.476
Government should send an SMS message to all users in Jordan introducing mobile government services and providing a link to the mobile portal that can be downloaded	4.16	.367
Government should include mobile government as an academic subject in the Jordanian school and university programs to inform people of the benefits and uses of M-Government	4.08	.264
Government should use the existing knowledge stations that are distributed in many parts of the country to spread awareness about M-Government services	4.30	.461
Government should launch an incentive program to encourage citizens to use mobile government services	4.26	.440

	Mean	Std. Deviation
Government should design applications for universal low features handsets	4.36	.482
Government should build its own compatibility and interoperability frameworks that should cover: different operation systems, languages, hardware and transmission protocols	4.31	.464
Government should collect data on the existing devices with Jordanian users and use this data to build compatible applications	4.47	.501
Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then government can inform users through SMS	4.38	.488
Users should be able to download mobile government services application from a central Government website	4.43	.496
Users should not pay for M-Government enquiry services	4.58	.495
Government should use mobile operators existing infrastructure when implementing M-Government services in order to keep the cost low	4.11	.312
Government should encourage mobile operators (MOs) to handle part of the cost of mobile government applications as part of their corporate social responsibility (CSR) campaigns	4.10	.301
Government should charge for customized and added value services only	4.08	.264

	Mean	Std. Deviation
Government should educate citizens in regard to mobile government benefits and uses through Ministry of Education (MOE) and knowledge stations	4.21	.408
Government should use the existing knowledge stations that are distributed in many parts of the country to conduct specialized training programs and workshops on the benefits of using mobile government services for local communities	4.33	.470
Government should educate its employees on the benefits of mobile government and the importance of user acceptance in implementing successful applications	4.31	.464
Government employees should be assured that mobile technologies will not lead to their replacement	4.31	.464
Government should introduce laws and regulations that regulate electronic and mobile data transfer between the following stakeholders: Government and users, businesses and users and users themselves	4.48	.502
Government should provide laws and regulations that tackle the issue of electronic and mobile crimes	4.52	.502
Government should provide laws and regulations that tackle the issue of electronic and mobile document in addition to electronic and mobile signature	4.15	.359

	Mean	Std. Deviation
The suitable mobile payment system for mobile government in Jordan is using tax-free phone credit	4.19	.395
Government should provide laws and regulations that tackle the issue of money back guarantee for mobile payments	4.40	.492
Government should launch an incentive campaign to encourage users to use mobile payment method	4.28	.453
Government should reengineer its process in order to ensure maximum reduction of time between submission time and response time to mobile government services	4.36	.482
Government should eliminate the intermediary between government and mobile operators and deal directly with mobile operators and users	4.28	.453
Government should adopt a tracking system for mobile government services and users should receive an acknowledgment SMS with a ticket number for tracking purposes	4.45	.500
Government should deploy an incentive program to change Jordanians' attitudes towards electronic and mobile transactions. For example, encourage Jordanians to use their credit and debit cards electronically and via mobile devices	4.55	.500

	Mean	Std. Deviation
Government should provide laws and regulations that tackle the issue of users' data security when transferring information or money through electronic and mobile devices and assure citizens that their data is secure	4.49	.502
Government should provide laws and regulations that tackle the issue of users' privacy and assure citizens that their data is protected and will not be sold to any other third party by either the government or the mobile operators	4.57	.498
All Government websites should have concise security and privacy policies	4.13	.332
Government should launch an awareness campaign to ease people's concerns in relation to security, privacy and trust	4.27	.444
Government should use simple technology when designing mobile government (M-Government) services	4.16	.367
Government should launch small scale pilot applications prior to launching final applications and test these applications with a sample of end-users	4.49	.502
Mobile government applications should detect mobile default language defined by the user (English or Arabic) and display content in that language	4.33	.473

	Mean	Std. Deviation
Government should conduct a survey to define users' needs and preferences for mobile government services and applications from both remote cities and remote areas	4.47	.501
Government should design applications and choosing delivery method based on users' feedback	4.50	.502
Government should keep mobile government applications content short through prioritizing content and keeping only the most important content	4.29	.456
Mobile government applications and websites should have limited use of graphics	4.20	.402
Mobile government applications and websites should improve people's mobile experience	4.21	.408
Mobile government applications and websites should allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard	4.19	.395
Mobile government applications and websites should be tested in different mobile browsers and in mobile devices	4.17	.374

