

THE TRANSITION OF DUBAI GOVERNMENT TO MOBILE
GOVERNMENT

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2010



RESEARCH PROJECT

PROFESSIONAL DOCTORATE (TRANSDISCIPLINARY STUDIES)

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The Transition of Dubai Government to Mobile Government

Submitted: April 2010

Abstract

This research report investigates the problems confronting the Dubai government in order to enhance the delivery of its current information and services. This is related to the research topic concerning the Dubai government information and services in the context of providing enhanced mobile and wireless environments for information and service delivery. This is embedded in the research question "What are the service enablers for the transition of Dubai government to mobile government over a five year period?". A literature review covered the current mobile government initiatives around the world and key identified mobile and wireless service enablers that could be applicable for the Dubai Police. A suitable research methodology was selected for the research including Soft System Methodology, Thematic Content Analysis (TCA) and Task-Technology Fit (TTF). A data collection was carried out in the Dubai Police, as an example department, using interviews and questionnaires. A recommended course of action document proposing the m-government solution is recommended for the Dubai Police. It has been concluded that the m-government solution consists of Mobile Messaging Services, Wireless Networks, Wireless Access Protocols, Web Services Architectures, Interactive Voice Response Systems, Mobile Geographic Information Systems, Mobile Resource Management, Mobile Procurement, Mobile Payments and Mobile Participation.

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Acknowledgement

Foremost, I would like to express my sincere and deep gratitude to my supervisor Dr. Rohan de Silva of CQUniversity Sydney for his continuous support, patience, motivation, enthusiasm, and his wide knowledge in my Professional Doctorate study and research. His guidance helped me in the writing of this thesis. I could not have imagined having a better supervisor for my research.

I am also grateful to Dr. Clive Graham, Creative Enterprise and Professional Doctorate Academic Director, CQUniversity for his constant direction during my first steps into the Professional Doctorate study and research. Dr. Clive made a significant contribution to build my knowledge and research base in a transdisciplinary and creative environment that had a remarkable influence on my entire research.

My special appreciation goes to the General Department of the Dubai Police for sponsoring my professional doctorate degree. My sincere thanks go to Lieutenant General Dhahi Khalfan Tamim, Commander-in-Chief of Dubai Police, for giving me the opportunity to continue my studies.

My sincere thanks go to Maj. Gen Tarish Eid Al Mansouri, Director General of Dubai Police Human Resources Department for giving me the permission and the opportunity to collect information from the General Department of the Dubai Police.

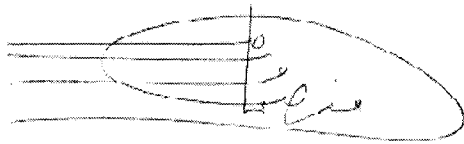
Special thanks to my industry advisor Badran Saeed Al Shamsi, Head of Human Resource Development in the Dubai Police, who provided the necessary access and advice in the workplace and ensured that the information gathering and use was performed ethically.

Last but not least, I would like to thank my family, and especially my parents, for always supporting me.

Declaration

I, Mansoor Nasser Alrazooqi hereby certify that the research conducted and presented in this project report is entirely my own work and that such work has not been previously submitted as a requirement for the award of a degree at CQUniversity or any other institution of higher education.

Signed:

A handwritten signature in black ink, appearing to read 'Mansoor Nasser Alrazooqi', is written over a set of five horizontal lines. The signature is enclosed within a large, hand-drawn oval.

Mansoor Nasser Alrazooqi

Date: 20/04/2010

Chapter 1

Introduction

Many governments around the world have a poor reputation in the level of services they provide (Bassara, Wisniewski & Zebrowski 2005:204). Overload of staff involving repetitive and manual tasks at government offices is time consuming and affecting worker morale. Low throughputs involved with traditional communication channels which are expensive to operate and require intensive human processing and lack of a single point of contact with the government are identified as the two key problems with traditional government service provision. Wimmer (2002:149) defines a single point of contact with the government that is also known as one stop government as follows:

It refers to a single point of access to electronic services and information offered by different public authorities. Online one-stop government requires all public authorities to be interconnected and that the customer (citizen, private enterprise and other public administration) is able to access public service by a single point even if these services are provided by different public authorities (Wimmer 2002:149);

The rapid development of Information and Communication Technologies (ICTs) coupled with the desire to overcome traditional government limitations and thereby improve government functions and services are factors driving the governments, including the United Arab Emirates (UAE) government, towards an electronic government (e-government) (Ndou 2004:1). E-government is the adoption of ICTs (mainly the Internet) by the government to provide government information and services to citizens, businesses, employees and other government departments (Grant & Chau 2005:3). E-government enables the citizens to interact and obtain government information and services 24 hours a day and seven days a week.

The advantage of providing services through electronic channels other than the Internet is that it enables a large number of citizens to interact with the government. This is enhanced by a growing interest in an “always-on” society (Song 2005) that the traditional and e-governments fail to deliver to an increasingly mobile society.

There are numerous problems and limitations associated with both traditional and e-governments. Such problems and limitations have led some governments to shift their attention to mobile government (m-government) as the target of e-government (Sharma & Gupta 2004:1). Song (2005) also advocates going beyond the traditional e-government to recognise the potential of m-government for the transformation of government services.

M-government is defined as a subset or a complement to the e-government through the utilisation of different mobile and wireless technologies, services, applications and devices to provide information and services to citizens, businesses, employees and all government units thus creating better opportunities for the public to participate and communicate with the government ((Kushchu & Kuscü 2003:1-2) & (Antovski & Gusev 2004)).

1.1 Motivation and Significance of this Research

The UAE is a federation of seven emirates; Abu Dhabi (the capital), Dubai, Sharjah, Ajman, Umm Al Quwain (UAQ), Ras Al-Khaimah (RAK) and Fujairah (See Appendix I). The total area of the UAE is 83,600 square kilometres.

Dubai is the second largest emirate after Abu Dhabi (area of 63,000 square km), with an area of 3,885 square kilometres. Dubai government consists of 28 main departments and authorities such as Dubai Municipality, Dubai Courts, Dubai Civil Aviation Authority, Department of Economic Development, Department of Health and Medical Services, and the Dubai Police (see Appendix I).

The e-government vision of the UAE has three goals (UAE government 2006:URL);

1. To become a world-class e-government

2. To create a knowledge-based society
3. To integrate policy formulation

However, according to UN statistics (United Nations 2005:URL), the UAE ranks 42nd in e-government services and 67th in electronic participation (e-participation). The UAE is thus far from achieving the e-government vision to become a world class e-government provider.

For countries such as the UAE which is in the early stage of e-government, the possibility of incorporating m-government into e-government is higher than the countries that have significant experience with e-government (Cilingir & Kushchu 2004:818). Cilingir and Kushchu (2004:818) believe that it is important to include m-government within the scope of e-government in order to have effective, efficient and future government services. In the UAE, there are multiple drivers towards m-government. For example, there is a high penetration of mobile and wireless devices in the UAE. For every 100 people, there are 176.50 mobile subscribers (International Telecommunication Union 2007:URL). Also, mobile phone penetration is well above PC penetration (Europmedia 2003:1).

However, the implementation of m-government is more complex than implementing e-government as governments need to identify the mobile technologies and applications relevant to service efficiency (Maio 2002). M-government involves using multiple wireless and

mobile technologies, services, applications and devices (Song & Cornford 2006:2). The development of infrastructure based services in this regard is in its infancy (Rossel, Finger & Misuraca 2006:80). Although there is a four stage model created for e-government by Gartner Group (Baum & Maio 2000), there is no model for m-government. Hence, there is a gap in the knowledge required for the provision of m-government.

1.2 Research Topic

Motivated by the reasons discussed in Section 1.1, this research studies the requirements of the users in context of the Dubai Police (as an example department from Dubai government) and proposes an m-government solution for the Dubai Police. It also attempts to incorporate cost effective mobile technologies and services that can be used in multiple environments and that can support highly personalised services in the m-government solution. It is a further aim of this research to help the Dubai government reach its vision in becoming a world class leader in e-government by incorporating m-government and creating an “always on” society. According to Avgerou (2001:15), the benefits expected of m-government might include:

- a. Increased productivity and efficiency;
- b. Improved management and decision-making;
- c. New products and services alongside traditional ones;
- d. Improved work arrangements;

- e. New possibilities in delivering public services.

As such, the research question is formally formulated as "What are the service enablers for the transition of the Dubai government to m-government over a five year period?".

The answer to this question is provided by meeting the following objectives:

- Identifying the problems and needs of the Dubai Police and its sectors to enhance services and customer participation;
- Identifying the current and emerging mobile and wireless technologies, applications and services for the Dubai Police in order to create a competitive and more participative UAE society;
- Developing a recommended course of action that proposes the m-government solution for the Dubai Police and creating a set of policies that can transform the Dubai government to m-government in 5 years.

The value of answering the research question and conducting the project is as follows:

- M-government can deliver information solutions for the Dubai Police and improve the government through the use of Information Technology (IT) for the benefit of its citizens.

- M-government has the capacity to solve traditional and e-government problems and provide a perfect environment for employees as it is not restricted to a wired network. It helps improve the internal processes of the government, provide citizens with convenient access to information anytime and anywhere, and reduce costs.
- The proposed research project adopts the transdisciplinary perspective of Mode-2 knowledge production by exploring multiple disciplines in research relevant to technology, government, business and society; that is, socially robust knowledge production.
- It could create value for the wider community. The proposed solution will help provide services through different channels on ICT. As such, the people from the wider community will have the choice to select the preferred means of access to the Dubai Police information and services alongside the traditional ones. This provides new means of accessing public services. As a result, the solution could be probably useful in similar situations at other places in the UAE or other countries.
- CQUniversity could benefit from this project, as this research outcome may generate further research questions.

- It will be useful for the researcher to answer the research question and gain an in-depth knowledge in the area of m-government.

1.3 Organisation of the Research Report

The rest of the report is organised as follows. In Chapter 2, a literature review of traditional and e-government problems is investigated. Moreover, a literature review of the key mobile and wireless service enablers that could be applicable to m-government solution for the Dubai government is undertaken followed by the current m-government initiatives around the world. The research methodology is detailed in Chapter 3 where various components in the selected research methodology are discussed. In this Chapter, the data collection procedure is also discussed including issues relating to population, sample and ethics. Data analysis methodology and the method of matching requirements to technologies and services are presented towards the end of Chapter 3. Several samples of collected data from interviews and questionnaires are presented in Chapter 4 and the entire data can be found in Appendix V. This Chapter also deals with data analysis and presentation as themes and categories. In Chapter 5, a recommended course of actions is provided for the Dubai Police that can transfer it to m-government. This m-government solution is extended for the Dubai government and a policy document is prepared that would incrementally transfer the Dubai government

to m-government. The research report is concluded in Chapter 6 where the key goals of this research are revisited and any deviations from the original plan are discussed. In addition, it also provides further research questions that arise as a result of this research.

Chapter 2

Literature Review

As discussed in Chapter 1, this research investigates the possibility of converting the Dubai government to a fully functional m-government. The Dubai government, as part of the UAE government, has a number of problems that have to be dealt with in order to reach this target. Two major problems of them are the inadequate access and participation of users, and inefficient cost, services and resource management.

Traditionally, governments used only telephones and faxes as electronic means for their communication. These governments had their inherent problems such as inefficient services and high costs associated with them. These problems of traditional governments are discussed in Section 2.1. There are several m-governments and their predecessors, e-governments currently proposed or deployed elsewhere in the world. These m-government initiatives are discussed in Section 2.5 of this Chapter. A good understanding of the technologies and services provided by mobile and wireless networks are required to understand these m-government initiatives. They are discussed in Section 2.4. Before introducing these technologies and

services, in Section 2.2, the e-governments and associated problems are discussed in detail.

2.1 Traditional Governments

Governments should provide information that is current, complete and accessible, and all citizens should be treated equally while participating and accessing information (OECD 2004:60). Decision making in the democratic process is insufficient if there is unequal opportunity for citizens to be involved in decision making programs (OECD 2004:55). Lack of awareness concerning how governments make decisions leads to lack of transparency and this prevents people from actively participating with the government (Centre for Democracy & Technology 2002:17).

Governments around the world are faced with problems of rising costs and declining quality of public services (Huque 2004:3). The public confidence in the government services have declined from 46% in 1983 to 17% in 2000, possibly due to the fact that government services are not improving as quickly as business services (Singh & Sahu 2004:4). Unlike the governments, businesses are quick to adopt the latest technologies to become more efficient and productive. The objective of the government is to provide services efficiently in terms of accessibility, friendliness and usability. But this objective is rarely satisfied (Bassara, Wisniewski & Zebrowski 2005:203). Bassara,

Wisniewski and Zebrowski (2005:203) observe that in the process of service delivery by the government, people wait in long queues, employees are busy attending phone calls and one government department redirects calls to another government department showing examples of inefficient and inconvenient service. Cambridgeshire County Council (2004:5) emphasises the need to reduce costs involving paper and mailing, repeat visits, document handling, correcting errors, dealing with customer queries and complaints by improving services, and providing strategic and intangible benefits. Furthermore, there is a low throughput when traditional communication channels are used. They are expensive to operate and require much human processing. Hence, Kamarck (2004:21) states that creating a government that costs less is difficult but will be the most important government innovation.

Traditionally, governments have allocated places to store paper documents (considered a waste of space), taking them more time to search for particular documents when required (Centre for Democracy & Technology 2002:19). This relates to the inefficiency resulting from inadequate interoperability. High costs associated with interoperability of traditional government lead to high costs in development and production as well as lower quality of service (Comert & Akinci 2003:4). For example, transferring information between different government departments still happens in traditional ways in some places which is very costly and time consuming. In the

UAE, it may require travelling to multiple cities and departments to obtain the information. While many operations of the government are still paper based, the information can be stored electronically except for the fact that a lack of interoperability can still exist between different information systems which is overcome by using the hard copy (Heeks 2000:4). This causes a duplication of processes and data within different government departments (Oracle 2003:2). As the National Office for the Information Economy (2002:5) assert, citizens and businesses should be able to deal with the government at any time without having to know which government department provides which services. As it is now, citizens have to visit different government departments to obtain information (Singh & Sahu 2004:9). This incurs high costs and dissatisfies citizens and businesses (Ndou 2004:9). Wayne observes that Information flows vertically and rarely horizontally between government departments (Huang et al. 2005:192). Wayne contends that this is because the information technologies used are not connected with each other.

Citizens are apparently not concerned with who is delivering a service or how it is provided, they are concerned with the availability of the service when they need it and the level of satisfaction of the quality of services (Millard 2003:16). Traditionally, citizens are treated as 'workers' in the delivery of government services by having to collect data required for their application themselves which need physical presence at different government departments (Comert & Akinci

2003:3). Many government channels are isolated and information is not synchronized between different interaction media such as face-to-face, Internet and phone (Oracle 2003:2).

In traditional face-to-face delivery of government services, the procedures are long, time consuming and inefficient (Ndou 2004:9). The method to inform citizens of government decisions such as the bulletin board approach is inconvenient (Comert & Akinci 2003:4). There is continuous criticism on the poor performance of the government as its coverage in terms of area is limited and some types of clients are in disadvantaged areas (Agriculture and Rural Development Department of the World Bank 2004:1). Earlier it was accepted that the government services should be provided only during working hours but this is no longer acceptable (Evans & Yen 2006:208). Rather, it is argued that citizens should be at work instead of waiting in long queues for government services.

In many countries, the number of people who participate with the government is decreasing. Brucher and Baumberger (2003:1) states a decrease of 40%. Reasons advocated for this decrease include the complexity of the political structure that limits people's participation, people prefer to spend their free time in leisure rather than in political problems, and most people have only a basic education and hence, do not know how to express their opinions (Brucher & Baumberger 2003:1). Brucher and Baumberger (2003:1) emphasises the

importance of looking for newer ways to reduce the abstinence and encouraging people to participate in the democratic arena. Public participation in the traditional arena is decreasing (Clift 2004:12). It is therefore necessary to use different means to make it easier for them to access and participate in the government (Brucher & Baumberger 2003:6).

Worldwide, there is an increased demand for quicker and longer access to government services, 24 hours a day, seven days a week, and government requirements to have shorter lifecycles and faster response times for service delivery (Cambridgeshire County Council 2006:URL). Consequently, governments might make information and services more accessible for citizens through the web and other communication technologies (Sharma & Gupta 2004:471). This changes the perspective of the government, who are now looking to bring services to people rather than have them visit the government departments in order to be serviced (World Wide Worx 2003:5).

2.2 E-governments

Though one of the important components of economic and social development is to provide citizens with access to government information and services, providing access to these services has been a challenging process (Heeks 2000:1). Providing access to government in the offline environment (face-to-face) causes difficulties for people

(Chen et al. 2004:194). As they can access government information and services only during working hours (National Office for the Information Economy 2002:5), which limits the democratic delivery of services is comprised. E-government that uses ICT and mainly the Internet enables the citizens to interact and obtain government information and services 24 hours a day, seven days a week.

There are five targets for the development of e-government (Heeks 2001:3):

- To acquire the same output as face-to-face delivery but at a lower cost.
- To acquire more outputs than face-to-face delivery but at the same cost.
- To acquire the same outputs as face-to-face delivery at the same cost and in a shorter time.
- To acquire the same outputs as face-to-face delivery at the same total cost, at the same time but at a higher quality standard.
- To produce new outputs.

Some of the main benefits of e-government are:

- Providing better public services online through one integrated stop portal 24 hours, seven days a week (Reffat 2002:3). Through the portal, citizens can obtain government information and complete any transaction online. They need not visit

different government departments or wait in queues as they currently do.

- Creating a new medium that will lead to increase citizen participation with the government through different ways such as online debate and discussion forums (Reffat 2002:3).
- Reducing cost and time: E-government will help reduce the processing costs for different tasks compared to the traditional way of processing the different functions (Ndou 2004:8).
- Reducing the digital divide (the gap between those who have access to ICT and those who do not) by making it possible for everyone to have access to new technologies and computer learning (Reffat 2002:2).

2.2.1 Problems of Access and Participation

Many researchers focus solely on the Internet portal as the important component of the e-government initiative. As a result of limited Internet penetration, e-government may worsen the digital divide and raise issues of inequality among citizens which is a matter of great concern (Song 2005:3). According to ITU statistics for 2004, only 10% of the world's population has Internet access, demonstrating an extreme digital divide (Singh & Sahu 2004:4-5).

Many governments have initiated the use of the Internet as a means to participate and contact them. However, there are still some weaknesses in this approach. For example, many people do not have Internet connection at home. Even though they may have access to Internet at public places, they prefer to access Internet from home (Brucher & Baumberger 2003:3). Hence, Riley (2004:3) states that one of the main issues is not just having online services but to create different levels of participation for citizens. Consequently, currently there are only a few governments at this time which have effectively involved citizens electronically (Riley 2003:63 and Riley & Riley 2003:15). Indeed, one of the opportunities of an e-government is to create new ways of interacting with citizens and linking communities (Tambouris, Gorilas & Boukis 2004:3).

The Dubai government has different websites for each department such as the Dubai Police, the Dubai Municipality and the Dubai Courts. This suggests that each government department has been developing its own system independent of other departments. Consequently, despite incurring additional expenditure on these resources, they result in low efficiency (Cilingir & Kushchu 2004:3). One of the biggest challenges to e-government is to integrate services at all levels of the government (Information, Communication and Space Technology (ICSTD) & Asian Development Bank Institute (ADBI) 2004:11). Interoperability, which allows different government departments to share information with each other, is important in

order to increase the effectiveness, efficiency and responsiveness required for reduced transition costs and increased participation (Moon 2004:11).

ICTs has a positive effect on people, but many are missing out or not benefiting from these opportunities as a result of lack of access and digital literacy training (Commission of the European Communities 2001:3). There are many people who live in areas of the UAE and elsewhere where access to technology infrastructure is ubiquitous, but are unable to use them because they are not e-literate (Centre for Democracy & Technology 2002:13).

Apparently, citizens would like to have different tools to facilitate easy access to government officials and departments (Riley 2004:6). Furthermore, access is a problem for people living in rural areas where there are no telecommunication infrastructure and often no government offices as well (Kushchu & Kuscu 2005:2). One of the main initiatives of e-government is to benefit rural and traditionally not-serviced communities (Centre for Democracy & Technology 2002:1). However, citizens who do not have Internet access will not have information on time (Singh & Sahu 2004:13). As a result, one of the key objectives of e-government is not materialised.

2.2.2 Problems of Inefficient Cost, Services and Resource Management

Inefficient and improper use of ICTs heralds future problems (Comert & Akinci 2003:2). Inefficient manual archiving systems and requesting information from citizens which is already held by other government departments are problems that need to be overcome (Comert & Akinci 2003:3). Field workers are inefficiently managed. A key challenge is to manage the time that the field worker spends on client issues such that every hour freed up can be spent with the client to improve efficiency and customer service (Microsoft 2005:1). Organisations are currently limited in extending the reach of their information systems to branch offices wired into their networked infrastructure. Consequently, mobile workers do not have real-time access to information systems and remain out of touch (SYBASE 2002:1). Field workers are still using paper which is inefficient, ineffective and costly (Microsoft 2005:1). Many government workers spend their time in the field to document activities and tasks (Intel 2003:3). Such field workers are unable to access critical and real-time information from that remote location, which is a disadvantage (Software Performance Systems 2005:1). These inefficient tasks are costly and also have an effect on the quality of service (Intel 2003:3).

There is a need to increase productivity from the government field workers and reduce the cost related to wires, disks and other

hardware (Centre for Digital Government 2005:4). Governments would like to enable employees to communicate with each other and work more efficiently (Sharma & Gupta 2004:464). They would like to improve the productivity of the field worker by enabling them to handle more cases and services by each field worker and having more productive time in the field by better management and providing real-time information. This enables the field officer to spend more time with clients and less on travelling to and from government offices to collect or submit data (Cambridgeshire County Council 2004:5). Assigning the right resource to the right task with the right equipment in the right location at the right time with the right IT tools will assist functioning as an efficient and flexible government (Zahran 2005:URL).