Appendix 11: One sample T-test results for proposed strategies

	Test Value = 4					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
	Lower	Upper	Lower	Upper	Lower	Upper
Government should use simple technology when designing M-Government services	4.731	119	.000	.158	.09	.22
Government should launch an awareness campaign to ease people's concerns in relation to security, privacy and trust	6.578	119	.000	.267	.19	.35
Mobile government applications should detect mobile default language defined by the user (English or Arabic) and display content in that language	7.714	119	.000	.333	.25	.42
All Government websites should have concise security and privacy policies	4.123	119	.000	.125	.06	.19
Government should encourage mobile operators (MOs) to handle part of the cost of mobile government applications as part of their corporate social responsibility (CSR) campaigns	3.636	119	.000	.100	.05	.15
Users should be able to download mobile government services application from a central Government website	9.379	119	.000	.425	.34	.51

Government should provide laws and regulations that tackle the issue of users' data security when transferring information or money through electronic and mobile devices and assure citizens that their data is secure	10.728	119	.000	.492	.40	.58
Government should include mobile government as an academic subject in the Jordanian school and university programs to inform people of the benefits and uses of M-Government	3.106	119	.002	.075	.03	.12
Government should conduct a survey to define users' needs and preferences for mobile government services and applications from both remote cities and remote areas	10.204	119	.000	.467	.38	.56
Government should launch small scale pilot applications prior to launching final applications and test these applications with a sample of end-users	10.728	119	.000	.492	.40	.58
Government should provide laws and regulations that tackle the issue of electronic and mobile document in addition to electronic and mobile signature	4.583	119	.000	.150	.09	.21
Government should use mobile operators existing infrastructure when implementing M-Government services in order to keep the cost low	3.802	119	.000	.108	.05	.16

Government should design applications and choosing delivery method based on users' feedback	10.909	119	.000	.500	.41	.59
Government should charge for customized and added value services only	3.106	119	.002	.075	.03	.12
Government should keep mobile government applications content short through prioritizing content and keeping only the most important content	7.000	119	.000	.292	.21	.37
Mobile government applications and websites should have limited use of graphics	5.454	119	.000	.200	.13	.27
Mobile government applications and websites should improve people's mobile experience	5.596	119	.000	.208	.13	.28
Mobile government applications and websites should allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard	5.312	119	.000	.192	.12	.26
Mobile government applications and websites should be tested in different mobile browsers and in mobile devices	4.879	119	.000	.167	.10	.23
Government should predefine all services that can be delivered through mobile applications	7.283	119	.000	.308	.22	.39
Government should build the suitable content for all its potential mobile government services	5.454	119	.000	.200	.13	.27

Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and encourage mobile operators to cover them especially if they were populated	6.018	119	.000	.233	.16	.31
Government should coordinate the use of Jordanian police network by mobile operators since it covers all the unpopulated areas that are not covered by private mobile operators	5.312	119	.000	.192	.12	.26
Government should use a multi-channel service delivery approach such as providing its services through the following channels: SMS solution, mobile Internet (MI) and intelligent voice recognition (IVR)	6.859	119	.000	.283	.20	.37
Government should build mobile applications with disabled people in mind Therefore government should offer access to its services in alternative forms such as video and voice for example	7.283	119	.000	.308	.22	.39
Government should give people the choice between the two most common languages in Jordan (Arabic and English) to access services	4.731	119	.000	.158	.09	.22
Government should have mobile version websites for all its related entities	5.737	119	.000	.217	.14	.29