Song (2005:1) stated that while 'conventional e-government efforts have focused on providing access to services through Internet portals, it has so far not addressed the mobility of the government itself, or the mobility at large'. This is the current position of the UAE government. It has considered the Internet as the only electronic means of accessing electronic services limiting the information and services. For example, only 5% of UAE government organisations have fully transactional services (Mansar 2006:5). In order to have better services of enhanced quality internally within the Dubai government departments and externally with citizens and businesses, these services should be provided through different channels (OECD

2003:3). Even though government services are provided through the Internet, the way people communicate with the government has not changed significantly (Bassara, Wisniewski & Zebrowski 2005:203).

According to Nowotny, Scott and Gibbons (2001:252), 'the emergence of Mode-2 society raises acute issues of social justice, economic equality and the further democratization of knowledge'. A potential problem with e-government is that they cannot provide equal access to services, especially for those in urban and rural areas which do not have government offices, and telecommunication infrastructure to access limited online government services. The potential of m-government to facilitate social justice, economic quality and the further democratization of knowledge can be explored further. It is to be noted that mobile adoption is more prevalent worldwide than access to the Internet.

2.3 M-governments

M-government is the utilisation of different mobile and wireless technologies, services and applications allowing people to access the above services from a mobile or wireless device. A mobile device is not limited to a mobile phone, but could involve a Personal Digital Assistant (PDA), handhelds, smart phones, cellular phones, terminals or any other devices that can be carried (Texas Department of

Information Resources 2002:3-4). A mobile device is a computing device that is not restricted to a laptop and can connect to a data source without a physical connection (Sharma & Gupta 2004:463).

M-government is particularly attractive as it offers the fulfilment of many opportunities that traditional face-to-face and e-governments deny. M-government is in its infancy and early stages of development (Kushchu & Kuscu 2003:1). The development of ICTs has enhanced mobility, interactivity and the intelligence of web solutions and encourages the shift from electronic business (e-business) to mobile business (m-business) (Kushchu and Kuscu 2003:11).

Furthermore, there needs to be a consideration of comprehensive policies for accessing the government information and services which m-government facilitates. For those people with disabilities, it is important for the government to provide access to services without having to travel to government departments (Centre for Democracy & Technology 2002:15). The Commission of the European Communities (2001:15) suggests that the government reduces the administrative distance and queues for people with disabilities and those who are restricted in their mobility as well as overcomes geographic distance barriers and spreads knowledge equally (Commission of the European Communities 2001:4).

2.4 Mobile and Wireless Technologies and Services

There is a continuous trend indicating that mobile phone penetration is higher than Internet penetration. For example, as shown in Figure 2.1 below, mobile phone penetration in the world is well above the Internet penetration.

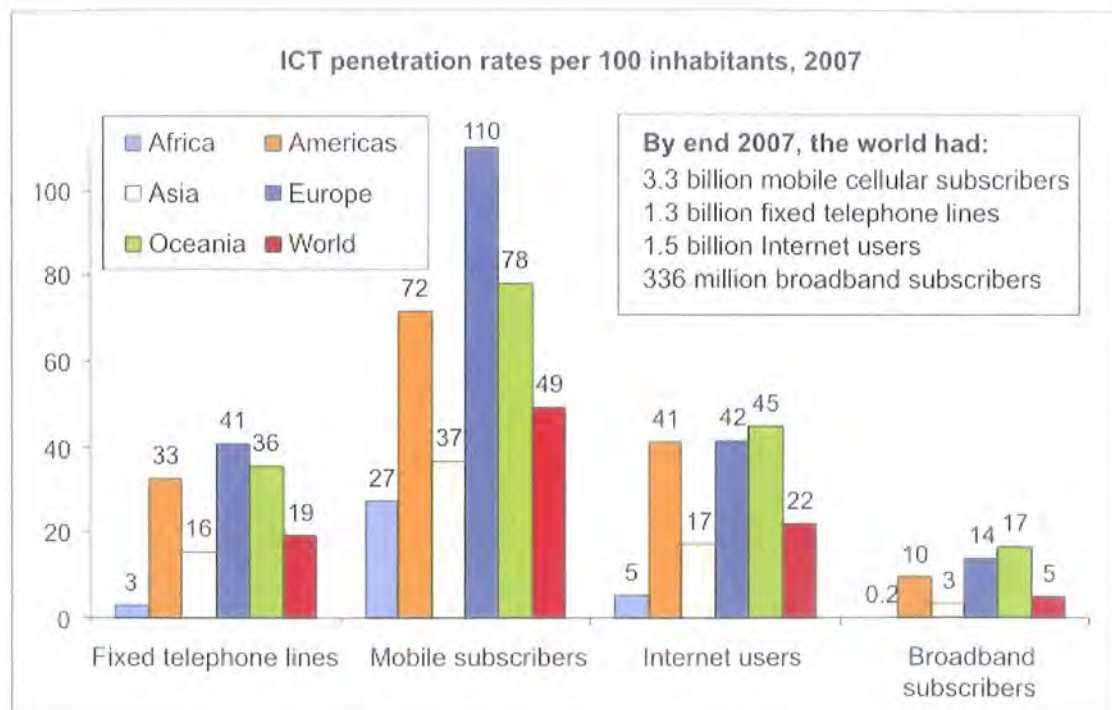


FIGURE 2.1: ICT PENETRATION RATES IN THE WORLD BY END OF 2007
 (ITU 2008:URL)

There are many innovations in the field of mobile and wireless technologies, devices, applications and services that can be applied to m-government. Examples of Mobile and wireless networks are Wireless Local Area Network (WLAN), Tetra, Worldwide Interoperability

for Microwave Access, Inc. (WiMAX), Bluetooth, Satellite and infrared. Mobile devices can take the form of PDA, cell phones, mobile terminals and smart phones. Many people use mobile devices as an essential part of their lives, and as a result, the wired connection to the Internet may lose its attraction due to the advances of mobile devices (Kushchu & Kuscu 2003:256). There is a continuous trend indicating that mobile phone penetration is higher than home PC penetration.

In the following section, different service enablers for mobile and wireless technologies and applications that can be useful for an m-government solution are reviewed.

2.4.1 Mobile and wireless networks

Wireless Internet is growing and expanding and many people use their wireless and mobile devices to access the wireless Internet. Currently, mobile and wireless network technologies are considered as the main channels for communication for hundreds of millions of users around the world (Juniper Research 2006:1). Many organisations are setting up or beginning to build wireless infrastructure. New wireless and mobile networks are introduced over time in order to support and provide access anytime and anywhere. The rapid developments in mobile and wireless network technologies have offered solutions to communication infrastructure in spite of its size and application

(Kopstopoulos & Rivera 2002). There are different mobile and wireless networks that have different features, usages, ranges and purposes depending on the requirement. Malladi & Argawal (2002:144) state that wireless networks are specifically suitable for situations that needs on the spot access to information. It is expected that wireless networking is going to replace wired network through the use of short range, medium and long range wireless networking technologies (Kopstopoulos & Rivera 2002:1), since they have many advantages over fixed lines, which include the following (Appropriate Technology 2006:51):

- The setup and maintenance of wireless networks is cheaper and faster than setup of fixed line networks. There are fewer infrastructures with wireless as fixed line networks require laying down and maintaining of cables and fibers.
- The deployment of wireless infrastructure is faster compared to fixed line infrastructure. It enables communication networks in rural and urban areas at a lower price.
- Wireless networks can provide better and more useful services.
- Wireless networks provide mobility, freedom and efficiency. Most of the technologies that are used by users are movable. They are either fully mobile such as a mobile phone or nomadic

such as laptop computer that can be moved temporarily from one Internet access point to another. Wireless networks can provide the required network for these types of technologies.

Two important wireless networks are WLANs and WiMAX. WLANs such as Wireless Fidelity (WiFi) can be used as an extension of the current local area networks (LAN). WiFi will be mainly useful to replace or supplement existing wired LANs. The main objective of WiMAX is to provide a broadband wireless network that covers a large area. WiMAX has a throughput of 70 Mbit per second as compared to 3 Mbps throughput of Third Generation (3G) (Vaughan-Nichols 2008:17), through a single channel and covers an area of 50km (Johnston & Aghvami 2007:194). The total capacity that could be offered from each base station could exceed 1 Gbps through the use of different channels (Suitor 2004). It is aimed to provide broadband wireless access, an attractive alternative solution to wired broadband technologies (Ghazal & Ben-Othman 2007:2) or even as a better solution (Yarali & Rahman 2008:77). Yarali and Rahman (2008) state that WiMAX will boost today's fragmented broadband wireless access market and mobile WiMAX promises to offer a solution to close the existing digital divide by addressing the needs such as cost effectiveness, high data rates, supporting fixed, nomadic and mobile applications thereby converging the fixed and mobile networks, easy deployment and flexible network architecture, supporting

interoperability with other networks, and is aiming to be the first truly global wireless broadband network.

WiFi will facilitate to have wireless broadband connection within a local area and WiMAX will extend services to cover the entire city. The devices in these networks can be installed anywhere without the need to dig roads for laying network cables (Intel 2003:3). This will help reduce cabling and associated costs such as installing, maintaining, troubleshooting and upgrading wires (Weber 2006:75-77). For example, the cost of installing only the wiring is between \$10 to \$1000 per foot (Weber 2006:75-77), whereas WiMAX base station will cost under \$20,000 covering up to 50km.

In conclusion, wireless broadband will be the main broadband access method for future user groups (Ranatunga, Withanage & Arunatileka 2008:140) and become apparent by the year 2012 (Yarali & Rahman 2008:82). The following chart in Figure 2.2 shows the mobile WiMAX subscribers forecast from 2007 to 2012.

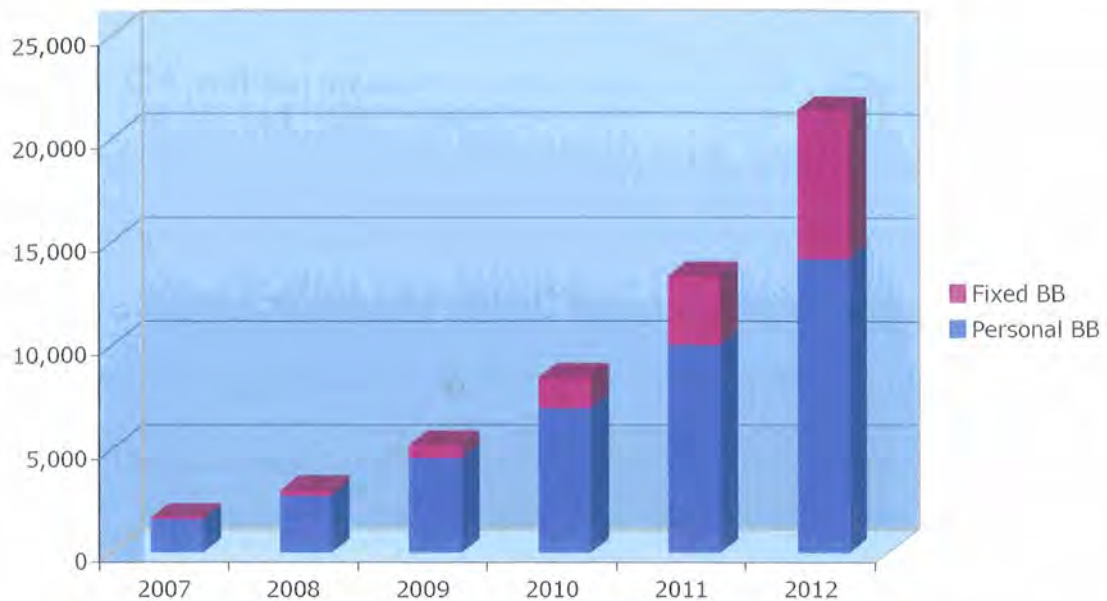


FIGURE 2.2: MOBILE WiMAX SUBSCRIBERS ('000) FIXED AND PERSONAL BROADBAND – GLOBAL FORECAST 2007-2012 (Juniper Research 2006:4)

2.4.2 Mobile Messaging

Mobile messaging services have changed and enhanced the way people communicate with each other. Mobile messaging technologies allow the exchange of messages between different mobile users (Bodlc 2002:13). According to Amplitude Research (2008:URL), about 73% of cell phone buyers consider text messaging as the most important reason for buying a cell phone, however 61% need a mobile for accessing the Internet and 63% use it for emails. In addition, two thirds of mobile phone users worldwide are active users of Short Message Service (SMS), which is twice more than the active users of emails (Bernhardt 2008). It is estimated that the value of the mobile messaging market increased from \$17.4 billion in 2002 to more than \$29 billion in 2006 (Hsu, Lu & Hsu 2006). According to Gartner

(Ingelbrecht et al. 2007:URL), mobile messaging was expected to exceed 2.3 trillion messages worldwide in 2008. There are many different mobile messaging services such as SMS, Enhanced Messaging Service (EMS), Multimedia Messaging Service (MMS) and Wireless Instant Messaging (WIM). Every messaging tool has its uses and areas of implementation. Mobile Messaging has a greater success rate than browser based applications in the areas of network efficiency, usability and availability (Shen et al. 2005:289). SMS has two important services; pull and push services. People can use the pull service feature to get specific information or they can use the push feature that enables a user to send information to a specific person or mass information to the entire population. Push services will save time and money of clients as compared to surfing the Internet (Dickinger, Heinzmann & Murphy). Pull messages provide clients with inexpensive or free information services according to their requests (Dickinger, Heinzmann & Murphy 2005:2). MMS which is an advanced type of messaging of SMS (Kim & Chun 2008:265) can provide a facility to send and receive multimedia messages. One of the main benefits of MMS is that it has two addressing modes, email and phone number addressing (Bodic 2005:213). Therefore, clients will be able to send an MMS message to an email address or a phone number. Organisations can enhance their presence and social interaction through Mobile Instant messaging (MIM) Staples, Wong & Cameron (2004) (effective virtual teams). MIM is predicted to be the

next mobile application market that exceeds the SMS market (Purdy 2006).

2.4.3 Mobile Geographic Information System (M-GIS) and Mobile Resource Management (MRM)

People need information of a specific location and how to reach a specific destination to be available at any time and any place (Yu Et al. 2003). Location is considered important for all sectors of the community, such as government, businesses and citizens. Moreover, spatial data is regarded as the most important information for the government (Yongling & Junsong 2007:80). Traditionally, we either remember the location information, or draw on a map. Therefore, Geographical Information System (GIS) has been developed to provide the electronic version of spatial data. GIS provides a geographic aspect to the organisation collaboration and this helps solve different problems that are difficult to deal with by any other means (Morris-Jones & Carter 2009:1646). GIS is an integration of hardware, software, trained people and data (GIS Lounge 2006:URL). It can operate on various kinds of mobile terminals such as mobile computers, PDAs, vehicle terminal devices and mobile phones (Li 2006:19). It has helped reduce costs by enabling employees to do their tasks more efficiently and, in turn, reduce the workload per employee. It has also improved productivity, performance, use of assets and decision making process by providing real time information (Pick

2004:63). GIS has some limitations such as the location is recorded and presented on static maps which is not very useful since most things we would like to locate are movable and not static (Tang & Selwood 2003:43). This led to the development of a new field called M-GIS (Tang & Selwood 2003:43). M-GIS is an expansion of GIS from the office to the field (ESRI 2007:URL). It consists of a mobile device, wireless or mobile communication, GIS, a positioning device, GIS embedded software, a mobile database and an application server (Yu et al. 2003:3). The main advantage of M-GIS is that the mobile or handheld computer can hold all the maps and connect in real time to the main server as opposed to using paper maps in the field (McDonald 2004:44). It can be used for areas such as environmental monitoring, utilities, maintenance, emergency response, navigation and tracking (Tsou 2004:153).

An important component of M-GIS is Location Based Services (LBS), which provides services and information according to the location of the client or user. Hence, the location of the client decides the content such as directions and instructions to reach a specific destination (Petrova 2006:769).

Transportation costs are calculated by considering the road distances, delay issues such as construction areas, tunnels and hence, further reduce costs (Sadoun 2008:973). M-GIS gives the decision makers the ability to categories and reorganise data in order to find patterns

which leads to discovering new information, better decisions and solutions to problems (Sadoun 2008:973). It will aid the Dubai Police to provide fast responses and better services (Tang & Selwood 2003:43).

One of the benefits of using GIS with other devices and applications is MRM. Resource Management is crucial for any organisation. Managing resources efficiently is important due to the fast increase in the size of the wireless community and limited resources (Kanellopoulos, Kotsiantis & Pintelas 2009:2180). It is important for the Dubai Police to plan, locate, track, monitor, and have knowledge about its movable resources such as mobile employees (such as policemen) or fleets (such as police cars) or static things in real time. Normally, field workers receive their tasks either by phone or they visit their office to collect their daily schedule and assignment. The administration has to call the field worker to know the progress of the assignment. In case of a new assignment, the administrator will have to call the field worker to know their location, job status and then assign the nearest worker to the place to do the task. This is a waste of time, money and resources. If the field workers require information from the administration to complete their task, they will have to go back to the office, or call the administration to find the exact location of the resource which is time consuming. MRM application has the ability to track the progress of the mobile resource in real time and

allows one to assign the right task to the right resource with the right equipment at the right time at the right location (Zahran 2005:URL).

2.4.4 Wireless Access Protocol (WAP)

A large amount of information that people want is available and accessible either through the Internet or intranet. Unfortunately, technologies and applications used and developed for the Internet are intended for the wired world and have not been developed to work for the wireless world (Cannataro & Pascuzzi 2000:178). The mobile users market is vast, and these users would like to have access to information through their devices without being limited to fixed computers. These devices have some limitations such as:

- Limited CPU speed, memory storage and battery power life.
- Different types.
- Small display screen.
- Limited facility for user input (lack of mouse and keyboard)
- Services created in HyperText Markup Language (HTML) language are not suitable for mobile devices and will not fit properly on these devices.

In addition, cellular networks such as GSM network have low data transfer rate (9.6 kbps for GSM and 60-80 kbps for General Packet Radio Services (GPRS)) compared to the fixed networks and high error rates compared to wired networks. In order to deal with these

limitations and to provide mobile access to Internet (Chen & Daim 2008) using low bandwidth networks, WAP) was developed. WAP is an open and key standard that enables mobile devices to access the Internet, emails and databases (Frolick & Chen 2004). The purpose of WAP is to provide a common environment for operators, content developers, infrastructures and mobile manufactures to enable the development of value added mobile phone services (Yen & Lancaster 2008:24). It enables a mobile device to access the desired information, save time and money by providing the ability to send and receive data in real-time and the possibility to run WAP based applications on traditional web sites through a slight program modification (Kumar, Parimi & Agrawal 2003:80). WAP can work over different mobile network services such as GPRS, CDMA, GSM and others and is independent of any network technology. Most mobile phones now have the WAP capabilities. It is considered the most widespread Internet enabling technology implemented by service providers and handset manufactures in America and Europe (Wang et al. 2005) which is compatible with almost all cell phones today (Streeter 2009:27).

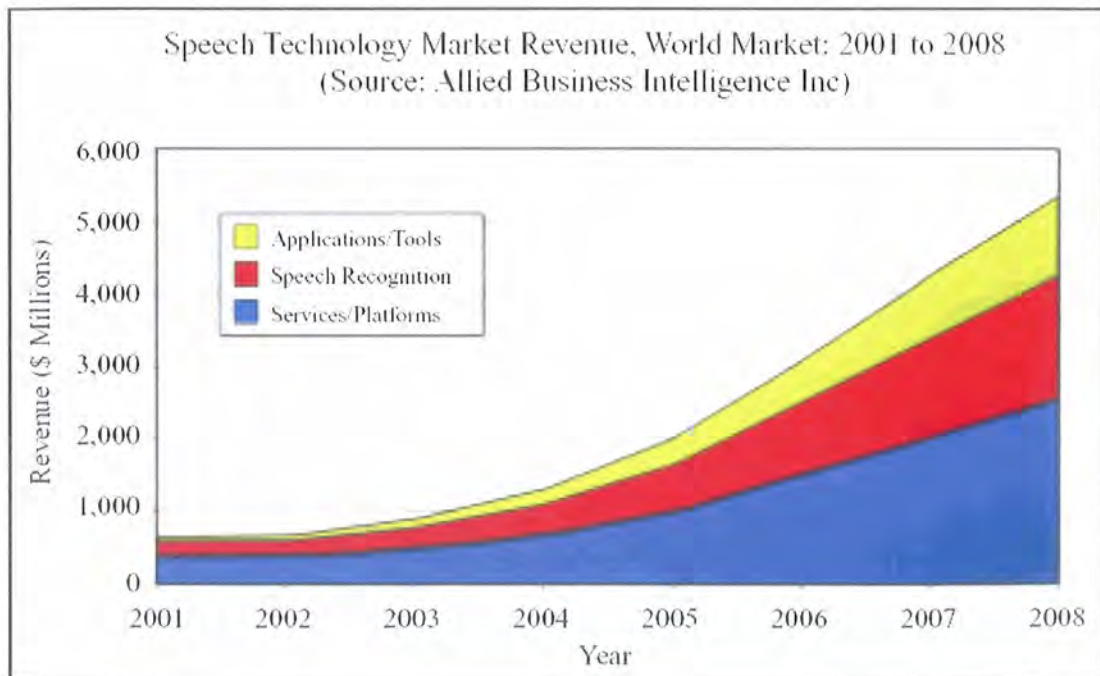
2.4.5 Web Services Architecture (WSA)

While dealing with legacy, interoperability is one of the challenges faced by e-government due to the various systems present in different languages and on different platforms (Wong & Tam 2004:URL). Web

services, as defined by W3C (2004:URL), is 'a software system designed to interoperable machine-to-machine interaction over a network'. Web service is an interface that enables isolated and different systems to communicate and share information (Wu, Chen & Rong 2009). It is the best technology choice for most enterprises in the area of project integration (Kumar 2005:44). It has the reuse concept. It reuses information and applications and share already developed applications (Isaias & Macedo 2007:1036). This will reduce the costs of systems integration and the time of development (Chen 2005:273). As stated by Pilioura et al. (2007:77), web services are considered as the most promising and fast developing technology for developing applications in an open, distributed and diverse setting. It provides a standard way of creating a connection between different software applications that are written in different languages and operating on different platforms (Hao et al. 2006:1). The content is customized automatically depending on the type of device (Sharma & Gupta 2004:469) & (Zhang & Cao 2005). One of the important objective of web services is to create plug and play m-government applications that provide interoperability between different systems (Sharma & Gupta 2004:468) while sharing information with others (Moon 2004:11).

2.4.6 Interactive Voice Response (IVR)

IVR enables organizations to provide services and information to clients through a voice portal (Leavitt 2003); Voice is considered the input and the output of the system. They are becoming the target of many organisations. As stated by Allied Business Intelligence (Industry research organisation) the speech recognition market was forecast to grow to \$5.3 billion by 2008 (Leavitt 2003:13) as shown in Figure 2.3.



**FIGURE 2.3 SPEECH TECHNOLOGY MARKET REVENUES, WORLD MARKET:
2001 to 2008
(Allied Business Intelligence 2003:URL)**

Users can interact with the voice application using different means such as voice, PC keyboard, mobile keyboard or telephone keyboard (Ruiz & Sanchez 2003:49).

IVR reduces costs of handling clients. As stated by Borders et al. (2009:1248), the average transaction cost for IVR is \$0.45 whereas phone customer care is \$5.50. It can provide responses to the clients through different forms such as voice, fax, callback, email, etc (Patel & Marwala 2008:3425). Voice information portals can serve a lot of people who cannot read or type (Townsend 2002). It is useful for users who have mobile devices with a small screen and tiny keyboard (Clark 2001:16) and have difficulties to use them to input or read information. Hence, clients will be able to use their voice for input and to hear the output. Some people such as older citizens may have difficulties to access Internet due to poor vision, literacy issues, and other disabilities (Headd 2007:1618).

2.4.7 Mobile Payment (M-Payment)

People are paying for purchasing products or services through different types of payments. These payments are traditionally done at the place where the purchase or service is provided such as in a government department. There are different traditional forms of payments available such as cash, cheques, credit cards and debit cards. However, the Internet has created a new opportunity to pay for

services such as electronic payments and digital payments. Hence, customers can select the products and services and pay for them online. The penetration of mobile and wireless devices is growing rapidly giving rise to a new way of payment which is m-payment (Ondrus 2004:2). Another reason for the growth of m-payment is that it can be made in all payment transactions types (Ondrus 2004:7). It is likely to be the successor to web payments (Kumar, Raj & Rabara 2008:43).

M-payment is very important for the success of m-government (Kushchu & Kuscu 2003). M-payments as defined by Mohammadi & Jahanshahi (2008:605) are payments for goods, services, and bills through the use of a mobile device (for instance, a mobile phone, smart-phone, or PDAs by taking advantage of wireless and other communication technologies. The users now have the ability to make payments using their mobile or wireless device (Ondrus 2004). M-payment can be transferred either directly or via an intermediary (Mallat & Tuunainen 2008:25). M-payment can be provided by using different means such as SMS, WAP and IVR (Siwen 2008:49). Other benefits includes convenience, flexibility, swiftness, low cost, scalable security, multiple points of contact and ease of use (Tong, Zhou & Liu 2005:880) & (Ho, Fong & Yan 2008:347).

Rouibah (2009) states some benefits of using m-payment:

It enables users to perform their transaction independent of location, and it complements the wide range of existing e-payment systems, such as digital credit cards, digital wallets systems, micro-payment systems, stored value payment systems (smart cards), accumulated balance digital payment systems, peer-to-peer payment systems, digital payment checking systems, and electronic bill payment systems.

Juniper Research (2005:URL) forecasts that m-payments will reach \$10 billion by the 2010 from \$155 million in 2005. The m-payment system consists of a merchant, a customer, a mobile operator and a payment transaction processing. The mobile operator can be a mobile network operator, government, a financial organisation, service provider, software provider and device manufacturer (Qiang & Lu 2008:1). As stated by Hu, Li and Hu (2008:1), that the next decade will be the decade of m-payment and digital cash.

2.4.8 Mobile Procurement (M-Procurement)

Procurement is an important issue for most organisations. They spend one third of their budget to purchase goods and services (Sheng 2008:3231). This involves the use of mobile applications and technologies to enhance procurement systems (Gebauer, Shaw & Zhao 2003). Approximately half the time taken for purchasing requests is a result of managers being out of the office (Ruhi & Turel 2005:107). Therefore, governments and businesses have shifted to the use of IT to

improve, automate and digitalize the procurement process (Neef 2001). Electronic procurement (e-procurement) provides an automated online solution for purchasing the needed supplies. Mobile technologies facilitate upgrading the traditional procurement system to M-procurement (Wu & Unhelkar 2008:492) which enables procurement services on the move.

2.4.9 Mobile Participation (M-participation)

It is the use of ICT (mobile and wireless) to provide greater opportunities for citizens to participate in the government process. This involves the use of mobile and wireless technologies to enhance participation by ease of access to political events, discussions, and voting (Brucher & Baumberger 2003). M-government can add up additional channels for citizens to participate, and therefore increase citizen participation (Trimi & Sheng 2008:55). Balasubramanian, Peterson and Jarvenpaa (2002), stated that the channels that are location and time flexible are highly appreciated and respected by customers.

A summary of technologies and services discussed in this section is shown in Table 2.1 below.

Type of Technology or Service	Cost	Setup and maintenance	Performance	Access & participation
Mobile and wireless network (WiMAX and WiFi)	cheaper than fixed lines	Faster than setting up mobile networks	Spded 70 Mbps, coverage 50 km through a single channel	Possible in rural and urban areas and cover large areas.
Mobile messaging (SMS, MMS, EMS)	cheaper than Internet and mobile calls	Easy to setup and maintain	Better than other communication means such as mail & fax. Allows sending different data types such as text, pictures, videos and audio.	Information sent to one person or many. Two modes: email and phone
M-GIS, MRM	Reduce the cost of field operations by reducing calls, paperwork and transportation cost	High cost to setup depending on the number of devices and layers used for mobile GIS	Providing faster response and accurate guidance compared to using paper maps and papers	Resources can be guided, tracked and located from Dubai Police H.Q. Policemen receives guidance and information access in the field using their mobile or wireless device.
WAP	Cost is reduced applications for both the Internet and WAP devices can be developed at once	Easy to build and manage as it is built on open standard	Faster way to build web pages for the Internet and mobile devices at once. It is designed to be independent of network.	Provide access to information through WAP compatible phones. It enables mobile devices to access Internet, email and databases

Type of Technology or Service	Cost	Setup and maintenance	Performance	Access & participation
WSA	Reduce the cost of applications integration and time of development	Easy to build and manage as it is built on open standard	WSA is based on XML and allows secure and reliable messaging between applications	Provides integration between different applications and provides access to these applications using different devices
IVR	Low cost. Average transaction cost is \$0.45 whereas customer care is \$5.50	Easy to setup and maintain as it works across different systems, hardware and software platforms	Fast response to people inquires	Can access via telephone, PC, mobile or telephone keyboard
M-payment	Reduce payment processing cost	Can be setup by different ways such as WAP, IVR and SMS	Enables electronic and digital payment online or through mobile devices	Multiple points of payments, independent of time and place
M-procurement	Decreasing administration costs, cut unauthorised spending, time saving through automated procurement	Easy to manage than paper procurement system	Enables procurement on the move	Access to procurement system from the field
M-participation	Less cost than traditional means which have cost of transportation, calls, etc, and can be through free wireless networks	Can be setup through different ways such as WAP and mobile messaging	Enables faster communication and participation with public than traditional means	Participation of public with the government

Table 2.1: Summary of Mobile and Wireless Technologies and Services

2.5 Current m-government initiatives around the world

By examining different e-government initiatives that use mobile and wireless technologies, a great deal of knowledge can be drawn. Although m-government is still in its infancy (Kushchu & Kuscü 2003:1), many governments have started or are in the process of planning m-government services. There is a growing demand for the private sector to invest in public mobile projects (Chan, Hu & Yen 2006:2). Ghyasi and Kushchu (2004:821) state that 'the promise of m-government to provide greater access to government information is progressing in many developed and developing countries'. The main reason for m-government solutions is the high penetration of mobile phones in the developing countries (Abanumy & Mayhew 2005:1). Mobile phone usage is larger than Internet usage in most countries and hence the impact of the mobile solution will be greater (Suarez 2006:1). Therefore, m-government appears to be appropriate for the UAE, where there are 100.86 mobile subscribers for every 100 people (International Telecommunication Union 2005:URL). The following sub-sections discuss different examples of m-government initiatives in Europe, Asia, Africa and North America.

2.5.1 Europe

Usability-driven open platform for m-government (USE-ME.GOV) is a research and development project being carried out by the *European consortium* that consists of a regional government, three local governments, two research institutions, two universities and a number of technological companies from France, Italy, Germany, Spain, Portugal and Poland (Martin et al. 2005:1). The purpose of the project is to deal with problems associated with traditional governments such as the low throughput, time consuming tasks and staff overload as well as problems with e-government such as long delays in implementation and low return on investment (Bassara, Wisniewski & Zebrowski 2005:2). The purpose of the project that commenced in January 2003 is to encourage governments to provide access to e-government services anytime and anywhere through mobile and Internet technologies (use-me.gov 2002:URL). These services aim to support high level of efficiency, accessibility, friendliness and usability (Bassara, Wisniewski & Zebrowski 2005:1) through multi-channels that offer better or cheaper services (Peinel et al. 2005:1). USE-ME.GOV has the following goals (Tilsner 2005:196):

- To use mobile services as a new or complementary multi-channel means of access to public information.
- To use mobile services as a communication channel between government, citizens and private sectors.

- To use mobile services to motivate citizens to participate in local community issues and provide them with a channel to submit complaints, suggestions and related issues.
- To use mobile services as a means to promote community events.

The project has four pilot services: Mobile Student (m-student) Service, Information Broadcast Service, Healthcare Information Service and Complaint Service (Abramowicz et al. 2005:2). The following is a summary of these services (Tilsner 2005:198):

M-student Service (*Spain*): Students in rural areas in Spain live far away from the school and find it difficult to access school information. This service aims to provide students and parents with access to different curricular information such as modifications to class schedules, marks, exercises to be prepared, school activities and events. It is used to improve communication between the schools and parents such that parents will be able to receive and access information about their children through the mobile phone.

Information Broadcast Service (*Bologna, Italy*): Registered citizens will be able to receive city information according to their interests and preferences: for example, notifications on their mobiles about local

traffic such as road works, road closures, emergencies and local events (Martin et al. 2005:3).

Healthcare Information Service (Gdynia, *Poland*): The purpose of this service is to provide information on healthcare programmes to reach a large number of citizens through mobile means. In addition, mobile users can use this facility to make appointments with healthcare centres according to their needs such as medical speciality and personal preferences.

Complaint Service (Villa Nova da Cerviera, *Portugal*): This service allows citizens to participate in local community issues by encouraging them, to make complaints or suggestions directly to the appropriate entity.

The pilot solutions of the USE-ME.GOV project deal with problems that people face and provide services that satisfy their needs by resolving these problems.

NOMAD National Project of the *United Kingdom* is a pilot project consisting of 9 authorities. It commenced in November 2003 (UK local e-gov 2004:3). The project aims to facilitate local authorities to begin mobile computing operations that will enable them to use their human and resource elements to the best of their ability and assist staff to be more productive. Mobile computing aims to save money by

reducing operating costs, improving field worker productivity and increasing processing time (UK local e-gov 2004:3). There are multiple projects under the Project NOMAD including: Electronic Financial Assessments (Social Care) directed by Cumbria Country Council; Citizen to Council Interactions directed by Sheffield City Council; Single Assessment directed by Cambridgeshire County Council; Street Scene directed by Norwich City Council; and Building Control directed by the London Borough of Sutton (Project Nomad n.d.b:URL).

The project Nomad statistics demonstrates the following benefits of using mobile computing (UK local e-gov 2004:6&8)

- Financial benefits: The implementation of three services – Highways, parking services and care financial assessments – assisted a cost reduction of 30-81 million Euros.
- Non Financial benefits: the response to service requests improved from 45 days to 12 days, reducing appeals and complaints from 80% to 1% and reduction in paper works by 80%.

Mobile penetration is considered high in *Estonia* compared to other countries of Central and Western Europe. Internet penetration was over 40% in March 2002 while mobile penetration was over 60% in December 2001 (Rannu 2003:5). Mobile penetration increased to over

100% compared to 53% Internet penetration in 2005. This is due to the fact that people carry mobile phones all the time which are cheaper than computers (Rannu & Semevsky 2005:5). In Tartu, the second largest city in Estonia, m-city project was launched in 2004 (Rannu & Semevsky 2005:5). M-city is adding value to the e-city where electronic services do not reach (Rannu 2006:5). About nine different mobile services were launched in Tartu at the end of December 2005 including mobile parking, mobile bus tickets, m-payments, m-teacher, m-neighbourhood watch and m-library (Rannu & Semevsky 2005:6):

Most of the services provided are a partnership between the government and the private sector to provide top quality services (Rannu 2003:14). A survey conducted in 2005 on 406 citizens showed that 82% thought that m-parking is most necessary, 72% thought that m-ticket and m-payments necessary, 85% thought that m-teacher was very important, 82% thought that m-neighbourhood watch was important and 72% thought that m-library was useful (Rannu & Semevsky 2005:9).

Mobile penetration in *Turkey* is 34% whereas Internet penetration is only 6% (Ghyasi & Kushchu 2004:824). The m-government applications in Turkey are still in the early stages but they are considered successful as compared to traditional services (Ghyasi & Kushchu 2004:824). Most of the online services are information or

interactive services, and few services are transactional but are infrequent (Cilingir & Kushchu 2004:814). Some of the main m-governments applications are (Cilingir & Kushchu 2004:815):

- **MOBESE Mobile Electronic System Integration:** This is one of the main m-government applications used in law enforcement. It enables the law enforcement units to be more effective and efficient as compared to traditional methods. Units are equipped with Tablet PCs that have GPS capabilities and connect to the Internet through GPRS so that the mobile units can supply different queries using Tablet PCs. The Command unit also knows the location of the units and hence can assign a task effectively to the appropriate unit. This aids the command unit with planning and management.
- **Traffic Bilgi Sistemi – Traffic Information System (TBS):** This service enables communication between mobile units using Tablet PCs to a central information system through a GPRS connection. It allows real-time messaging communication between the mobile units and the command centre. Mobile traffic units can perform real-time queries about drivers such as licence information, vehicle registration and other related data. This decreases waiting time and increases the efficiency and effectiveness of mobile units. It enables a mobile unit to attend to incidents more effectively.

- Earthquake monitoring and information system: This project has linked 100 seismographs in Istanbul to an observatory via GSM. In the case of an earthquake, the seismographs send information through SMS to the observatory. The information is analysed and sent to government organisations through GPRS.
- BAYON-M: This involves using mobile technologies to support democracy by providing unofficial mobile voting for local elections and sending SMS messages to citizens about different topics on special days.

Mobile phone penetration in the *Czech Republic* is the highest in Europe with about 95% of the population using mobile phones (Ghyasi & Kushchu 2004:824). Some m-government applications have been launched using SMS for delivering important information to citizens. Traditionally, the government used loudspeakers to inform citizens about critical news and alerts which cost them a lot for operation and maintenance. The government replaced loudspeakers with SMS which has proven to be more efficient and reliable. Furthermore, mobile voting is used by municipalities for voting on different issues.

There is a high penetration of mobile phones in *Sweden* (88%) compared to Internet penetration (57%). Citizens use mobile phones

to send SMS, read newspaper headlines and order from supermarkets (Lundevall & Hallin 2004:837). The government placed a target in 2003 to become a 24/7 agency by providing services anytime through different channels but especially through wireless terminals (Ostberg 2003:2). One of the main m-government projects is m-city in Stockholm which commenced in 2002 (Lundevall & Hallin 2004: 837). The purpose of this project is to identify community needs and create solutions through mobile services. These services could help the city to simplify routines, save time and money, improve service quality and minimize administration. The following are three of the mobile services provided (Lundevall & Hallin 2004: 840-841):

- SMS services: SMS services are used in schools for absence management. Students send their social security number and code automatically by email or SMS to the teacher which reduces administrative tasks. SMS services are used within the care sector and by management to make changes to schedules. Management can send SMS to all staff at once saving time compared to reaching staff through regular phone calls. It is also used to encourage staff in the field.
- M-student: The purpose of this project is to develop mobile services for students in relation to studies, leisure time and social events.

- Tourism: The aim of this project was to implement tourism services where a small version of the city guide was developed for mobile terminals.

The project in Berlin, *Germany* called Mobile Public services (Mobud) started in 2004 (Ackermann & Schiewe 2004). This project was developed to solve public administration problems. There were few public service offices in the suburbs. Since the population was low, the establishment of these offices were considered costly for small number of users. It was difficult for people with limited mobility to go to the public service office because it required waiting there to obtain the required service. Furthermore, there were insufficient funds to establish public service offices.

The project involves a Mobile Public Service Office to solve these problems and to provide all services in real time. The employees are equipped with mobile terminals that can provide various services and are sent to different locations. The solution consists of a notebook with all applications, a printer confirmation and receipts, a payment terminal which makes it possible to pay with Maestro card, and a smartcard reader. The connection is established with the server through GSM. The project has reduced waiting to a maximum of 10 minutes and citizens can make appointments in advance with the advisor.

Mobile phone penetration in *Malta* is 74% of the total population and this pushed the government to develop different m-government services as part of the e-government programme (Government of Malta 2006:URL). The project is managed by the Ministry of Information and Technology with different partners. Mobile services are provided through SMS. The services offered include notification, acknowledgement, status, progress and receipt of complaints, notification of court deferrals, licence renewals, exam results and direct credit payments. Other m-government services through SMS are in the process of being developed such as notifications to blood donors when urgent blood is needed, to parents about school absenteeism, from public libraries about book reservations, on bus schedules, on job opportunities, and of police reports of incident and relevant information.

2.5.2 Asia

The *Korean* government aims to create a smaller and more efficient government and improve the life of its citizens through the development of IT (Jeong & Kim 2003:1). Korea has implemented eleven e-government projects. However, they have limited accessibility as they are based on the wired Internet (Jeong & Kim 2003:8). The government promotes the benefits of mobile technologies but m-government is still in its infancy (Jeong & Kim 2003:7). However, some m-government applications are (Jeong & Kim 2003:8-9):

- M-Police: Police officers use mobile devices to get information on missing vehicles, vehicles history, driver's licences and pictures from the police server.
- M-parking: Parking inspectors use PDAs and a small printer in controlling the places of towed vehicles. This helps increase the efficiency by printing and collecting parking lot information on the site.
- M-local tax: Offices use PDAs to access tax database servers, obtain data of outstanding taxes and transmit data to the tax database.
- Civil Services (Yeoul 2003:22): Providing civil services through voice recognition system.

The use of PDAs and wireless applications has helped to simplify the processes of Korean government activities and increase productivity and effectiveness demonstrating that there is high potential in improving government services through the use of mobile technology (Jeong & Kim 2003:9).

In the *Kingdom of Saudi Arabia*, there are five million mobile subscribers in 2003 compared to 1,462,000 Internet users (Abanumy & Mayhew 2005:1). An e-government initiative was launched in order

to reform public organisations and improve information and communication infrastructure. E-government applications have faced difficulties notably, e-readiness in the country. However, in the case of m-government, there is a large availability of technical infrastructure and citizen readiness. The development of m-government applications are still in the early stages. The main application used is SMS due to low cost. Four applications have been implemented:

- SMS notification about exam result to students. Students send an SMS message that contains the student number and receive the return result through SMS. This helps students receive results faster than mail.
- SMS reminders sent to medical patients concerning appointment time, date and the location of the clinic. This service reduces the number of missed appointments.
- A congratulatory SMS on public occasions and for private events.
- SMS notification of the weather.

The mobile phone penetration in Beijing, *China* in 2004 was 90.6% whereas Internet penetration was only 27.6% (Song 2005). The high mobile phone penetration has enabled the government to deliver

better services. The Beijing government has an m-government initiative to solve the problem of the high bureaucracy and the inefficiency in city management. A project was commenced in 2004 using grid technology which divides the city area of 25.38 square km into 1652 cells. Each cell is represented with a 6 digit number that corresponds to the neighbourhood (first two digits), community (second two digits) and the exact cell (last two digits). Every public facility has been placed in a relevant cell represented in a GIS that is displayed on a big screen. There are four layers that represent the responsible entities: the district government, neighbourhood committees, residents committees and institutions. The locations of supervisors at work are displayed on the big screen. The location information is refreshed every fifteen minutes through GRPS connection. Management can check the screen for the working status of the supervisors and for communities without supervisors. All issues are displayed on the screen using different colours and symbols. Management can assign the right task to the nearest supervisor using the screen. Supervisors can receive tasks and call the management centre through their mobile phones. They can also send any complaints from residents through their mobile phones to the centre. When a supervisor completes a task, he or she sends the report with photos taken by a mobile phone checking the position on the GIS. The result of the project is that problems have been solved in efficient ways and consequently satisfy the residents. The mobile system with the grid management helps manage workers in the field in an efficient

way. Before the implementation of the project, any problem from a citizen went through a complicated bureaucracy.

Mobile phone penetration in *Singapore* is the highest in the world, with penetration rate exceeding 99%, whereas fixed line penetration is 42.5% and Internet access is 66% (Joo 2006:2). Singapore launched a program in 2005 called iGov2010 to raise the level of quality of the e-government by 2010 (Joo 2006:3). The government provides 1600 public services that is 98% of all public services, online (Joo 2006:6). About 9 out of 10 who dealt with the government in 2005, have dealt electronically through Internet, kiosks, IVR, e-mail, SMS, etc (Joo 2006:7). One of the main objectives of iGov2010 is to make e-government services accessible to a large population by delivering services to mobile devices (Joo 2006:16). Therefore, it developed an m-government program under iGov2010 which focuses on providing mobile services through a mobile channel (Singapore government 2006:URL). The government aims to speed up the implementation of mobile services to increase cost effectiveness. The five key programmes of m-government under iGov2010 are:

- To maintain a mobile services directory of all mobile services in order to make it easy for citizens to find the services;
- To have a shared central repository of all mobile numbers;

- To share mobile service enabling infrastructure such as m-payment services, mobile publishing services and mobile authentication services;
- To provide government workers with the needed skills and knowledge of m-government projects through mobile education;
- To standardise the use of SMS through a standard number and SMS message format (Peng 2006:13).