Mobile version websites should have alternative texts for images in order to ensure that information is available for people who turn off images on their mobiles	5.454	119	.000	.200	.13	.27
The suitable mobile payment system for mobile government in Jordan is using tax-free phone credit	5.312	119	.000	.192	.12	.26
Government should launch an incentive campaign to encourage users to use mobile payment method	6.859	119	.000	.283	.20	.37
Government should provide laws and regulations that tackle the issue of money back guarantee for mobile payments	8.907	119	.000	.400	.31	.49
Government should reengineer its process in order to ensure maximum reduction of time between submission time and response time to mobile government services	8.152	119	.000	.358	.27	.45
Government should eliminate the intermediary between government and mobile operators and deal directly with mobile operators and users	6.859	119	.000	.283	.20	.37
Government should adopt a tracking system for mobile government services and users should receive an acknowledgment SMS with a ticket number for tracking purposes	9.867	119	.000	.450	.36	.54

Government should introduce laws and regulations that regulate electronic and mobile data transfer between the following stakeholders: Government and users, businesses and users and users themselves	10.551	119	.000	.483	.39	.57
Government should provide laws and regulations that tackle the issue of electronic and mobile crimes	11.279	119	.000	.517	.43	.61
Government should deploy an incentive program to change Jordanians' attitude towards electronic and mobile transactions. For example, encourage Jordanians to use their credit and debit cards electronically and via mobile devices	12.060	119	.000	.550	.46	.64
Government should use all traditional marketing tools such as newspaper ads, TV promotion, radio etc. to spread awareness of M-Government portal in Jordan	7.859	119	.000	.342	.26	.43
Government should send an SMS message to all users in Jordan introducing mobile government services and providing a link to the mobile portal that can be downloaded	4.731	119	.000	.158	.09	.22

Government should provide laws and regulations that tackle the issue of users' privacy and assure citizens that their data is protected and will not be sold to any other third party by either the government or the mobile operators	12.475	119	.000	.567	.48	.66
Government should use the existing knowledge stations that are distributed in many parts of the country to spread awareness about M-Government services	7.154	118	.000	.303	.22	.39
Government should launch an incentive program to encourage citizens to use mobile government services	6.438	119	.000	.258	.18	.34
Government should educate citizens in regards to mobile government benefits and uses through Ministry of Education (MOE) and knowledge stations	5.596	119	.000	.208	.13	.28
Government should use the existing knowledge stations that are distributed in many parts of the country to conduct specialized training programs and workshops on the benefits of using mobile government services for local communities	7.569	119	.000	.325	.24	.41
Government should educate its employees on the benefits of mobile government and the importance of user acceptance in implementing successful applications	7.283	119	.000	.308	.22	.39

Government employees should be assured that mobile technologies will not lead to their replacement	7.283	119	.000	.308	.22	.39
Government should design applications for universal low features handsets	8.152	119	.000	.358	.27	.45
Government should build its own compatibility and interoperability frameworks that should cover: different operation systems, languages, hardware and transmission protocols	7.283	119	.000	.308	.22	.39
Government should collect data on the existing devices with Jordanian users and use this data to build compatible applications	10.204	119	.000	.467	.38	.56
Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then government can inform users through SMS	8.601	119	.000	.383	.30	.47
Users should not pay for M-Government enquiry services	12.907	119	.000	.583	.49	.67

Appendix 12: One way analysis of variance (ANOVA)/ differences between cities

	Sig.
Government should use simple technology when designing mobile government (M-Government) services	.960
Government should launch an awareness campaign to ease people's concerns in relation to security, privacy and trust	.976
Mobile government applications should detect mobile default language defined by the user (English or Arabic) and display content in that language	.998
All Government websites should have concise security and privacy policies	.907
Government should encourage mobile operators (MOs) to handle part of the cost of mobile government applications as part of their corporate social responsibility (CSR) campaigns	.956
Users should be able to download mobile government services application from a central Government website	.998
Government should provide laws and regulations that tackle the issue of users' data security when transferring information or money through electronic and mobile devices and assure citizens that their data is secure	.933
Government should include mobile government as an academic subject in the Jordanian schools and universities programs to inform people of the benefits and uses of M-Government	.959
Government should conduct a survey to define users' needs and preferences for mobile government services and applications from both remote cities and remote areas	.960
Government should launch small scale pilot applications prior to launching final applications and test these applications with a sample of end-users	.834
Government should provide laws and regulations that tackle the issue of electronic and mobile document in addition to electronic and mobile signature	.808
Government should use mobile operators existing infrastructure when implementing M-Government services in order to keep the cost low	.787
Government should design applications and choosing delivery method based on users' feedback	.801
Government should charge for customized and added value services only	.959
Government should keep mobile government applications content short through prioritizing content and keeping only the most important content	.951
Mobile government applications and websites should have limited use of graphics	.944