The current m-government services provided by Singapore include (Government of Singapore 2004:URL):

- SMS: SMS services such as sending an SMS feedback to the online consultation portal; citizen alert such as status of a request, reminder of an appointment, expiry of the passport and road tax renewal; SMS headlines about statistical releases; traffic information and news. Furthermore, borrowers from the national library can receive information about their account and can extend their deadline (Rannu & Semevsky 2005:15)
- Motoring WAP portal: Access to the news and traffic information; live traffic camera images; enquires through the mobile phone using WAP or I-mode application.

- CPF (Central Provident Fund) Mpal: Employers of small companies can make contributions for their employees using mobile phones; citizens can check their CPF account and contribution history.

According to a 2003 UN survey, the *Philippines* was ranked 4th in South East Asia for readiness to change to m-government (Tozsa & Budai 2005:417). The main mobile technology used is SMS with many applications. TXT CSC is an SMS service launched by the Civil Service Commission (CSC) to enable citizens to send complaints through SMS. This assists government to tackle corrupt employees and improve services. Before the launch of the service, email, telephone and hotline were available which were rarely used due of their limitations and costs.

SMS is also used by the National Police that enable citizens and police officers to report criminal offences. All complaints are sent through SMS to a specific number. The sender's information is recorded and informed about the status of the case. This service enhances the complaints procedure as it is automated and stored without any human involvement. It avoids busy police telephone lines and reduces the barrier to complaint to the police. SMS is also used by the University of De la Salle to inform citizens about cancelled lectures, exam dates and changed classes (Rannu & Semevsky 2005:16).

2.5.3 Africa

A vision called Johannesburg 2030 (Villiers 2005) has been developed in Johannesburg in *South Africa*. Its mission is to be a world class city by 2030 by solving crime, which is the biggest problem facing the city. The Johannesburg Metropolitan Police has strengthened the zero tolerance campaign as the first step to solve crime problems. A major part of the problem is to close the 700 000 cases of outstanding traffic violations which are worth 16,000,000 pounds. The lack of efficient access to case databases and insufficient staff has held back the collection of the outstanding fines. In order to provide a solution to this problem, the Metropolitan Police in 2005 equipped the officers in the field with mobile phones. It enables them to check the status of a vehicle to see if there is a record against the owner. The officer will enter the vehicle registration number or motorist number on the mobile phone using a WAP interface, establishing GPRS connection with the database, and the results are returned back to the officer. This helps collect fines and make arrests. The next phase of the project will make it possible for motorists to pay fees directly in the field using m-payment terminal that has a credit card processing facility.

2.5.4 North America

The government of *Canada* has launched a project called "Government of Canada Wireless Portal" (Government of Canada

2006:URL). This gives people access to government information and services through web enabled devices such as PDA and web enabled mobile phones. Some of the current services (which are mostly information services) provided through the wireless portal are:

- Government news releases in real time.
- Parliament contact information.
- The estimated waiting time for crossing Canada and USA border, depending on the location.
- Canada business service centres contact information such as toll free numbers, locations and email addresses.
- Hurricane and tropical storm information and warnings.

There are many m-government projects and services in the **USA**. The Registered citizens service in California (eC3 2001:6), Traffic Management using GPS in Portland (eC3 2001:7), wireless network implemented in a university in Texas (eC3 2001:8), Mobile computing installed in 14 police cars in Kentucky (eC3 2001:11), The City Fire Department using Blackberry in New York (Government Technology 2005:URL), Construction inspectors equipped with PDAs in Washington DC (Rannu & Semevsky 2005:20) and South Florida environment clean in Florida (Taft 2004:URL) are some of these projects.

The main reasons for implementing m-government solution by these governments are as follows:

- M-government has the capacity to solve traditional and e-government problems.
- It provides a perfect environment for employees as it is not restricted to a wired network (Kiki 2006:2) and thus, provides an opportunity to improve the internal processes of the government (Kiki 2006:5).
- It provides citizens with convenient access to information that is available anytime, anywhere and saves time, money and effort (Kiki 2006:2).
- It helps reduce cost. Gartner predicts that notebooks provide an annual saving of \$34,560 per workers who spend 20% of their time in the field. He predicts that more than 65% of the Fortune 2000 companies will adopt mobile applications (Intel 2003:3).

These projects demonstrate that m-government relates to the contextualized application of Mode-2 knowledge production. Nowotny, Scott and Gibbons (2001:256) state:

‘Contexts are made, not given. Rather they emerge, are generated or constructed, either in relation to particular problems for which they are or may become relevant, or in relation to other, already existing contexts’.

Aspects of these solutions could be applied to the Dubai government. However, the requirements and needs of every community are different. Hence adopting a particular solution is inappropriate but it helps realise what works and what does not (Rannu & Semevsky 2005:24).

The current m-government initiatives around the world discussed in this section are summarised in Table 2.2 below.

Country	Project	M-Government Services	* Mobile Penetration
European Consortium	USE-ME.GOV	M-student Service, Information Broadcast Service, Healthcare information service & Complaint Service	-
United Kingdom	NOMAD	Electronic Financial Assessments, Citizen to Council Interactions, Street Scene & Building Control	121.24%
Estonia	M-city	Mobile parking, mobile bus tickets, mobile payments, m-teacher, M-neighbourhood watch and M-library	147.58
Turkey	MOBESE, TBS	Traffic Information System (TBS), Earthquake monitoring and information system & BAYON-M	84.89%
Czech Republic	M-government applications	SMS for delivering important information and mobile voting	128.83%
Sweden	M-city	SMS services, m-student and Tourism	111.11%
Germany	Mobud	Equipping employees with mobile terminals with all applications, printer and payment terminal	116.87%
Malta	M-government services	SMS services such as notification, acknowledgement, status, progress and receipt of complaints; notification of court deferrals, licence renewals, exam results and direct credit payments	90.74%
Korea	M-government applications	M-Police, M-parking, M-local tax & Civil Services	90.69%
Kingdom of Saudi Arabia	M-government applications	SMS services such as exam result to students, reminders to medical patients, A congratulatory SMS on public occasions and for private events & weather notification	115.07%
China	M-government project	Mobile system with grid management to manage workers in the field	41.18%
Singapore	iGov2010	SMS services, Motoring WAP portal & CPF Mpal.	132.10%
Philippines	M-government applications	SMS services such as TXT CSC, reporting criminal offences and university classes related information	64.64%

Country	Project	M-Government Services	* Mobile Penetration
South Africa	Johannesburg 2030	Equipping metropolitan police with mobile phones to check vehicle status	86.02%
Canada	Government of Canada Wireless Portal	Information services through the wireless portal such as government news, parliament contact, waiting timing for crossing Canada and UAE border, business services centres contact information and weather information and warning	61.55%
USA	M-government projects in different cities	Notification to registered citizens in California, GPS Traffic Management and wireless network in Portland, wireless network in universities in Texas, laptops in police vehicles in Kentucky, mobile devices to access to email system and data collection in the field, Equipping construction inspectors with PDAs in Washington DC and using rugged handheld computers by field inspectors in Florida.	85.20%

*International Telecommunication Union (2007:URL)

Table 2.2: Current m-government initiatives around the world

2.6 Chapter Summary

Traditionally, governments used only telephones and faxes as electronic means for their communication. These governments had their inherent problems such as inefficient services and high costs associated with them. Public confidence in the government services have declined from 46% in 1983 to 17% in 2000, possibly due to the fact that government services are not improving as quickly as business services (Singh & Sahu 2004:4).

Government services can be accessed only during working hours, which is a major limitation. As a result, there has been an increasing demand for better and faster government services 24/7. One of the challenging objectives for economic and social development for the government is to provide access for the public to these government services. As a result, governments are now upgrading their communication technologies to provide services through the Internet. This will enhance its service delivery since people will not have to visit the government offices to obtain services. This vision led to the emergence of the concept of e-governments as an alternative to traditional governments.

However, when considering e-government solutions, many concentrate solely on the Internet portal. According to ITU statistics for 2004, only 10% of the world's population has Internet access (Singh & Sahu

2004:4-5). Consequently, the digital divide among citizens will increase which is a drawback for the government.

Mobile cellular penetration around the world by the end of 2009 was 67% compared to 26% Internet penetration (International Telecommunication Union 2010:1). Hence it is a better solution. M-government is the utilization of different mobile and wireless technologies, services and applications to provide access to government services allowing people to access these services from a mobile or wireless device. A mobile device is not limited to a mobile phone, but could involve a PDA, handhelds, smart phones, cellular phones, terminals or any other devices that can be carried (Texas Department of Information Resources 2002:3-4). A mobile device is a computing device that is not restricted to a desktop and can connect to a data source without a physical connection (Sharma & Gupta 2004:463).

Mobile technologies are an important channel for providing timely information to citizens from the government (Ghyasi & Kushchu 2004:821). Wireless technologies are leading to ubiquitous, mobile devices that are becoming an essential part of life, and mobile applications allow unrestricted access regardless of individual mobility (Borukci, Arat & Kushchu 2005:56). As such, a detailed study of a number of different mobile and wireless services and technologies such as mobile messaging, WiFi, WiMAX, WAP, WSA, IVR, M-GIS and

MRM, m-procurement, m-payments and m-participation was undertaken.

Although m-government is in its infancy and early stages of development (Kushchu & Kuscu 2003:1), several governments have already started or are in the process of planning to use mobile services. There is wide support for m-government in Europe, USA and Asia (Carroll 2005:77). USE-ME.GOV project of European Consortium, NOMAD project of the United Kingdom, Mobud project of Berlin, Germany, Government of Canada Wireless Portal project of Canada and several different projects in different parts of the USA have been discussed.

Chapter 3

Research Methodology

All research methods can be divided into two primary types, quantitative and qualitative (Fitzgerald 2000:URL). Quantitative methods provide the information in the form of numbers that is easier to handle. However, the knowledge of the researcher in advance about the information that need to be collected would help in classifying features and constructing statistical models.

The qualitative methodology involves contextualization and has an interpretive nature. Qualitative research is used to study everyday life in the researcher's own culture and society (McGuigan 2005:50). Such research helps understand and cover what lies beneath the subject that is little yet known (Strauss & Carbin 1990:19). It is considered to be the most appropriate in researching systems development (Beynon-Davies & Williams 2003). It is also valuable to discover the views of people in organisations and culture (Geode & Villiers 2003).

3.1 Methodology Selection

Scholars from different disciplines recommend the use of multiple methodologies to study complex subjects (Creswell 2003 & Newman and Benz 1998). A methodology is a strategy for solving problems, consisting of techniques, tools, convention, documents and tasks to follow (Bowman 2004:3). Some developers select some parts and techniques from a method and use them with other tools in order to meet their needs (Kautz, Hansen & Jacobsen 2004:2). This research is in the area of information systems and hence, the methodologies used are related to this area. Avison and Fitzgerald (1995) suggests to use information systems methodologies due to the accuracy in recording the requirements, the possibility to monitor progress to identify changes as early as possible, the delivery of systems within appropriate time and cost limits, and the possibility to deliver systems which are appreciated by the relevant parties. Information systems development methodologies aim to make the developing process of information systems, whether manual or computerized, clear and simple (Walters, Broady & Hartley 1994).

Soft System Methodology (SSM) is one of the well-known methodologies used for information systems development (Oura & Kijima 2002:77) and one of the most widely used methodologies in many parts of the world (Rodriguez-Ulloa & Paucar-Caceres 2005:5). It has been used in the public sector and in the industry (Crawford and

Costello 2000). SSM theory, developed by Peter Checkland, uses a system thinking approach for understanding the whole and the relation among the parts (Hasliza et al 2006:2).

3.1.1 SSM

Soft problems are considered when we know that things are not working in the way we want and we want to find out what we can do about it (Couprie et al. n.d:URL). Systems engineering or hard systems approach is not appropriate in dealing with messy problems or poorly defined problems. Poorly defined or messy problems are the problems in that the 'what' and the 'how' attributes of problem solving are unclear (Walters, Broadly & Hartley 1994). Organisations are considered as open systems that have to achieve many different goals and satisfy different requirements or solve different problems at the same time. In these situations, the system engineering or hard systems approach fails and SSM is applicable.

SSM methodology focuses on making system development as a subset of problem solving (Panagiotidis & Edwards 2001:215). SSM is an interpretive approach to solve organisational problems (Crawford & Costello 2000). It is applied to the early stages of IS development to identify problems and propose corrective actions (Oura & Kijima 2002:79). It was used in this research to identify the problems and the technical and user requirements. According to Bennetts, Wood-

Harper and Mills (2000:195), the other reasons for choosing SSM are as follows:

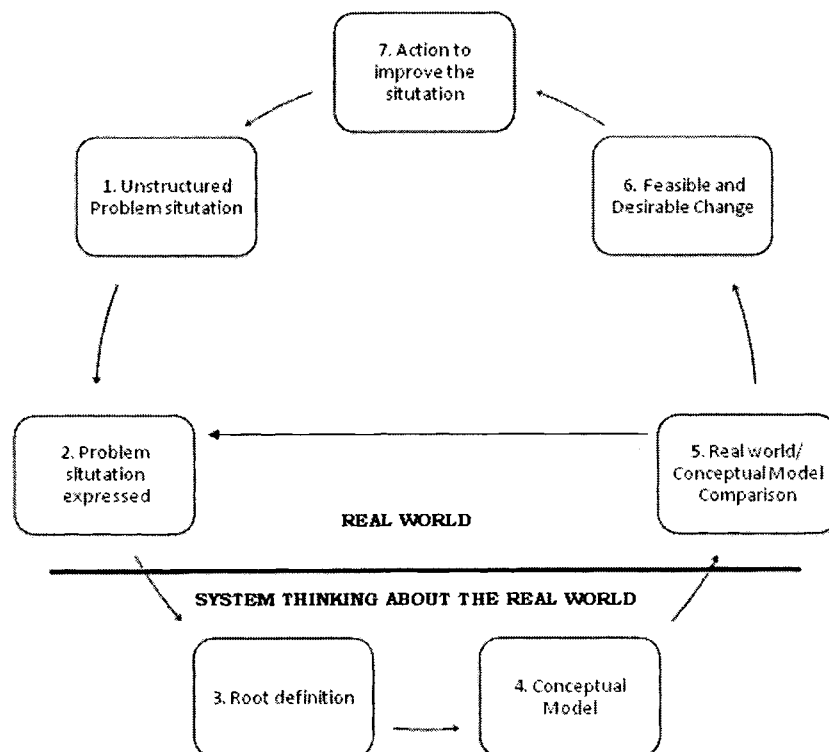
- a. The social and organisational aspects are relevant for analysing culture.
- b. The technical processes to develop the system can be represented
- c. There is a learning process
- d. Historical information is employed to demonstrate how the organisation got to the current state
- e. It does not assume that all answers are already known, and therefore, assist in identifying appropriate and feasible solutions

SSM offers a methodology to deliver multiple views of the problem situation and launch a new product that can be seen differently by different people (Christis 2005:12). It is involved in the definition of what problems need to be solved and clarification of problems that exist in order to define the options for improvement (Sofer & McIntosh 2004:235). In order to develop an information system effectively, the real problem situation should be examined through 'what' and 'how' of the problem before making an effort for a solution (Walters, Broady & Hartley 1994).

SSM is divided into seven stages (Checkland 1981). These are:

1. Problem situation unstructured
2. Problem situation appreciated

3. Root Definition
4. Conceptual Models
5. Real World/ Conceptual Model comparison
6. Feasible and desirable change
7. Action to improve the problem situation



**FIGURE 3.1: SEVEN STAGES OF SSM
(CHECKLAND 1981)**

In the following, these seven SSM stages are discussed in detail:

1. Problem situation unstructured: In this stage, it is discovered by the researcher, managers, or employees that there is a need to review or change the way the work or task is performed. There is

a problem or space for improvement. Hence, the researcher gets an understanding and wider view of the problem.

2. Problem situation appreciated: The researcher collects information from as many resources as possible and sorts the information and provide description of the problem. Information could be collected through work observation, interviews and discussions.
3. Root definition: In this stage, the root definitions are developed which are the basic descriptions of the proposed system. It gives explanations of potential information systems that are then used to choose the needed ones (Rose 2002:251). It contains information about the transformation process. Root definition is a short statement that expresses the main purpose of the proposed system.
4. Conceptual model: It involves developing conceptual model on how the system should operate so as to compare it to the real world situation (Ingram et al. 1997:119). The most essential skill of SSM is to move freely between the two worlds, Real and conceptual, and to compare and contrast them (Rose 2000).

5. Comparing conceptual model with real world: Compare the real world with conceptual model to see the similarities and differences and what have been changed.
6. Feasible and desirable change: All changes are discussed and expressed and a plan of schedules is developed to prioritize the requirements.
7. Action to improve the situation: It is considered to be the development and implementation phases.

In this project, the application of SSM progressed as follows:

Stage 1: In this stage, the need to improve the services provided by the Dubai Police through m-government was researched. This was undertaken in the Literature Review in Chapter 2 and formulating the research question (Chapter 1).

Stage 2: The information was collected and a detailed description of the problem was established. The information gathering process is described in Section 3.2 of this Chapter.

Stage 3: Gathered information was analysed in Sections 3.3 of this Chapter and results were produced in Chapter 4.

Stage 4: Using these results, key mobile and wireless service and technology enablers were identified. From the key mobile and wireless service enablers that were identified, the most suitable ones were chosen for the Dubai Police (Chapter 5).

Stage 5: In this stage, a comparison between the proposed m-government system and the current system used by the Dubai Police was compared to indentify the similarities and differences and the changes brought in by the new system (Chapter 5).

Stage 6: All changes recommended and proposed as part of m-government solution for the Dubai Police were discussed and a recommended course of action was developed. A policy document was developed, and the actions were prioritized (Chapter 5).

Stage 7: This stage deals with the deployment of the recommended mobile services and technologies and is beyond the scope of this research.

3.2 Data Collection Methodology

According to the application of SSM, the next step was to collect the information. To this end, first, the population, frame and the sample

were identified. Then, a suitable sampling method and a data collection method were determined.

3.2.1 Selection of Population, Frame and Sample

The population is the entire public in Dubai as everyone would need to seek services or receive services from the government at some point in time. Thus, it would be reasonable to assume that a representative random section of this population would visit the Dubai Police General Department (Head Quarters – HQ) located in the city of Dubai, in the UAE. That section of the population then becomes the frame for this study. The frame would contain two distinguished strata; the employees of the Dubai Police and the other stakeholders.

The total sample size was 120. The sample comprised of 20 participants for the interviews and 100 participants for the questionnaires. To represent both strata, the sample covered participants from the Dubai Police employees and the public that deal with the Dubai Police such as citizens, tourists and businesses.

3.2.2 Data Collection Procedure

There are several methods that can be used for data collection. Glesne (1999:31) indicated that 'the more sources tapped for understanding, the richer the data and the more believable the findings'. Therefore,

data were collected from participants using two methods, interviews and questionnaires. Interviews were chosen as the primary method of data collection because of its high response rate and the ability for the interviewer to guide the interview to extract more useful information. The second method of data collection was through questionnaires. Generally, questionnaires have a low response rate if they were sent to the respondents as email attachments or made available via web forms.

3.2.2.1 Ethical considerations

Before starting data collection, an appropriate ethical consideration has to be made. Ethical measures setup standards and form the bases from which the researcher assesses the conduct of the research study. These measures include rules, guidelines and behavioural expectations concerning the most appropriate way to deal with participants to ensure that their rights are respected and protected.

Permission was requested and granted as stated in the 'letter of permission' received from the Dubai Police general department in order to have access and carry out this research at the Dubai Police (see Appendix III). This minimized the risk to the workplace. An application was made and the Human Research Ethics Committee, of Central Queensland University, approved this project under the project number H08/02-009 (see Appendix II). The researcher then

followed the ethical guidelines of the research, practices and principles in accordance with the National Statement on Ethical Conduct in Research involving Humans (Australian government 2007:URL) throughout the process of this research. This helped ensure that the research was conducted in accordance with the National statement and the ethical and research arrangements of the organisation involved.

An industry advisor from the Dubai Police was appointed to ensure that the information was gathered and used by the researcher was performed ethically according to the guidelines specified in the ethics clearance approval and specified by the ethics committee of CQUniversity. The industry advisor also provided the necessary access and advice in the workplace. Participants were identified by the industry advisor, who had access to the records of employees and clients of the Dubai Police. The initial contacts were made with participants by the industry advisor through a formal letter of invitation with an information sheet, telephone call or by a request through direct contact or email. The information sheet and the consent form were sent to each participant (see Appendix IV), hence, each of them had a good understanding about the data collection process and the security of data. The information sheet provided details about the nature and purpose of the research project that the participants would be involved in. Participants were ensured in the consent form that they had the right to withdraw from the project at

any time without penalty or loss of benefit, their identity will remain confidential and anonymous, and the information provided by them will be used only in aggregate form for the thesis and other published studies. The researcher followed measures to ensure that the collected information were secure from misuse, loss or unauthorized access.

Participation was voluntary for all participants. Each participant received a consent form that was completed and signed before the interview or before completing the questionnaire. Hence, each participant had the opportunity to either accept or reject participation. Participants could choose the time and place of the interview.

The confidentiality of participants and their data were secured during the research and in the dissemination of research results as:

- Identification information about participants was recorded.
- Names were not included in any results of the project.
- Participant's comments and opinions were not linked with names of individuals or with any identifying data in the report or any article.
- The research ensured that the data collected were not released to the Dubai Police. Direct quotations from the interview or questionnaires did not reflect either the position held by the participant or the geographic location of his/her workplace. The Dubai Police will receive a recommended course of action document proposing the m-government solution, but it will not

include any actual comments under any names or any information that identifies or links the participant. As a result, it will not be possible to identify participants even in the future.

The questions for the interviews and questionnaires did not include any questions that would have a bad effect on participants. The questions were prepared solely to collect the needed information without harming the participants or the organisations that they work for.

The researcher provided participants with his contact details in order to contact him if they needed to obtain further information or complain about the research project. The researcher also provided participants with an assurance that they would receive the results of the study in which they were participating as suggested by McMillan and Schumacher (2001:198). Participants were provided with the choice as to whether they liked to receive a plain English statement of results at the end of the research or not.

3.2.2.2 Interviews

The main purpose of interviews is to know what people think, feel and do, and what they say about the researched subject (Henning 2004:52). According to Choudrie and Weerrakody (2007:27), it is important to carry out interviews with several members of the

organisation in order to obtain a complete picture about the requirements. The Interviews have the following uses (Vermeulen 1998:62):

- Identify possible changes
- Provide direction in further phases of the research
- Collect data
- Supplement other methods of data collection

Interviews were conducted with the Dubai Police employees, at different levels and in different areas such as in the customer services, human resources management, top management, IT staff (responsible for providing electronic services), and other areas within the Dubai Police General Department. The interviews were semi-structured with open-ended questions encouraging long responses that may help obtain useful information that the researcher did not know about or thought that was not needed (Hall 2001:URL) resulting into collection of rich and extensive data (Fitzgerald 2000:URL). The primary data were collected from semi-structured face-to-face interviews conducted between 1st of September 2008 and 15th of November 2008 (see Appendix V). The complete interview questions that the participants were asked may be found in Appendix V. Before the interview, participants were emailed with the interview questions so that they could familiarize themselves with them. Each interview was introduced by explaining its background and purpose. The interviews lasted between 30 to 60 minutes. All interviews were

conducted by the researcher and notes were taken down. Key questions were developed covering all the issues identified during the literature review. Topics discussed were:

- The strategic vision of the Dubai Police departments to increase the effectiveness of service delivery
- The Dubai Police stakeholders
- The current information and services provided (traditional and electronic services) including the means to access, obtain and communicate with the Dubai Police and with its stakeholders.
- The problems that the Dubai Police encounters while delivering service. Hence, identifying their needs, shortcomings and requirements. This includes describing the current problems of the traditional (face-to-face) and electronic services.
- The current usage of mobile and wireless services.
- Future plans and recommendations.

At the end of the interviews, the collected information was checked against the prepared questions to ensure that all questions have been answered. To ensure that the collected data can be easily accessed for analysis, the researcher recorded the interview responses by hand and then typed and stored each interview as an electronic file. Participants were given the notes of the interviews to read and correct possible misunderstandings and errors.

3.2.2.3 Questionnaires

The second method used was the questionnaires. Questionnaires are set of printed questions that participants are asked to answer (Thomas 2003). One hundred questionnaires were distributed and collected from participants. Questionnaires were started at the beginning of November 2008 and were completed by the end of December 2008 (see Appendix V). Questionnaires were distributed by the industry advisor to the participants and they contained both open-ended and closed-ended questions. Participants were asked questions in order to know:

- The roles of their Department in the area (applicable only to the participants of the Dubai Police)
- The methods used by clients to access information and services and the difficulties faced in obtaining them.
- Client's preferences based on type of service (traditional or electronic services) or form of communication technology.
- The current and the possible future usage of mobile and wireless services.
- The positives, negatives, level of satisfaction and recommendations on the current services provided by the Dubai Police.

The full questionnaires that the participants were asked to complete is given in the Appendix V. The data collected using the numerical

questions of the questionnaire were transformed into different tables (see Appendix V).

3.3 Data Analysis Methodology

After collecting data using questionnaires and interviews, they had to be analysed (Step 3 of SSM). Since the collected data can be quantitative as well as qualitative and could also be unstructured, a method of analysis that can extract key features was required. As stated by Ritchie and Lewis (2003), the common method that is used to analyse qualitative data is the identification of key themes, concepts or categories that is described in the Thematic Content Analysis (TCA) approach.

3.3.1 TCA theory

Data analysis can be considered as a description of what has been extracted from the field study. It is a difficult, challenging and highly descriptive process (Poggenpoel 1998:334). As mentioned by Merriam (1998:7), hypotheses are rarely used in qualitative research since this could lead to imposition of data or meaning and therefore, put neutrality and reliability at risk. Hence, hypotheses were not used in this research. The data were analysed by means of the TCA method. Content analysis is a qualitative tool used to find out not only themes, but also recurring patterns of meaning (Merriam 1998). Creswell

(2003) stated that the motivation for qualitative research is to collect open-ended, emerging data in order to develop themes from the data. The main goal is to extract themes and to present a reliable picture of the situation under research (Neuman 1994).

Interviews and questionnaires were theme based content analysed, where repeated patterns and themes could be formed (Morse & Richard 2002:97). It includes encoding the qualitative information in order to identify a particular theme with the information that may have some relevance to the area or research (Boyatzis 1998).

TCA follows five main steps: familiarization, identifying a thematic framework, indexing and coding, charting and rearranging data according to themes (Ritchie and Lewis 2003). Henning, Rensburg and Smit (2004:104-109) proposed the following steps are required for this type of analysis see Figure 3.2:

- Preparing and organizing data for analysis
- Read for global impression
- Coding
- Categorizing
- Thematic organisation
- Writing up findings
- Validating accuracy and credibility

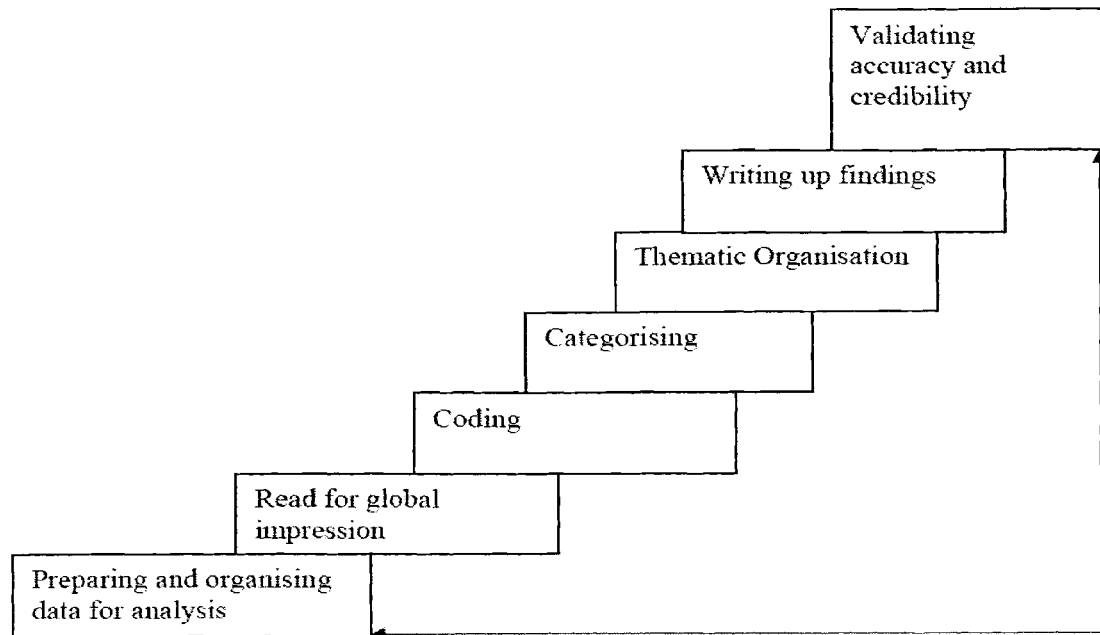


FIGURE 3.2: STEPS OF TCA (HENNING, RENSBURG & SMIT 2004)

Preparing and organizing data for analysis:

Hand written notes were taken during the interviews and reviewed immediately following each interview. Any necessary notes were added. Question and answers of each interview were written and typed out in full length and safely stored as electronic files in order to protect the data. All questionnaire responses were scanned and stored electronically. Backup up copies were created in order to be used should there be a loss or damage to the files.

Reading for global impression

The entire data gathered from the interviews and questionnaires were repeatedly read and studied to familiarise with the information and to have a global impression about the content.

Coding, Categorizing and Thematic organisation

Codes are served as a template for the data analysis (Robson 2002:458). Morse (2002:117) states that 'Topic coding is a very analytical activity, it entails creating a category or recognizing one from earlier, reflecting on where it belongs to among your growing ideas, and reflecting on the data you are referring to and on how they fit with the other data coded here'. As stated by Merriam (1998:160) 'although categories and variables initially guide the study, others are allowed and expected to emerge thought the study'. Therefore, a coding method that is consistent with the research aims, objectives and the theoretical ideas was identified and developed at the beginning, and additional codes were created for ideas presented from reading the interviews and the questionnaires that did not fit into the original coding scheme.

Krippendorff (2004) states that, a unit is distinguished as a whole and is treated as an independent element. These units are described as categories. Codes were then organised and grouped together into related parts which formed categories. Categories that are related to each other were grouped together. The categories, codes and patterns identified from the findings led to the themes. These themes are then used to answer the objectives of the study and later categorised into appropriate headings.

Writing up the findings

The research findings are the results that the researcher reaches after analysing the data. These findings are used to find out the real situation. These findings are described in Chapter 4.

Validity and Reliability

Greenhalgh (1997) believes good qualitative research use different data collection methods in order to know really what is happening and have deep information rather than just the surfers in order to have validity (closeness to the truth). Different methods have been employed to enhance the reliability and validity of the research.

Qualitative data can be analysed using qualitative, quantitative or both methods. An analysis using both methods can be used to triangulate results from different methods, to complement results from one method with another or to increase the coverage of the research by using different methods (Greene, Caracelli & Graham 1989).

Triangulation is using different sources of data surrounding the same topic under research, making the research analysis and findings more valid (Al-Qirim 2007:112). It is a useful and a widely used strategy to improve the truthfulness of research (Robson 2002:174). Researchers also use triangulation approach to study m-government services (Al-Khamayseh et al. 2006:2). Validation includes checking, questioning

and the interpretation of research findings. It verifies the reliability and the accuracy of the research process (Henning, Rensburg & Smit 2004:148). Moreover, bias can be minimized when the researcher spends enough time in the field and use different data collection methods to support the findings (Bashir, Afzal & Azeem 2008:41).

To validate and verify the results, transcripts of the interviews were sent back to the participants to check the details and make necessary corrections. The results of questionnaires were used to validate and complement the qualitative material.

3.4 Method of Matching Requirements to Technologies and Services

After extracting the needs and requirements of the participants, a method was needed to select the proper technologies and services to match these requirements. Commonly used method is the Task-Technology Fit (TTF) theory (Zigurs & Buckland 1998). The next section, describes this theory and the outcomes it produce.

3.4.1 TTF Theory

TTF is defined by Dishaw and Strong (1996) as ‘the matching of the functional capability of available IT with the activity demands of the

task at hand'. It helps in matching the capabilities of the technology to the demand of the task (Dishaw, Strong & Bandy 2002:1022). TTF theory focuses on matching between user tasks need and the functionality of the IT component (Goodhue 1995:1829). TTF is divided into two categories, individual characteristics and task characteristics (Ledbetter & Aronson 2007:112). The framework proposed by Gebauer and Shaw (2004) which is based on the TTF theory for mobile applications and technologies (displayed in the diagram below) was used here.

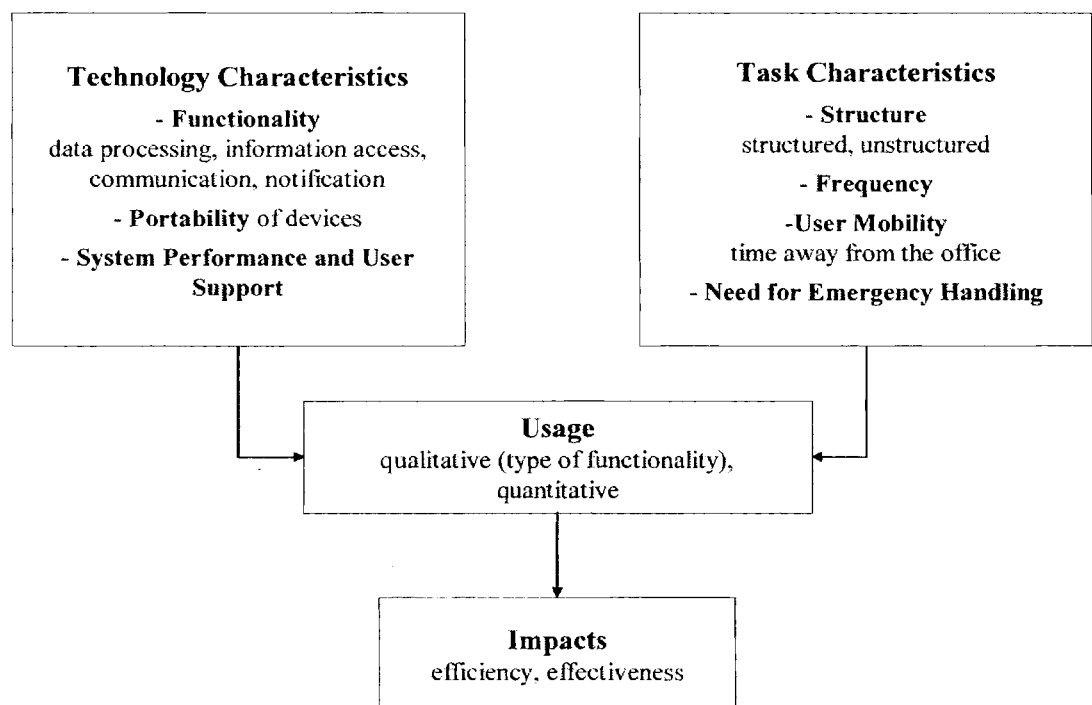


FIGURE 3.3: MATCHING TASKS TO TECHNOLOGIES USING TTF

(Gebauer & Shaw (2004))

a) Technology characteristics: There are four characteristics called Functionality, portability, system performance and user support.

1. Functionality: The functions of the technology such as data processing, information access, communication, notification and other technology functionalities.

2. Portability: the portability of the technology of the device that different in capabilities, size, weight, etc.

3. System performance: system performance such as networking that allows remote access.

4. User support

b) Task characteristics: This includes the characteristics of the task performed including structure (how structured a task is), frequency (how frequent the task usually take place), mobility (the location where the tasks is performed) and the need for emergency handling.

1. Structure ranges from highly structured to unstructured tasks. For example, employees performing high structured tasks (such as accountants) use mobile applications for data processing whereas employees performing unstructured tasks (such as managers) use mobile applications for accessing information.

2. Frequently: it relates to how often the tasks are performed.
 3. Mobility: the time spent out of the office with the requirement of immediate access to organisation information.
 4. Need for emergency: The need to perform a certain task within a short time.
- c) Usage: It is determined by matching the technology characteristics with the task characteristics.
- d) Impacts: The impacts of the mobile application on the organisation. There are two types of impacts; operational impacts and impacts on organisational flexibility and emergency handling. Operational impacts include productivity and efficiency improvements such as reducing the time to do the task and the possibility to distribute the workload equally. Organisational flexibility includes informing the possibility to have a contact and keep the employee updated with organisational events while out of the office. Also, the ability to handle emergencies such as the possibility to provide a back up in the case of network failure.

TTF was applied to the findings from questionnaires and interviews and this procedure and outcomes are discussed in Chapter 5.

3.5 Chapter summary

This chapter detailed the methodology that was followed throughout the research. It helped provide guidelines and the required steps to reach the objective of this research.

SSM, a well known type of information systems development methodologies was used in this research. This approach was used because it could identify technical and user requirements and deliver multiple views of a problem situation.

Data was collected using interviews and questionnaires. Interviews were used due to its ability to identify possible changes, provide direction in further phases of research and supplement other methods. Interviews that were conducted with different employees of the Dubai Police and questionnaires that were used to collect data from different participants dealt with issues such as strategic vision of the Dubai Police, current information services provided, current problems faced, current usage of mobile and wireless technologies and future recommendations and suggestions.

Before the data collection, ethical measures were setup that formed the bases from which the researcher assesses the conduct of the research study. An industry advisor from the Dubai Police was appointed to ensure that the information gathered and used by the researcher was performed ethically according to the guidelines specified in the ethics clearance approved and specified by the ethics committee of CQUniversity. Permission for the research was taken from the Dubai Police as well as from the participants. They were informed about the research topic, the confidentiality of their identity and responses and the security of the data.

After the data were collected, they were analysed by means of the TCA method. Content analysis is a qualitative tool used to find out not only themes, but also recurring patterns of meaning (Merriam 1998).

After extracting the needs and requirements of the participants, TTF theory was used to select the proper technologies and services to match the Dubai Police requirements. It helps in matching the capabilities of the technology to the demand of the task (Dishaw, Strong & Bandy 2002:1022).

Chapter 4

Results

As discussed in chapter 3, the requirements were gathered by analysing the data and these requirements were classified under categories. Then, similar categories were grouped together to form the themes. In this chapter, first, the key quantitative data extracted from the questionnaires were presented in tables and charts and, discussed. This is followed by the presentation and a detailed discussion of the themes, categories and the user requirements.

4.1 Quantitative data

The following are key sample responses from the questionnaires that produced quantitative results (See appendix V for complete questionnaire).

The table (4.1) shows that the participants were covered from all the age groups. The participants come from all the cities to obtain services from the Dubai Police. The 'employment' row states the 2 strata from which the participants were selected for the data collection.

- Demographics of the questionnaires participants

Age	18-29: 44% 30-39: 33% 40-60: 20% 60+: 1% No response: 2%
City	Abu Dhabi: 11% Dubai: 69% Sharjah: 11% Ajman: 2% Umm Al Quwain: 1% Ras al-Khaimah: 3% Al Ain: 3%
Employment	Dubai Police Employee: 22% Non Dubai Police Employee: 78%

Table 4.1: Demographic Data

According to the response to Q15 (see Appendix V) in the questionnaire, 54% of participants use mobile or wireless devices more than computers.

As shown in the table below (Table 4.2), the most likely method to contact the Dubai Police is using their Web site. The second likely form of communication is mobile or wireless communication. The least likely method is surface mail.

	Very Likely	Likely	Unsure	Unlikely	Very Unlikely
Face-to-face contact	25%	44%	8%	13%	10%
By Surface Mail	14%	23%	16%	22%	25%
By telephone	33%	47%	12%	6%	2%
By e-mail	40%	42%	10%	4%	4%
Website	62%	24%	7%	6%	1%
Self Service Kiosks	28%	40%	26%	3%	3%
Mobile or wireless	43%	36%	15%	3%	3%

Table 4.2: The likely method of contacting the Dubai Police

Rank	Mobile Messaging	Mobile and wireless network	Mobile GIS	Access to information using mobile and wireless devices	Mobile payment	Access to information using voice
1	41	19	8	13	13	6
2	18	21	14	25	13	9
3	22	14	8	25	17	14
4	12	20	18	18	19	13
5	3	17	27	12	23	18
6	4	9	25	7	15	40

Table 4.3: Ranking of possible mobile and wireless service enablers

Participants were asked to rank their priority if using key mobile and wireless service enablers if they were provided with them. The table

above (Table 4.3) reveals how participants responded to it. The mobile messaging ranked first followed by the mobile and wireless networks, access to information using mobile and wireless services, M-GIS and access to information using voice.

Participants were asked if they used mobile and wireless devices to receive any information or services. 82% of participants used the mobile or wireless devices to receive information and services. In addition, they were asked if mobile services were provided by the Dubai Police, would they use them. 96% of participants showed their interests in having mobile services.

4.2 Research Themes

Following the interviews, the summary of each interview outcome was typed and sent to the respective participant for verification and adjustment. After reading and studying the collected information from the interviews and questionnaires, and verifying them, the following six themes and categories of the research were identified. Some of the categories draw the current picture of the Dubai Police and its sectors whereas the others are what the participants expect to have. Whether they are already existing or what the participants wish to have are differentiated by the letter 'C' or 'W' placed in brackets.

- THEME 1: Strategies and roles of the Dubai Police General Department

- Category A: The main strategy of the Dubai Police (C)
 - Category B: Strategies and roles of different Dubai Police departments (C)
- THEME 2: Access to the Dubai Police information and services
 - Category A: Access, feedback and communication means to the Dubai Police information and services (C)
 - Category B: Difficulties in accessing and obtaining information and services (C & W)
 - Category C: Problems, shortcomings and needs of the departments (C & W)
- THEME 3: Services
 - Category A: Main systems and services (C & W)
 - Category B: Stakeholders (C & W)
 - Category C: Resources and supply management (C & W)
 - Category D: Payment (C & W)
 - Category E: Satisfaction (C & W)
- THEME 4: Traditional and electronic services
 - Category A: Advantages and disadvantages/strengths and weaknesses (C)
 - Category B: Preference (C)

- **THEME 5: Mobile and wireless service enablers**
 - Category A: Current usage by the Dubai Police (C)
 - Category B: Stakeholder's usage and ownership (C)
 - Category C: Access using Mobile or Wireless Device (C)
 - Category D: Rank of possible key mobile and wireless service enablers (W)
 - Category E: Recommended mobile services (W)

- **THEME 6: Futuring**
 - Category A: Participants opinion about the services that should be provided and their recommendation about specific useful ICT technologies (W)
 - Category B: Suggestions and recommendations (W)

THEME 1: Strategies and roles of the Dubai Police General Department

Category A: The main strategy of the Dubai Police:

The vision of the Dubai Police stated in 2008-2015 Strategy is that 'Security is the pillar of development. Let us ensure the security and safety for our community and maintain public order at world-class efficiency, professionalism, and at excellence levels'. The mission is to strengthen the feeling of security, and protection of rights, and to provide services that will win people's satisfaction which is an important objective.

The Dubai Police acknowledges the need to respond to the changing needs of the people and communities by continuing to evaluate and assess the methods in which services are being provided to increase the level of service delivery. Strategy targets include communicating, updating technology, continuous education and measuring performance level. Hence possessing and utilising the latest ICTs such as mobile and wireless service enablers should be a part of the strategic targets of the Dubai Police in order to enhance service delivery.

Category B: Strategies and roles of different Dubai Police departments

There are many different departments under the Dubai Police General Departments. The following are the strategies and roles of some of the main departments of the Dubai Police.

The General Department of Traffic is considered as one of the most important servicing departments in the Dubai Police. Its main objective is to provide police services to different sectors of the community such as law enforcement and regulation of traffic. It is responsible for traffic control, ensuring traffic flow along streets, reducing traffic accidents, issuing and collecting fines, and ensuring the security and safety of all travellers.

The General Department of Operations is considered as the heart and the central point of the Dubai Police. It is the main point of all reports and queries directed to the Dubai Police. It is responsible for monitoring and controlling all police patrols and policemen in streets and coordinating with emergency committees in different local and governmental departments. The department intends to use the electronic means to control the police patrols. It uses Terrestrial Trunked Radio (TETRA) networks to communicate with police patrols.