Mobile government applications and websites should improve people's mobile experience	.922
Mobile government applications and websites should allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard	.829
Mobile government applications and websites should be tested in different mobile browsers and in mobile devices	.949
Government should predefine all services that can be delivered through mobile applications	.986
Government should build the suitable content for all its potential mobile government services	.787
Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and encourage mobile operators to cover them, especially if they are populated	.771
Government should coordinate the use of Jordanian police network by mobile operators, since it covers all the unpopulated areas that are not covered by private mobile operators	.912
Government should use a multi-channel service delivery approach such as providing its services through the following channels: SMS solution, mobile Internet (MI) and intelligent voice recognition (IVR)	.938
Government should build mobile applications with disabled people in mind. Therefore government should offer access to its services in alternative forms such as video and voice for example	.907
Government should give people the choice between the two most common languages in Jordan (Arabic and English) to access services	.777
Government should have mobile version websites for all its related entities	.967
Mobile version websites should have alternative texts for images in order to ensure that information is available for people who turn off images on their mobiles	.988
The suitable mobile payment system for mobile government in Jordan is using tax-free phone credit	.912
Government should launch an incentive campaign to encourage users to use mobile payment method	.882
Government should provide laws and regulations that tackle the issue of money back guarantee for mobile payments	.944
Government should reengineer its process in order to ensure maximum reduction of time between submission time and response time to mobile government services	.612
Government should eliminate the intermediary between government and mobile operators and deal directly with mobile operators and users	.977

Government should adopt a tracking system for mobile government services and users should receive an acknowledgment SMS with a ticket number for tracking purposes	.947
Government should introduce laws and regulations that regulate electronic and mobile data transfer between the following stakeholders: Government and users, businesses and users and users themselves	.874
Government should provide laws and regulations that tackle the issue of electronic and mobile crimes	.701
Government should deploy an incentive program to change Jordanians' attitude towards electronic and mobile transactions. For example, encourage Jordanians to use their credit and debit cards electronically and via mobile devices	.996
Government should use all traditional marketing tools such as newspaper ads, TV promotion, radio…etc to spread awareness of M-Government portal in Jordan	.148
Government should send an SMS message to all users in Jordan introducing mobile government services and providing a link to the mobile portal that can be downloaded	.777
Government should provide laws and regulations that tackle the issue of users' privacy and assure citizens that their data is protected and will not be sold to any other third party by either the government or the mobile operators	.998
Government should use the existing knowledge stations that are distributed in many parts of the country to spread awareness about M-Government services	.886
Government should launch an incentive program to encourage citizens to use mobile government services	.982
Government should educate citizens in regards to mobile government benefits and uses through Ministry of Education (MOE) and knowledge stations	.922
Government should use the existing knowledge stations that are distributed in many parts of the country to conduct specialized training programs and workshops on the benefits of using mobile government services for local communities	.944
Government should educate its employees on the benefits of mobile government and the importance of user acceptance in implementing successful applications	.176
Government employees should be assured that mobile technologies will not lead to their replacement	.986
Government should design applications for universal low features handsets	.808
Government should build its own compatibility and interoperability frameworks that should cover: different operation systems, languages, hardware and transmission protocols	.639
Government should collect data on the existing devices with Jordanian users and	.874

use this data to build compatible applications	
Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then government can inform users through SMS	.102
Users should not pay for M-Government enquiry services	.059

Appendix 13: One way analysis of variance (ANOVA) results/ differences between different age groups