The General Department of Human Resources has many objectives such as recruiting new employees, training and developing the capabilities and skills of employees to interact with the public in different situations.

General Department of E-services has been established to cope with technology advancement. Its objective is to reduce the paper work. It carries out many tasks such as converting from traditional services to electronic services, IT project management, software developments, supervising all technical equipment in the Dubai Police such as computers, printers, networks, managing the Dubai Police portal and website, and technical consultation and support. It is an important department to support the Dubai Police's e-government initiative.

General Department of Community Services is responsible for information and moral guidance, mass communication and awareness

programs, security information through publications, emails, audio-visuals, and customer service and satisfaction

General Department of Services and Supplies is responsible for purchasing the Dubai Police requirements, supplies and ancillary services. It is also responsible for the Police clinic that provides distinctive medical, diagnosis and therapeutic services to the Dubai Police employees, their families and others, dissemination of health awareness and transfer of patients to the hospitals.

In summary, Theme 1 identifies the main requirements of the Dubai Police which are to enhance the services provided, transform traditional systems into electronic services, provide around the hour services using updated and latest technologies and systems in order to satisfy the people.

THEME 2: Access to the Dubai Police information and services**Category A: Access, feedback and communication means to the Dubai Police information and services**

There are various ways in which people can access, obtain and send information to the Dubai Police. The common and traditional way is to visit the Dubai Police departments and police stations or by phone, fax and mail. The electronic means include website, emails, e-fax, SMS and kiosks. The Dubai Police also communicate to people through awareness and advertising campaigns, exhibitions, meetings, ideas, presentations and brainstorming, brochures and booklets and through media such as radio, TV and newspapers. Employees use the intranet in order to access and obtain information internally. The Dubai Police developed a complaints and suggestions program on the Dubai Police website through the Internet for external and internal clients. They also collect feedback through surveys. They have a Quality Assurance Department to ensure that services are provided at an acceptable standard.

The Dubai Police provides different means of access to its services, using the traditional and electronic means. It currently communicates electronically through centralized software called e-correspondence system using LANs for the Dubai Police General Departments and through leased lines which are payable services for other departments

and police stations. However, there are other ways of access, such as mobile and wireless that are not being fully utilised.

TETRA (release 1) network Dubai Police Departments is used to establish communication only between the Dubai Police H.Q operational departments with police patrols and not by other departments or clients. It enables police patrols to send voice, messages (SMS messages) and use data services. TETRA handsets are expensive compared to mobile devices and data rate is 28.8 kbps which is slow compared to available ways of communications such as new mobile and wireless services.

Category B: Difficulties in accessing and obtaining information and services

There are numerous difficulties faced by people in accessing and obtaining the required information and services from the Dubai Police. Employees cannot access real-time information and services while working in the field. Only the employees in the police patrols can access information in the field. The only communication method available for the former is the telephone. Hence, they have to record the information and then enter the data into the system when they return to their offices.

People face some obstacles when communicating with the Dubai Police on the phone such as no response, kept on hold for a long time

and multiple diversions of calls. Other problems include traffic jams and lack of adequate parking space at the office especially for those travelling long distances to complete their work with the Dubai Police.

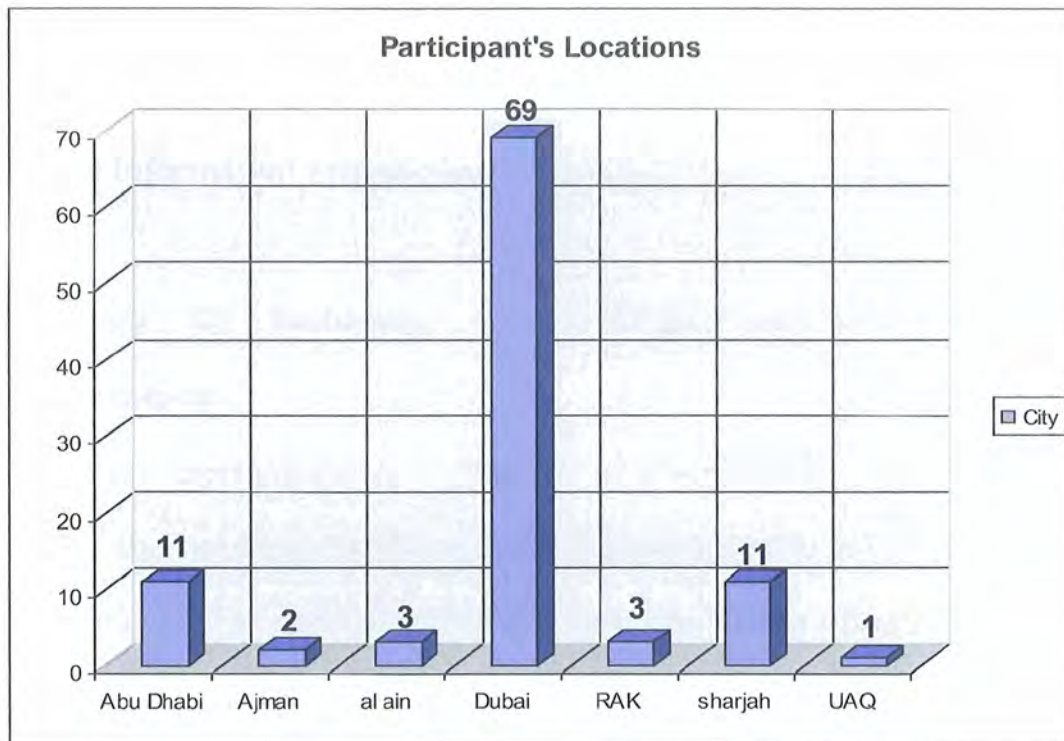


FIGURE 4.1: LOCATIONS OF PARTICIPANTS

The statistics in Figure 4.1 shows that the largest sample of respondents comes from Dubai (69%), as the Dubai Police is located in the city of Dubai. Abu Dhabi and Sharjah (11%) come in the second place then Al Ain and RAK (3%), Ajman (2%) and UAQ (1%). This indicates that participants come from all over the UAE and they travel from different cities, such as Abu Dhabi (around 150 km) to arrive at Dubai Police General Department.

Some people find it difficult to access these services of the Dubai Police on the intranet, as they do not have Internet access. There are just a few electronic services that can be completed online. The participants state that, the current technology used to contact the required department is weak and need to be upgraded. Therefore, other means of access need to be provided to make it possible to access information and services when and where it is needed.

Category C: Problems, shortcomings and needs of the departments

The main shortcoming is to provide more services in different ways to satisfy the needs of clients and communicate to the entire population. For example, in case of an emergency, the Police should be able to communicate to the staff and to a large number of people in a very short time. There is a lack of patrol vehicles that can provide quick and efficient services. Police patrols sometimes take a long time to reach the location of the car accident due to traffic jams or lack of directions. Transcripts revealed that many people were unaware about the different services provided, and it is important to increase their awareness.

People would like to be reminded about appointments, vehicle renewal, fines and so on. There is a need to provide these services either by traditional or electronic means. Services should be available in different languages. There should be direct networks between the

Dubai Police with its stakeholders such as public and businesses. Most of the services should be automated in order to access real-time information whenever needed. Services should be available anytime and anywhere.

THEME 3: Services

Category A: Main systems and services

There are several main systems within the Dubai Police. The four main systems are Government Resources Planning (GRP), Police Criminal System, Traffic System and Electronic Messaging System.

GRP is used to manage the Dubai Police resources (financial, human and material). Police Criminal System is a system that deals with all criminal records, fingerprints and other related services such as Good Conduct Certificate, reporting a crime and home safety. Traffic System handles all traffic related transactions that includes driver's licence, car insurance, car ownership and registration, traffic violations, fine queries, fine payment and so on. E-correspondence system (electronic messaging) provides a paperless environment for the Dubai Police and enables the exchange of electronic messages between the departments of the Dubai Police.

The following are other services used and provided by the Dubai Police:

- Email system (Outlook): Sending and receiving emails.
- Lost and found : Reporting lost items
- Awareness services
- Internet and intranet
- Medicus (for the Dubai Police health clinic: electronic patient file) or the so called electronic clinic
- Attendance program
- Job vacancies: Enables job seekers to find out about current job vacancies at the Dubai Police and submit their applications online.
- Security control : providing security for locals, foreigners and visitors, housing security, preventing crimes, latest information about crimes
- Electronic archiving
- E-Fax System
- Helping in disasters
- Alameen service allows the members of the community to report unusual or suspicious activity to the authority, by calling a toll free number, in order to create a safer community.
- Electronic suggestion system
- Customer Relationship Management (CRM)

The Dubai Police encourages people to use their website through different ways such as:

- Sending the website link of the Dubai Police to customers through emails or surface mail
- Encouraging clients to communicate with the Dubai Police through the website
- To create awareness of the services and encourage them to use the website through events, exhibitions and community functions
- Draws for prizes for people who participate and use the website

Even though the Dubai Police provides the above services, the participants indicated that they needed improvement. For example, they liked to receive immediate notifications of traffic fines, employees would like to access the intranet while they are in the field and clients would like to access the Internet while they are in the Dubai Police Departments.

Category B: Stakeholders

The stakeholders of the Dubai Police can be categorised into four groups: public, businesses, employees, and other government departments. Public are people living in a specific district. It includes all people that deal with the Dubai Police. Businesses are companies such as banks, car rentals, hotels, shops and so on. Employees are all the people working for the Dubai Police. Other government departments include all the government departments dealing with the Dubai Police such as Naturalization & Residency Administration,

Dubai Civil Defence, Land Department, Dubai Electricity & Water Authority, Dubai Courts and Department of Health & Medical Services. Therefore, the Dubai Police should support and focus on its internal activities (within Dubai Police), external businesses and government relations (with business and government) and external relations with clients (public).

Category C: Resources and supply management

GRP is the main system to manage assets and resources. It consists of e-procurement services. It is a cycle which begins with the request for quotations followed by bidding, purchase orders, invoice and payment. Currently, when an item is received or sent, each item is manually entered into the system. This may lead to human errors in data entry. A computer that is connected to the network is required at the location of receipt, delivery or purchase of the items in order to input the details. Otherwise, they have to be first written down and then entered into the system later. Therefore, employees spend much time on this process.

Operational Department is responsible for managing its fleet such as patrol vehicles in the field. It is using a desktop GIS for monitoring and tracking patrols vehicles in the field. All patrol vehicles are equipped with devices that enable the operational department to track their movement through the TETRA network. Only they can track the police vehicles but not the policemen in the field. The police patrols

face some difficulties in reaching the places of accidents requested by the Operational Department. The possible reasons for this are the lack of knowledge of the exact location and the fastest or shortest route to reach the required location. When people meet with accidents, they expect the Police to arrive quickly. Therefore, the fleet and human resources need to be managed in a better manner.

Category D: Payment

The Dubai Police currently provides different payment methods such as cash, cheques, bank transfers and credit cards. Clients can use touch screen kiosks available at different places like shopping malls to make payments using their credit cards.

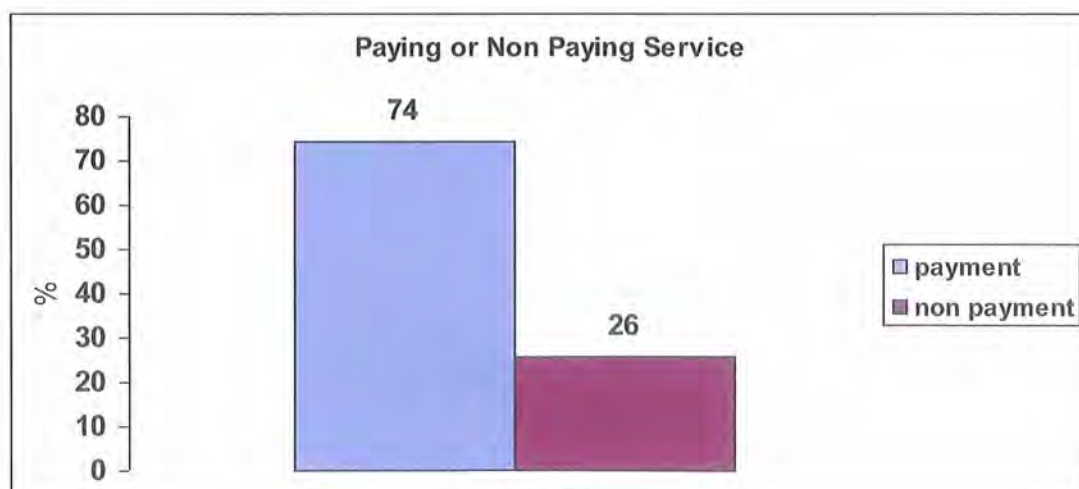


FIGURE 4.2: PAYING OR NON PAYING SERVICE

According to Figure.4.2 constructed using quantitative survey results, 74% of participants have dealt with a paying service during their last visit to the Dubai Police.

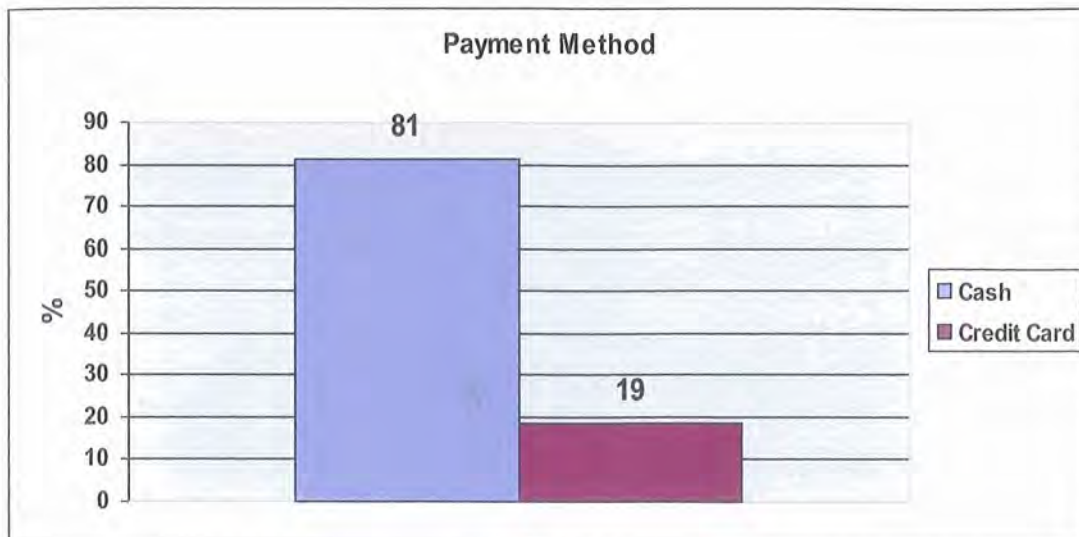


FIGURE 4.3 PAYMENT METHOD

Out of the participants who used a paying service, 81% paid cash during their last visit, while 19% used their credit card (Figure 4.3). These are the current ways of payment. Therefore, a wider range of payment options either traditional or electronic (including mobile and wireless) mean should be made available to the clients.

Category E: Satisfaction

Participants stated that during their visit at the Dubai Police office, they sometimes had to wait in long queues to receive some services.

As shown in Figure. 4.4 below, on an average, clients spend 30 minutes to reach service locations of the Dubai Police, the longest time spent was 120 minutes and the shortest time was 1 minute for people working in the Dubai Police itself. On an average, participants spent 28 minutes in queues, 240 minutes being the highest and 1

minute being the lowest time spent. Employees on an average take 14 minutes to complete the services for the clients, 60 minutes being the longest and 1 minute being the shortest time taken.

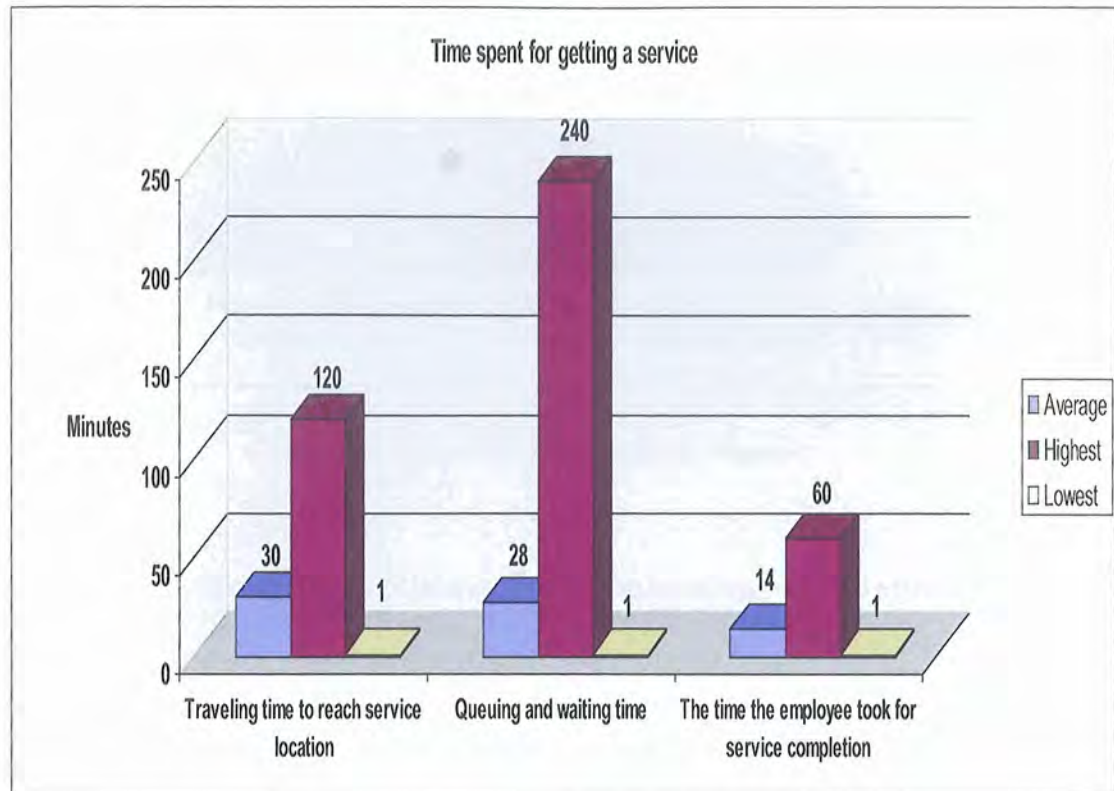


FIGURE 4.4: TIME SPENT FOR GETTING A SERVICE

Sometimes clients have to make several trips or visits to different departments of the Dubai Police departments to complete a single task. For example, they made two trips on an average to complete a service, the highest number of trips being 15 and lowest being 1 trip. On an average, participants visited 2 other government departments to complete the service, 7 being the highest and 0 being the lowest (Figure 4.5)

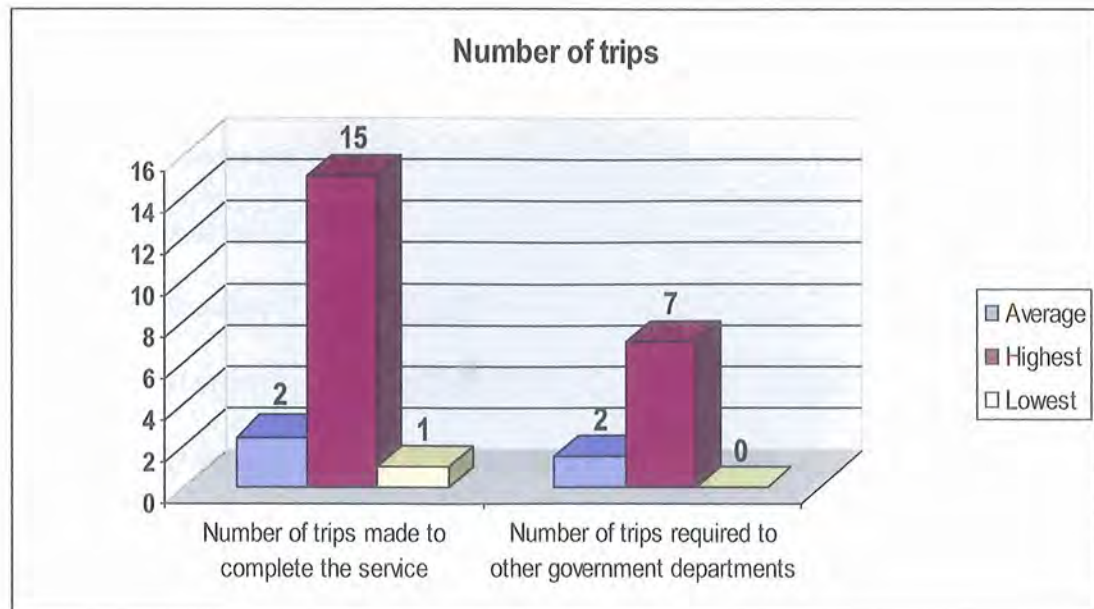


FIGURE 4.5: NUMBER OF TRIPS

Clients require visiting other government departments due to the fact that there is no work integration or network connection between the Dubai Police department with other government departments. A system should be in place such that the clients visit only one department to receive their service and that department should be able to interact with the other departments in order to complete the service. Some tasks have long procedures that can be automated and simplified. Some participants found that the Dubai Police website is not clear and simple. A participant stated that not even a quarter of their services were provided electronically.



FIGURE 4.6: SATISFACTION LEVEL

Figure 4.6 above represents the respondent's level of satisfaction based on the last service they received from the Dubai Police. Although slightly more than 80% of the respondents are satisfied, only 24% of them are extremely satisfied and 57% are somewhat satisfied. Figure 4.6 also shows that 14% are somewhat dissatisfied and no one is dissatisfied.



FIGURE 4.7: SERVICE QUALITY

The survey results in Figure 4.7 indicate a mixed reaction by participants to the services provided by the Dubai Police. It shows that 58% of participants found that the services provided by the Dubai Police are excellent, 25% average, 12% outstanding, 5% fair and 0% poor.

It is important for the Dubai Police to increase the quality of their services in order to increase the level of satisfaction. This could be done by decreasing the travelling time, waiting time, time taken by employees to complete the service and the number of trips required to complete a task. Participants stated that there is a need for improving it by providing more interactive and fully electronic services. Many participants have mentioned that it is important that services should be provided for mobile devices.

THEME 4: Traditional and electronic services**Category A: Advantages and disadvantages/Strengths and weaknesses**

Traditional services require more time and effort in storing and retrieving information due to the paper work involved. It is costly and consists of many routine procedures that takes a long time to process and requires much human processing than electronic means.

Services such as awareness campaigns do not reach a large population of the community, and hence does not meet the objective of delivering information to people. Many people do not have Internet as they could not afford to pay for it.

The Dubai Police and the community can benefit by using electronic services. They can pass on important information to the people through their website that is provided in both English and Arabic languages. It is a faster way to obtain reliable information. People can check traffic information, fines, download forms and make payments through kiosks using their credit cards. Electronic services can integrate all the departments of the Dubai Police. Employees can access required information easily anywhere and anytime.

Electronic services do have some weaknesses. Some respondents found it complicated to use, less interactive, too much unwanted

information, many services are still not available online and lack of response to emails. There is not enough marketing and advertising done in order to create awareness of the available electronic services.

Category B: Preference

More than 90%, of the participants indicated that they prefer electronic means because of the following reasons:

- It is available anytime
- It is an easier, faster and cheaper service compared to traditional services
- It is better than dealing with police employees
- One does not have to visit different departments and hence can avoid the traffic, long queues and waiting time
- Services can be tracked online
- Easy access to large amount of information which cannot be provided by the employees
- More accurate information

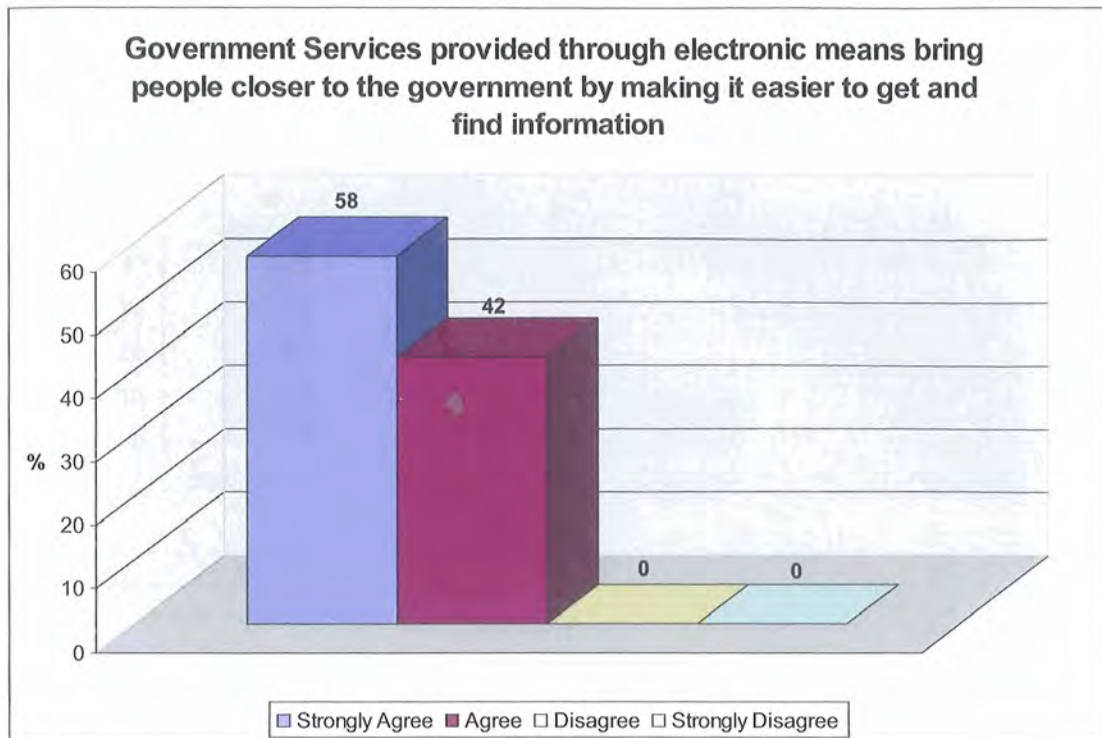


FIGURE 4.8: GOVERNMENT SERVICES PROVIDED THROUGH ELECTRONIC MEANS BRINGS PEOPLE CLOSER TO GOVERNMENT BY MAKING IT EASIER TO GET AND FIND INFORMATION

It was found from the results of the questionnaire that a majority of participants would benefit from a government service provided by electronic means. In response to Question 22, whether it makes it easier to find and access the information, 58% of the participants strongly agreed, 42% agreed and none disagreed (Figure 4.8).

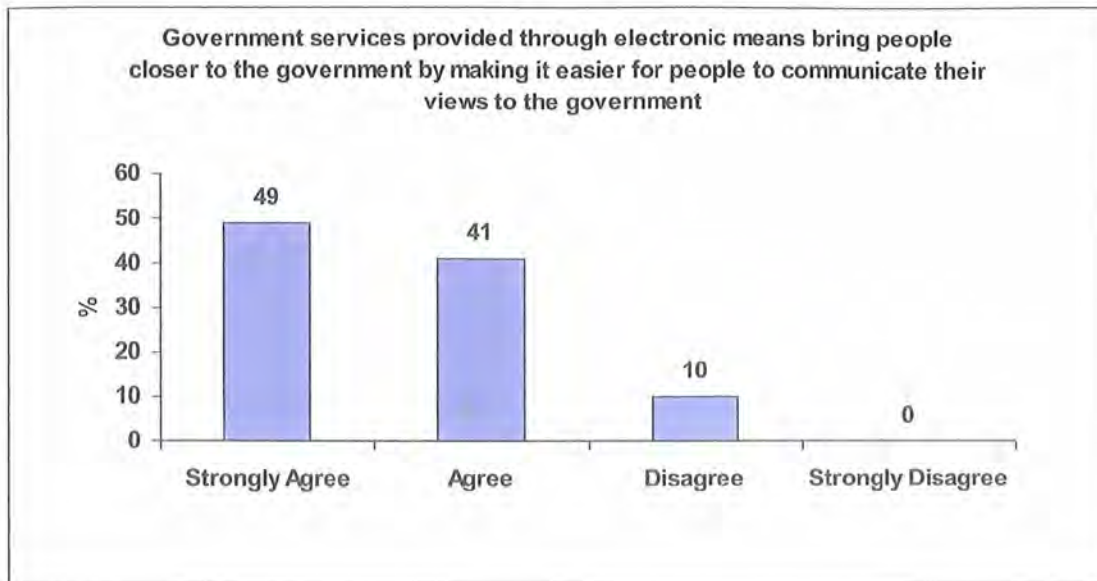


FIGURE 4.9: GOVERNMENT SERVICES PROVIDED THROUGH ELECTRONIC MEANS BRING PEOPLE CLOSER TO GOVERNMENT BY MAKING IT EASIER FOR PEOPLE TO COMMUNICATE THEIR VIEWS TO GOVERNMENT

In response to Question 23, whether it makes easier for people to communicate their views to the government, 49% of the responses strongly agreed, 41% agreed, 10% disagreed and none strongly disagreed (Figure 4.9).

In response to Q12 in the Interviews and Q 14 in the questionnaires, some participants preferred face-to-face approach in order to ensure that there would be no delay and information can be directly obtained. In their opinion, some tasks can be solved only through traditional means and not electronic means. Other participants liked to have access to both methods.

THEME 5: Mobile and wireless service enablers

Category A: Current usage by the Dubai Police

The current uses of mobile and wireless services are as follows:

- Mobile networks are used to call and receive calls from companies, employees and other departments.
- SMS is used for specific and limited services such as notifications to clients.
- TETRA network is used to communicate between the operation department and the patrol vehicles. It enables voice communication and messaging (SMS) through the TETRA network. The Operation Department can track police vehicles in the field.

Category B: stakeholder's usage and ownership

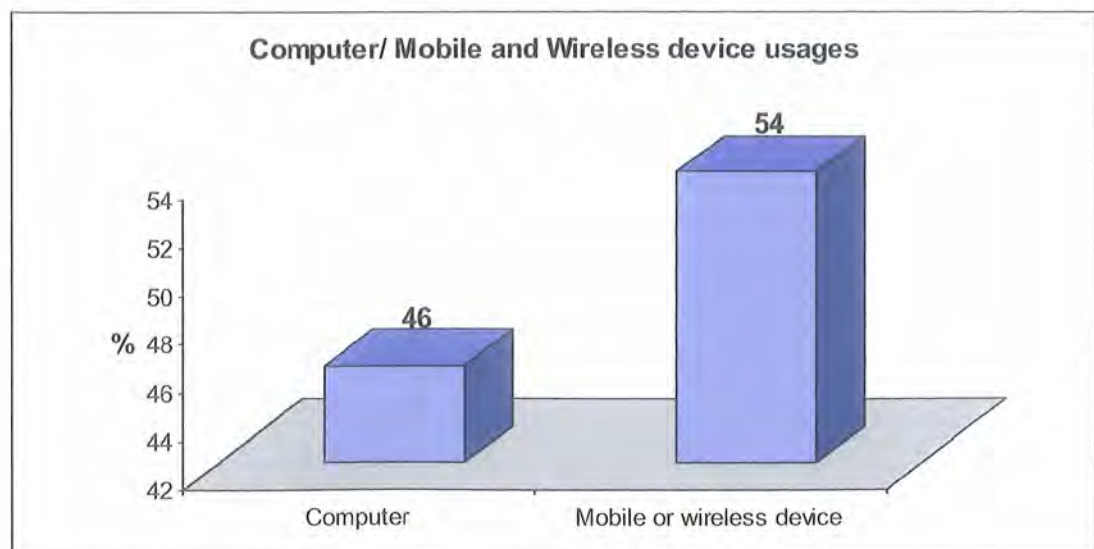


FIGURE 4.10: COMPUTER/MOBILE AND WIRELESS DEVICE USAGES

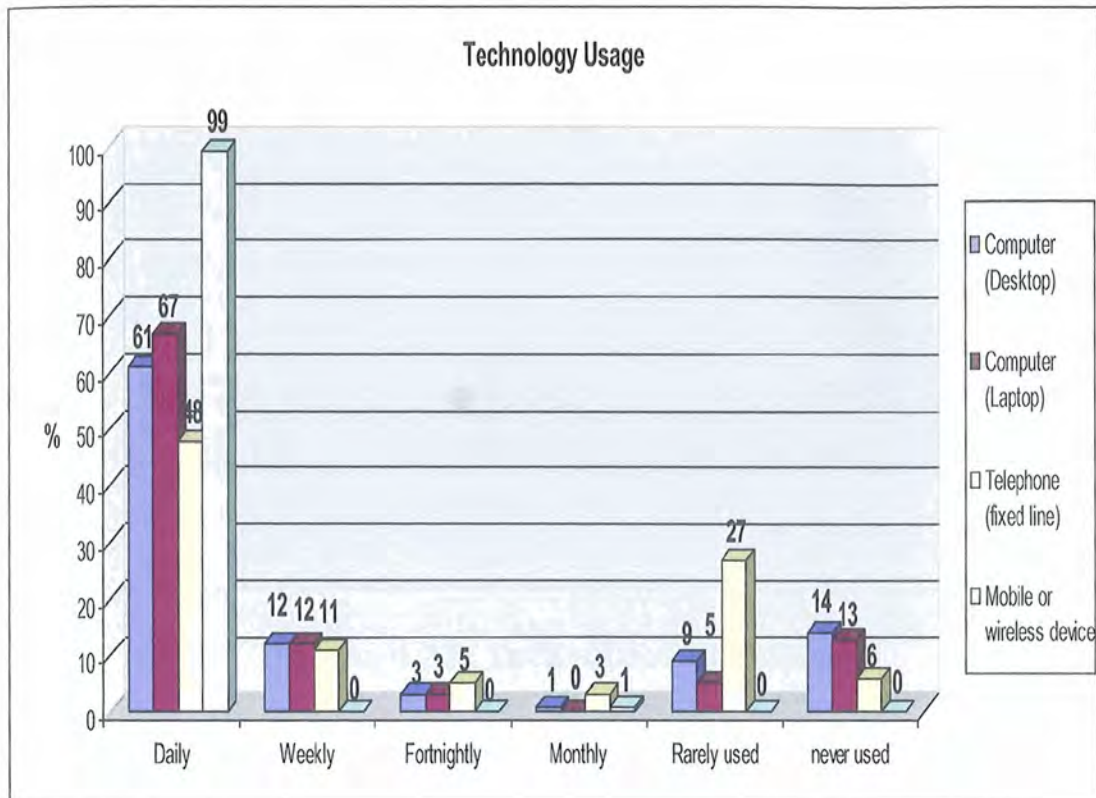


FIGURE 4.11: TECHNOLOGY USAGE

As shown in Figure 4.10, 54% of participants use mobile and wireless devices more than computers. Mobile or wireless devices came in first place in the most used technology by participants, with a daily usage rate of 99% as shown in Figure 4.11. This supports the view that m-government would be more suitable for the Dubai Police than e-government.

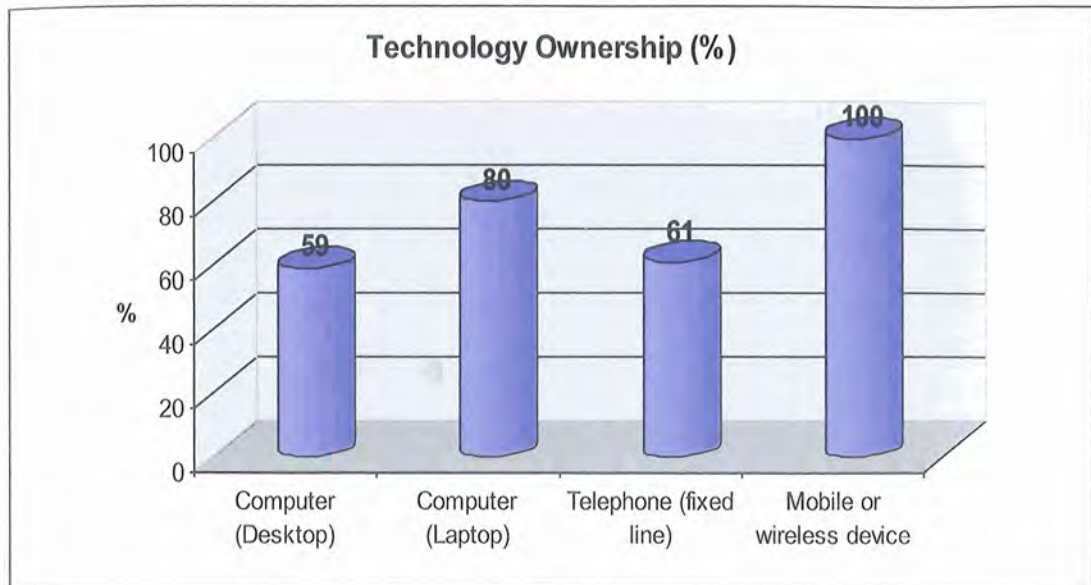


FIGURE 4.12: TECHNOLOGY OWNERSHIP

As shown in Figure 4.12, 59% of the participants own a computer, 80% own laptops, 61% own telephone and 100% own mobile or wireless devices. This supported the literature that there is a high penetration of mobile and wireless devices in the UAE (International Telecommunication Union 2007:URL).

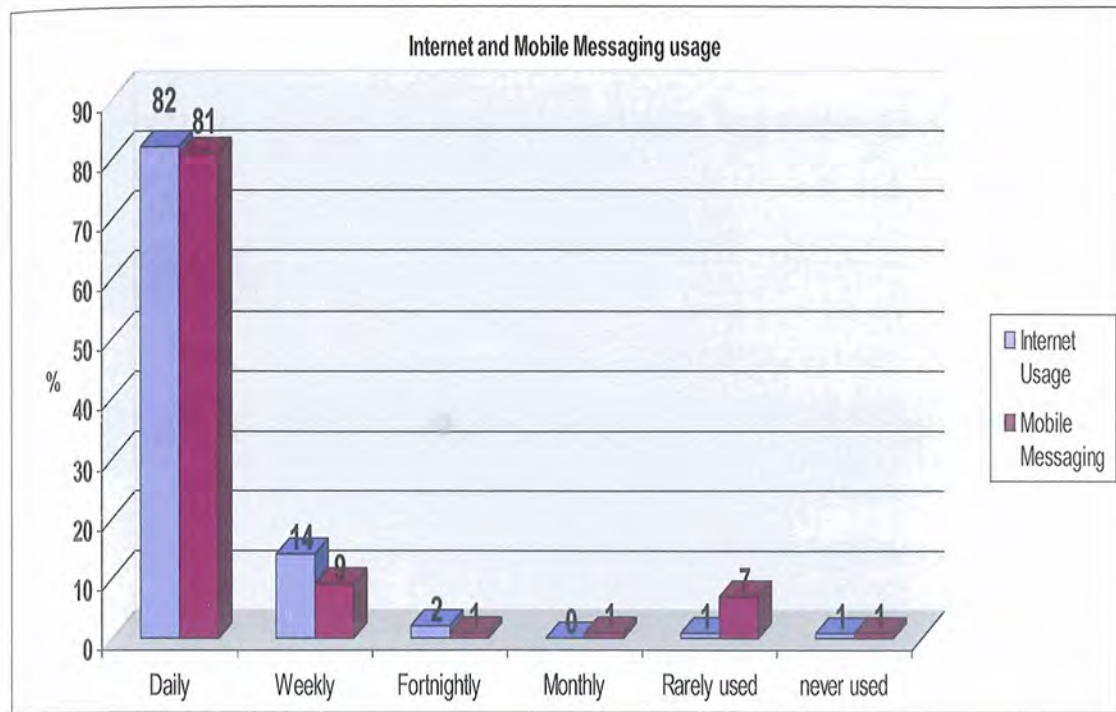


FIGURE 4.13: INTERNET AND MOBILE MESSAGING USAGE

As shown in Figure 4.13, there is a similar usage rate between the Internet and mobile messaging by participants. For example, 82% of participants use the Internet daily whereas 81% use mobile messaging on a daily base.

In conclusion, this category shows that people already use mobile and wireless devices more than computers and landline telephones (fixed line). In addition, 100% of participants own mobile and wireless devices.

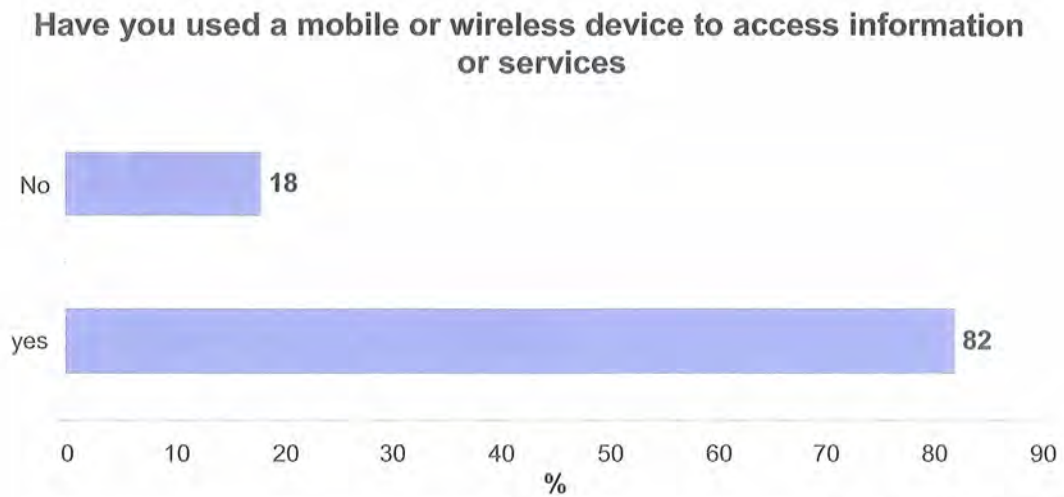
Category C: Access using Mobile or Wireless Devices

FIGURE 4.14: USING MOBILE AND WIRELESS TO ACCESS INFORMATION OR SERVICES

Figure 4.14 shows the frequency of mobile or wireless devices used to access information and services. 82% of participants use the mobile or wireless devices to access information and services.

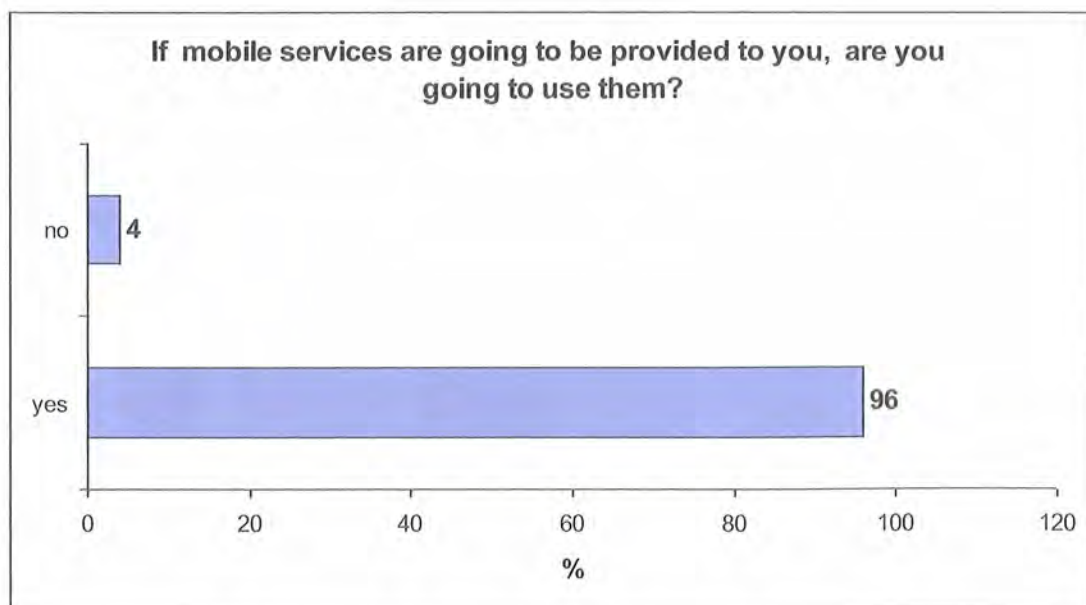


FIGURE 4.15: THE POSSIBILITY OF USING MOBILE SERVICES

This Figure 4.15 reveals that 96% of participants have shown interests in accessing mobile services if they were provided to them.