	Sig.
Government should use simple technology when designing mobile government (M-Government) services	.472
Government should launch an awareness campaign to ease people's concerns in relation to security, privacy and trust	.310
Mobile government applications should detect mobile default language defined by the user (English or Arabic) and display content in that language	.168
All Government websites should have concise security and privacy policies	.990
Government should encourage mobile operators (MOs) to handle part of the cost of mobile government applications as part of their corporate social responsibility (CSR) campaigns	.190
Users should be able to download mobile government services application from a central Government website	.135
Government should provide laws and regulations that tackle the issue of users' data security when transferring information or money through electronic and mobile devices and assure citizens that their data is secure	.278
Government should include mobile government as an academic subject in the Jordanian school and university programs to inform people of the benefits and uses of M-Government	.063
Government should conduct a survey to define users' needs and preferences for mobile government services and applications from both remote cities and remote areas	.095
Government should launch small scale pilot applications prior to launching final applications and test these applications with a sample of end-users	.323
Government should provide laws and regulations that tackle the issue of electronic and mobile document in addition to electronic and mobile signature	.965
Government should use mobile operators existing infrastructure when implementing M-Government services in order to keep the cost low	.191
Government should design applications and choosing delivery method based on users' feedback	.196
Government should charge for customized and added value services only	.978
Government should keep mobile government applications content short through prioritizing content and keeping only the most important content	.236

Mobile government applications and websites should have limited use of graphics	.066
Mobile government applications and websites should improve people's mobile experience	.066
Mobile government applications and websites should allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard	.056
Mobile government applications and websites should be tested in different mobile browsers and in mobile devices	.230
Government should predefine all services that can be delivered through mobile applications	.513
Government should build the suitable content for all its potential mobile government services	.122
Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and encourage mobile operators to cover them, especially if they are populated	.368
Government should coordinate the use of Jordanian police network by mobile operators, since it covers all the unpopulated areas that are not covered by private mobile operators	.097
Government should use a multi-channel service delivery approach such as providing its services through the following channels: SMS solution, mobile Internet (MI) and intelligent voice recognition (IVR)	.185
Government should build mobile applications with disabled people in mind. Therefore, Government should offer access to its services in alternative forms such as video and voice for example	.061
Government should give people the choice between the two most common languages in Jordan (Arabic and English) to access services	.473
Government should have mobile version websites for all its related entities	.066
Mobile version websites should have alternative texts for images in order to ensure that information is available for people who turn off images on their mobiles	.148
The suitable mobile payment system for mobile government in Jordan is using tax-free phone credit	.383
Government should launch an incentive campaign to encourage users to use mobile payment method	.073
Government should provide laws and regulations that tackle the issue of money back guarantee for mobile payments	.622

Government should reengineer its process in order to ensure maximum reduction of time between submission time and response time to mobile government services	.839
Government should eliminate the intermediary between Government and mobile operators and deal directly with mobile operators and users	.476
Government should adopt a tracking system for mobile government services and users should receive an acknowledgment SMS with a ticket number for tracking purposes	.979
Government should introduce laws and regulations that regulate electronic and mobile data transfer between the following stakeholders: Government and users, businesses and users and users themselves	.220
Government should provide laws and regulations that tackle the issue of electronic and mobile crimes	.093
Government should deploy an incentive program to change Jordanians' attitude towards electronic and mobile transactions. For example, encourage Jordanians to use their credit and debit cards electronically and via mobile devices	.578
Government should use all traditional marketing tools such as newspaper ads, TV promotion, radio…etc to spread awareness of M-Government portal in Jordan	.772
Government should send an SMS message to all users in Jordan introducing mobile government services and providing a link to the mobile portal that can be downloaded	.300
Government should provide laws and regulations that tackle the issue of users' privacy and assure citizens that their data is protected and will not be sold to any other third party by either the government or the mobile operators	.612
Government should use the existing knowledge stations that are distributed in many parts of the country to spread awareness about M-Government services	.306
Government should launch an incentive program to encourage citizens to use mobile government services	.237
Government should educate citizens in regards to mobile government benefits and uses through Ministry of Education (MOE) and knowledge stations	.253
Government should use the existing knowledge stations that are distributed in many parts of the country to conduct specialized training programs and workshops on the benefits of using mobile government services for local communities	.316
Government should educate its employees on the benefits of mobile	.744

government and the importance of user acceptance in implementing successful applications	
Government employees should be assured that mobile technologies will not lead to their replacement	.079
Government should design applications for universal low features handsets	.283
Government should build its own compatibility and interoperability frameworks that should cover: different operation systems, languages, hardware and transmission protocols	.474
Government should collect data on the existing devices with Jordanian users and use this data to build compatible applications	.781
Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then government can inform users through SMS	.347
Users should not pay for M-Government enquiry services	.599

Appendix 14: Independent-samples T-test results/ research phase 5

Independent Samples Test	Sig. (2-tailed)
Government should use simple technology when designing mobile government (M-Government) services	.179
Government should launch an awareness campaign to ease people's concerns in relation to security, privacy and trust	.453
Mobile government applications should detect mobile default language defined by the user (English or Arabic) and display content in that language	.574
All Government websites should have concise security and privacy policies	.328
Government should encourage mobile operators (MOs) to handle part of the cost of mobile government applications as part of their corporate social responsibility (CSR) campaigns	.319
Users should be able to download mobile government services application from a central Government website	.651
Government should provide laws and regulations that tackle the issue of users' data security when transferring information or money through electronic and mobile devices and assure citizens that their data is secure	.934
Government should include mobile government as an academic subject in the Jordanian schools and universities programs to inform people of the benefits and uses of M-Government	.637
Government should conduct a survey to define users' needs and preferences for mobile government services and applications from both remote cities and remote areas	.595
Government should launch small scale pilot applications prior to launching final applications and test these applications with a sample of end-users	.631
Government should provide laws and regulations that tackle the issue of electronic and mobile document in addition to electronic and mobile signature	.209
Government should use mobile operators existing infrastructure when implementing M-Government services in order to keep the cost low	.613
Government should design applications and choosing delivery method based on users' feedback	.162
Government should charge for customized and added value services only	.777
Government should keep mobile government applications content short through prioritizing content and keeping only the most important content	.433

Mobile government applications and websites should have limited use of graphics	.134
Mobile government applications and websites should improve people's mobile experience	.402
Mobile government applications and websites should allow for different input modalities such as touch screen, spoken commands, keypad and virtual keyboard	.246
Mobile government applications and websites should be tested in different mobile browsers and in mobile devices	.534
Government should predefine all services that can be delivered through mobile applications	.603
Government should build the suitable content for all its potential mobile government services	.319
Telecommunications Regulation Committee (TRC) in Jordan should define dead zones (areas that have no network) and encourage mobile operators to cover them, especially if they are populated	.695
Government should coordinate the use of Jordanian police network by mobile operators, since it covers all the unpopulated areas that are not covered by private mobile operators	.246
Government should use a multi-channel service delivery approach such as providing its services through the following channels: SMS solution, mobile Internet (MI) and intelligent voice recognition (IVR)	.633
Government should build mobile applications with disabled people in mind Therefore government should offer access to its services in alternative forms such as video and voice for example	.929
Government should give people the choice between the two most common languages in Jordan (Arabic and English) to access services	.803
Government should have mobile version websites for all its related entities	.841
Mobile version websites should have alternative texts for images in order to ensure that information is available for people who turn off images on their mobiles	.319
The suitable mobile payment system for mobile government in Jordan is using tax-free phone credit	.721
Government should launch an incentive campaign to encourage users to use mobile payment method	.633
Government should provide laws and regulations that tackle the issue of	.685

money back guarantee for mobile payments	
Government should reengineer its process in order to ensure maximum reduction of time between submission time and response time to mobile government services	.140
Government should eliminate the intermediary between Government and mobile operators and deal directly with mobile operators and users	.633
Government should adopt a tracking system for mobile government services and users should receive an acknowledgment SMS with a ticket number for tracking purposes	.920
Government should introduce laws and regulations that regulate electronic and mobile data transfer between the following stakeholders: Government and users, businesses and users and users themselves	.117
Government should provide laws and regulations that tackle the issue of electronic and mobile crimes	.666
Government should deploy an incentive program to change Jordanians' attitude towards electronic and mobile transactions For example, encourage Jordanians to use their credit and debit cards electronically and via mobile devices	.764
Government should use all traditional marketing tools such as newspaper ads, TV promotion, radio etc. to spread awareness of M-Government portal in Jordan	.392
Government should send an SMS message to all users in Jordan introducing mobile government services and providing a link to the mobile portal that can be downloaded	.768
Government should provide laws and regulations that tackle the issue of users' privacy and assure citizens that their data is protected and will not be sold to any other third party by either the government or the mobile operators	.051
Government should use the existing knowledge stations that are distributed in many parts of the country to spread awareness about M-Government services	.118
Government should launch an incentive program to encourage citizens to use mobile government services	.636
Government should educate citizens in regards to mobile government benefits and uses through Ministry of Education (MOE) and knowledge stations	.402
Government should use the existing knowledge stations that are distributed in many parts of the country to conduct specialized training programs and workshops on the benefits of using mobile government services for local	.313

communities	
Government should educate its employees on the benefits of mobile government and the importance of user acceptance in implementing successful applications	.068
Government employees should be assured that mobile technologies will not lead to their replacement	.166
Government should design applications for universal low features handsets	.291
Government should build its own compatibility and interoperability frameworks that should cover: different operation systems, languages, hardware and transmission protocols	.440
Government should collect data on the existing devices with Jordanian users and use this data to build compatible applications	.287
Government can develop applications for the existing operating systems and publish these applications in the main mobile devices stores and then Government can inform users through SMS	.562
Users should not pay for M-Government enquiry services	.568

Appendix 15: Previous studies that included success factors for mobile government

Study	Title
Ghyasi and Kushchu (2004)	M-Government: Cases of Developing Countries
Antovski and Gusev (2005)	M-Government Framework
Sandy and McMillan (2005)	A Success Factors Model For M-Government
Carroll (2005)	Risky Business: Will Citizens Accept M-Government in the Long Term?
El-Kiki and Lawrence (2006b)	Mobile User Satisfaction and Usage Analysis Model of Mgovernment Services
Maumbe and Owe (2006)	Bringing M-Government to South African Citizens: Policy Framework, Delivery Challenges and Opportunities
Kumar and Sinha (2007)	M-Government - Mobile Technology for e-Government
Capra, Francalanci and Marinoni (2008)	Soft Success Factors for M-Government
El-kiki (2007)	Mobile User Satisfaction and Usage Analysis Model of mGovernment Services
Al-Khamayseh, Elaine and Zmijewska (2006)	Towards Citizen-centric Mobile Government Services: A Roadmap
Bataineh, Abu-Shanab and Jdaitawi (2005)	M-Government in Jordan: Today and the Future
Abu-Samaha	The Prospects of Mobile Government in Jordan: An Evaluation of

Study	Title
and Abdel Samad (2008)	Different Delivery Platforms
Karan and Khoo (2008)	Mobile Diffusion and Development: Issues and Challenges of M-Government with India in Perspective
Hellstrom (2008)	Mobile Phones for Good Governance: Challenges and Way Forward
Sheng and Trimi (2008)	M-Government: Technologies, Applications and Challenges
Vincent and Harris (2008)	Effective Use of Mobile Communications in Egovernment: How do we Reach the Tipping Point?
Mengistu, Zo and Rho (2009)	M-Government: Opportunities and Challenges to Deliver Mobile Government Services in Developing Countries
Naqvi and AL-Shihi (2009)	M-Government Services Initiatives in Oman
Keoduangsine and Goodwin (2009)	User Satisfaction Model for Mobile E-Government Service
Al-Khamasey and Lawrence (2010)	Mobile Government in Action at Local Councils: A Case Study
Misra (2011)	Make M-Government an Integral Part of E-Government: An Agenda for Action
Rannu, Saksing and Mahlakõiv (2011)	Mobile Government: 2010 and Beyond
Al-Khamayseh and Lawrence (2011)	A Regional City Council mGovernment Case Study: Success Factors for Acceptance and Trust
Salkute, Kolhe and Veedhi (2011)	Implications of Mobile Communication Technologies (MCT) in M-Government: Challenges, Technology and Applications
GSMA Europe (2011)	M-Government: A New Public Space for European Citizens
Thunibat, Zin	Identifying User Requirements of Mobile Government Services in

Study	Title
and Sahari (2011)	Malaysia Using Focus Group Method