Most of the participants have used mobile and wireless devices to obtain information and services daily. Furthermore, most of the participants showed interest in using mobile and wireless services if these services are going to be provided to them. This confirms the importance of mobile and wireless services as means to obtain information and services.

Category D: Rank of possible key mobile and wireless service enablers

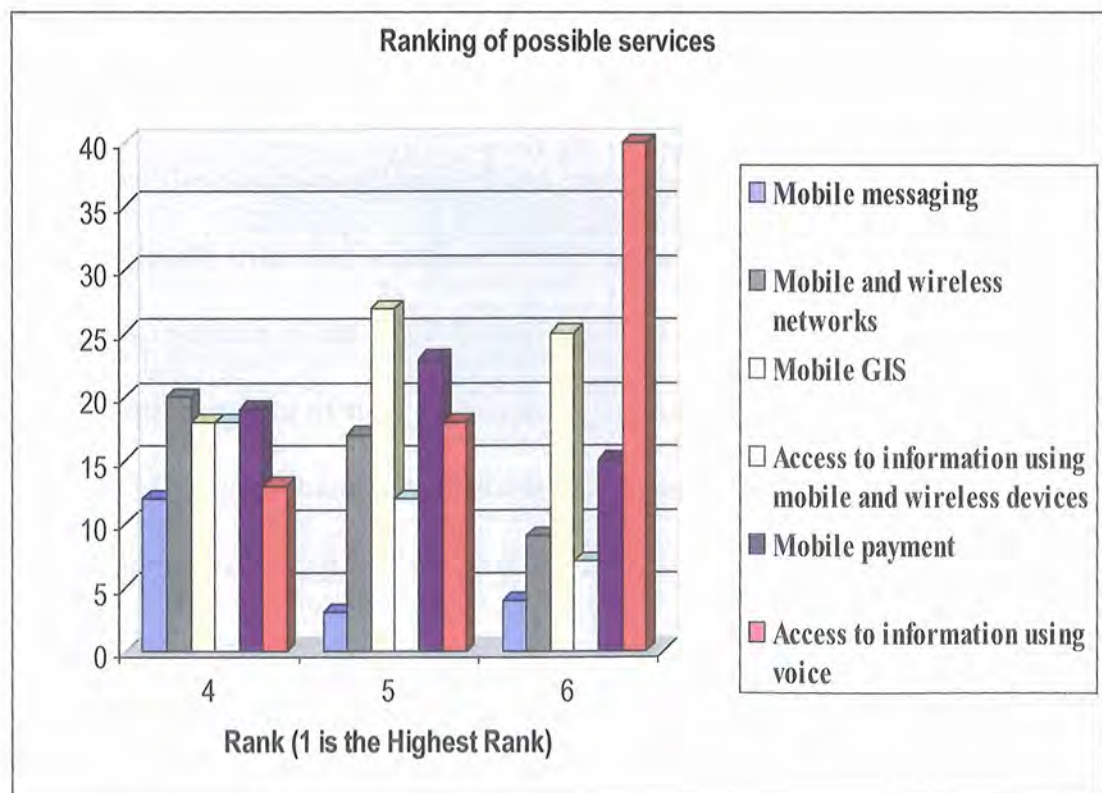


FIGURE 4.16: RANK OF POSSIBLE MOBILE SERVICE ENABLERS

Participants were asked to rank key mobile and wireless service enablers, if they were provided to them. Figure 4.16 reveals how participants responded to the choice of key mobile and wireless service enablers. The mobile messaging ranked the highest followed by mobile and wireless networks, access to information using mobile and wireless devices, m-payment, the M-GIS and lastly, access to information using voice. These ranks are important when considering and proposing m-government solution for the Dubai Police.

Category E: Recommended mobile services

The participant's recommended the following mobile and wireless services:

- Checking application status
- Accessing services anywhere
- Notifications and receipt of messages such as time of salary deposit into the account, leave balances, important information and status of services, activities and events
- Notifications of new rules, general advice to prevent crimes
- Traffic and road information such as notifications of traffic jams, diversion routes, blocked roads, traffic fines, renewal of car insurance, violations
- Services to complete job tasks after working hours
- Making appointments
- Sending and receiving emergency information
- More ways to receive information

- Road assistance
- Information of different departments with locations
- Access to dedicated numbers to make queries in order to reduce pressure on police employees
- Faster response to telephone calls.
- Payment services
- Provide people with updated and daily information about the Dubai Police
- Mobile and wireless access to the Dubai Police information and services.

This category highlights the different services recommended by participants. These recommendations will be considered in proposing the m-government solution for the Dubai Police.

THEME 6: Futuring

Category A: Participants opinion about the services that should be provided and their recommendation about specific useful ICT technologies

Participants have requested or recommended many services that can be provided. For example, they believed that there should be different means to communicate with the Dubai Police departments, Dubai Police and clients. They suggested creating an 'electronic communication link' between the Dubai Police and its stakeholders

such as schools, public, different government departments. Remote access should be provided for people working in the field to have real-time information. Most of the services should be available electronically through a network connection. This will help speed up the process of completing and finishing the work. Survey revealed that the Dubai government targets to transfer 90% of services provided by its departments to be electronic by the end of 2010.

Participants recommend using the best and latest technology to enhance the Dubai Police services. There should be a better use of mobile messaging services and mobile and wireless services.

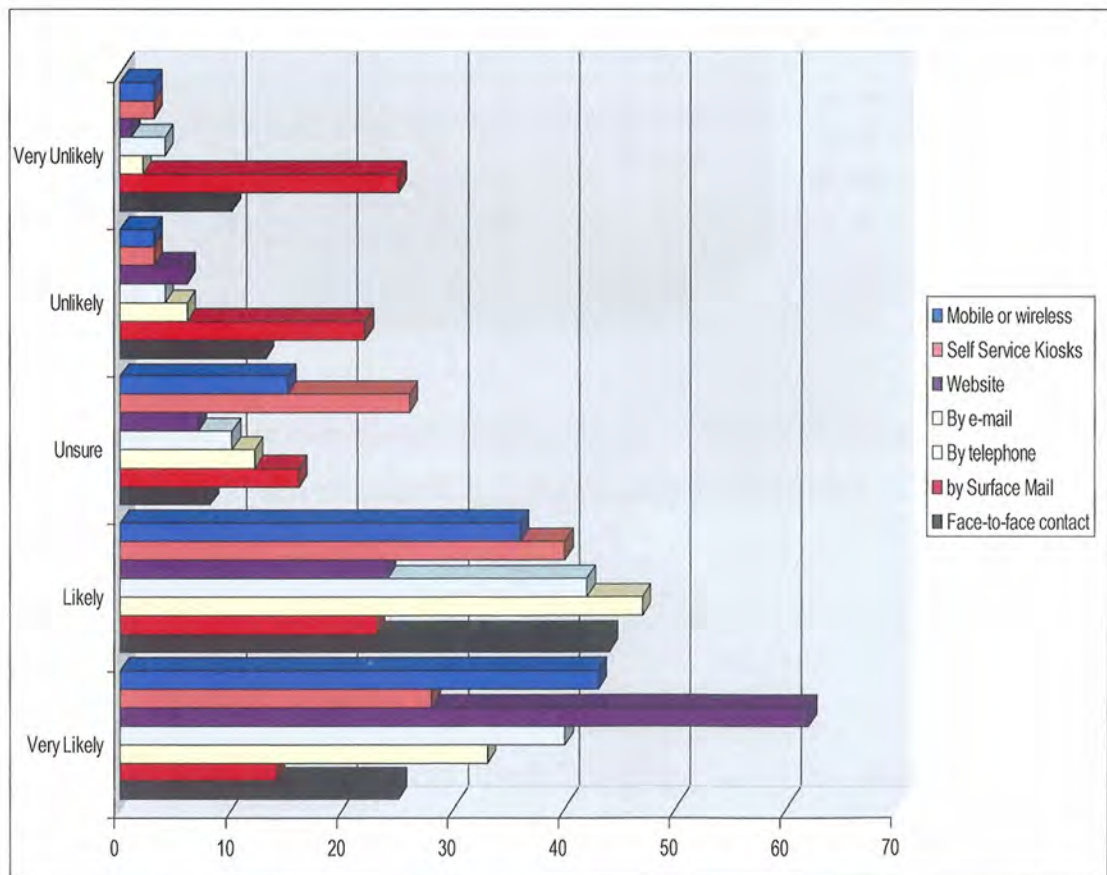


FIGURE 4.17: THE LIKELINESS OF USING DIFFERENT FORMS OF COMMUNICATION

Figure 4.17 shows a summary of the likeliness of using different forms of communication, if they were available to the participants to contact the Dubai Police. As can be seen in the figure, the most likely method is using the Dubai Police website, followed by mobile or wireless communication and the least likely is surface mail. Therefore, mobile and wireless communication should be considered by the Dubai Police in service delivery.

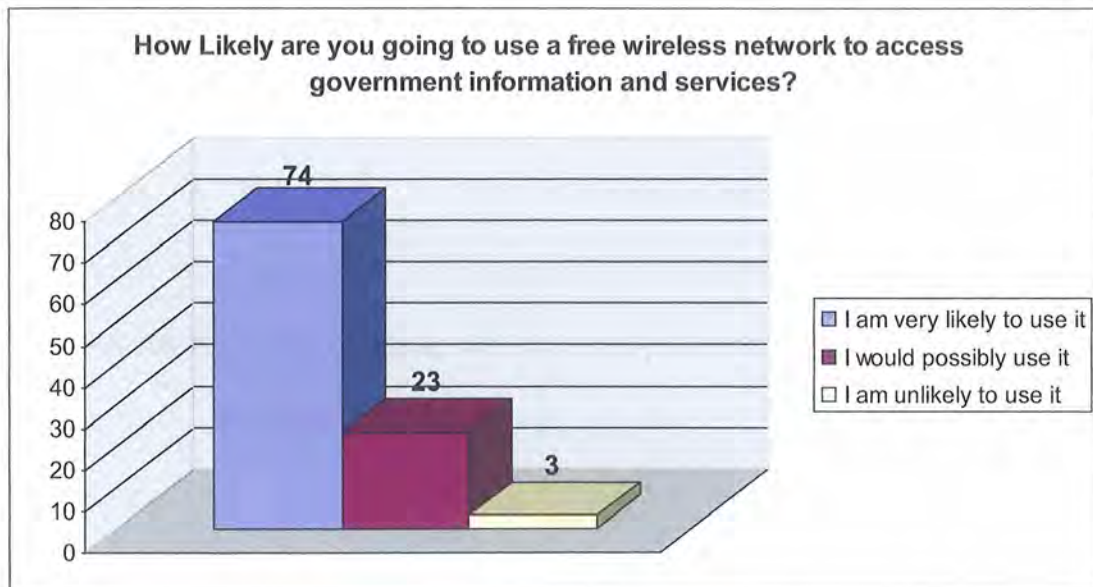


FIGURE 4.18: LIKELINESS OF USING A FREE WIRELESS NETWORK TO ACCESS GOVERNMENT INFORMATION AND SERVICES

Participants were asked about the likeliness of using a cost free wireless network to access government information and services. 74% of the respondents are very likely to use a free wireless network to access government information and services, 23% would possibly use it and 3% are unlikely to use it (Figure 4.18)

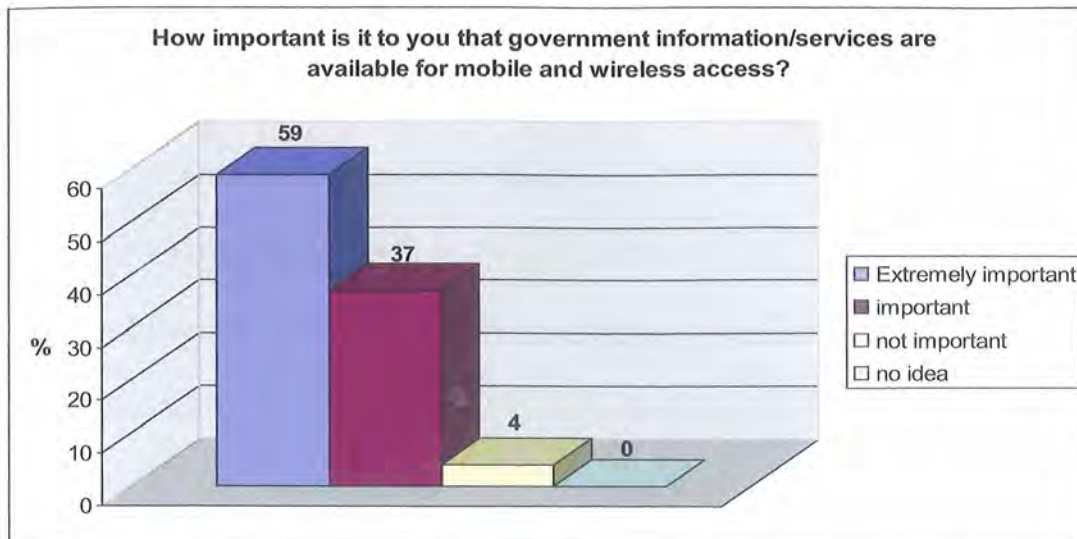


FIGURE 4.19: THE IMPORTANCE OF HAVING GOVERNMENT INFORMATION AND SERVICES AVAILABLE FOR MOBILE AND WIRELESS ACCESS

According to Figure 4.19, 59% of respondents found it extremely important that government information and services are available for mobile and wireless access, whereas 37% found it important, and 4% found it not important.

In conclusion, people are very likely to use mobile and wireless form of communication to access the Dubai Police information and services and they believe that it is important to provide them.

Category B: Suggestions and recommendations

The following is a list of general suggestions and recommendations made by the participants

- Linking all the Dubai Police departments with other departments such as different hospitals, clinics, civil defences will be helpful in case of disasters.
- New simple methods to access information and services.
- Additional payments methods through mobile devices.
- Providing a wider range of electronic services to choose from in order to reduce the visits required to the Dubai Police departments.
- Marketing the new service through different media.
- Providing wireless services for clients to enable them to complete their tasks at home or within the Dubai Police department.
- Provide a faster response to client's enquires and reduce the waiting time.
- Installing surveillance cameras in remote and residential areas
- Providing electronic subscription in order to receive special information such as events.
- Providing different ways to interact and communicate with people.
- The Dubai Police should be more active in disseminating information instead of only relying on their website.

This category presents some suggestions and recommendation from participants. This recommendation would be considered in proposing m-government.

4.3 Chapter Summary

Data were collected using two complementary data collection methods; interviews and questionnaires. Collected information was read many times to extract information following the procedure of TCA discussed in Chapter 3. After repeated reading and studying, the information collected via interviews and questionnaires, six themes were developed.

The themes were further analysed and a number of categories were identified. Some of the categories revealed the current position of the Dubai Police and its sectors whereas the others were the expectations of the participants from a future m-government. The remaining categories included requirements that were currently satisfied as well as that were not. Each category included many requirements and some of them that are of key importance were:

- People are eagerly looking for different multiple channels to easily access information and communicate with the Dubai Police anytime and anywhere.
- The cost for a citizen to interact with the government in terms of money, time and effort should be reduced.
- Improving the delivery of government information and services and providing a faster way for information exchange

- The Dubai Police should provide time critical information regarding emergencies.
- Providing access to needed information in real-time while in the field in order to increase efficiency.
- Users like to receive notifications according to their needs and interests.
- Providing LBS to clients and employees.
- Managing and tracking fieldworkers and task assignment in a better manner.
- Improving interoperability (the ability of two or more systems or components to exchange information) and integration

Chapter 5

Recommended Course of Action

The vision of the Dubai Police and the objectives of its departments in increasing the effectiveness of service delivery have been discussed in Chapter 1. In addition, the current way of access and delivery of information and services and the problems that face the Dubai Police in service delivery have been discussed in Chapter 2. In this chapter, to solve these problems and meet the requirements of the Dubai Police and its stakeholders, a solution based on m-government is proposed. To this end, each service enabler as part of the m-government solution will be discussed and each one is matched to the requirements identified in Chapter 4 using TTF theory. Finally, in Section 5.2, a policy statement that can transfer the Dubai government to an m-government is proposed.

5.1 Proposed M-government Solution for the Dubai Police

In the terminology of TTF, service enablers or technologies are the *Technologies* and the requirements are the *Tasks*. Technologies are fitted to the *Tasks*, resulting in *Usages* and *Impacts*. In the following matching process, these four attributes are clearly identified under each service or technology.

5.1.1 Mobile Messaging Services

Task

One of the requirements of the Dubai Police identified in the data collection (Theme 2, Category C & Theme 6, Category B) is to have more services in different ways and to be able to reach the entire population. Another requirement identified in the data collection (Theme 2, Category C; Theme 3, Category A & Theme 5, category E) was that the people would like to be reminded of and receive immediate notifications.

Technology

As stated in the Amplitude Research (2008:URL), about 73% of cell phone buyers consider text messaging as the most important reason for buying a cell phone, however 61% need a mobile for accessing the Internet and 63% use it for email capabilities. In addition, two thirds

of mobile phone users worldwide are active users of SMS which is more than twice of the active users of emails (Bernhardt 2008). Furthermore, 100% of participants own mobile or wireless devices. According to the survey conducted with the Dubai Police participants, 81% of participants use mobile messaging on daily basis which is close to the 82% of participants who use Internet on daily basis (Figure 4.13). In addition, mobile messaging has the highest rank according to participant's feedback in the survey on possible services (Figure 4.13). Moreover, the data collected via interviews show that (Theme 4, Category A), 20% of people do not have Internet as they cannot afford to pay for it.

Usage and Impact

Mobile messaging can satisfy this requirement by allowing the Dubai Police to provide another method of access and communication. However, the Dubai Police has a very limited use of mobile messaging, and it uses SMS only when required. It is important to include mobile messaging as an important component and a service enabler of the proposed m-government solution for the Dubai Police as there is a great demand and use of mobile messaging. The Dubai Police can use different types of mobile messaging such as SMS, MMS and WIM. SMS is considered to be an important tool in m-government (Tozsa & Budai 2005:414).

There are many impacts of messaging services that could be of benefit to the Dubai Police. People will be able to receive specific information from the Dubai Police by using the pull service, or it can facilitate the Dubai Police to send information to a specific person or to a group using the push service. The Dubai Police stakeholders will be able to request information by sending their requests to a dedicated telephone number. They will then receive a reply as an SMS or a multimedia message through MMS. This will eliminate the need to enquire from individuals and will reduce the burden on police employees.

SMS can provide the Dubai Police and its stakeholders with a convenient and a cheaper alternative way when compared to other means of communication. It can provide the clients of the Dubai Police with a faster way to access the information rather than to call and wait for a period of time or to visit a specific department to obtain the needed information. This will help solve the delays faced by people associated with communicating by phone or physically reaching the Dubai Police as mobile messaging can provide a means to respond to queries 24 hours a day, seven days a week.

Moreover, mobile messaging will enable people to receive notification information from the Dubai Police such as car registration, due appointments, application status, activities and events. Furthermore, it will facilitate the Dubai Police to send immediate notifications such

as traffic jams, traffic fines, emergency information, etc. For example, in case of an emergency situation, the Dubai Police will be able to contact a large number of people in a very short time using SMS.

It will also be useful in the work environment. For example, employees can take videos or pictures in the field using their mobile phones or terminals and send it to the Dubai Police through MMS. Clients will be able to send a MMS message to an email address or a phone number. For example, they will be able to send a MMS to the Dubai Police email. Clients could receive MMS messages from the Dubai Police at a specific time of the day, or the week or at the occurrence of specific events.

Many people use mobile devices such as Blackberry which possess the instant messaging (IM) capability. It can create a medium for the Dubai Police to interact and deal with the community. It will enable the Dubai Police to have a two way communication with their clients, facilitate sending instant messages that could be in the format of information or newsletters to reach mobiles of clients and create a community network between the Dubai Police and the people for awareness, feedback and queries. As a result, the role of the Dubai Police in the community is enhanced. Therefore, it will allow the different departments of the Dubai Police to satisfy its needs in sending information and allowing employees to access information by

integrating mobile messaging with other Dubai Police applications. The following are some examples:

General Department of Community Services can send information and moral guidance to the community, undertake mass communication, awareness programs and security news. One of the problems identified were that awareness campaigns do not reach a large population from the community.

Members of the community can report unusual or suspicious activity to the Dubai Police, by sending an SMS or MMS. This will enhance Al Ameen (the service that is currently provided) and will also enable the Dubai Police to meet its vision of creating a safer community.

The Operational Department can send messages to police patrols, emergency alerts to the wider community in order to reach the largest possible number of people in the shortest possible time and latest information about crimes etc.

The General Department of Services and Supplies can promote health awareness programs

The General Department of Finance can send notifications of salary deposits and advance cheques.

5.1.2 Wireless Networks

Task

As evidenced by the data collected, people would like to have Internet access when they are in the Dubai Police departments (Theme 3, Category A). It was also identified that the Dubai Police have to meet the need of having connections with the different government departments (Theme 3, Category E). It was found in the data collection (Theme 2, Category B) that some people do not have Internet access in their homes and hence are unable to access these services. Many employees of the Dubai Police do not have means to access (Theme 2, Category B) information and services required to serve the community while they are in the field. According to the responses, the current communication system (TETRA) is an expensive solution (Theme 2, Category A). It has a very low data rate, cannot be accessed by clients and is used only for police patrols and by the Operational Department.

Technology

Today, wireless network technologies are on the rise and are considered as the main channel of communication. According to the survey conducted within the Dubai Police, wireless network is the second preference after Internet in the choice of using different forms of communication, and the majority of respondents (74%) are very likely to use a free wireless network to access government information and services (Figure 4.17). According to the survey, 74% are very

likely to use a free wireless network, and there is a possibility that 23% will be using it (Figure 4.18).

The Dubai Police is currently using leased lines which are payable services, to connect the Dubai Police General Department with other Police departments and stations. Wireless networks are recommended as it will increase the level of service delivery, they are free of charge, and can be designed and implemented based on the needs of the Dubai Police. Two wireless networks recommended for the Dubai Police, WLANs and WiMAX. They can have full control over these networks unlike mobile networks which are controlled by the service provider. Wireless networks can be made available in rural and urban areas where telecommunication or mobile infrastructure is not present. Moreover, wireless networks provide a higher data rate than mobile networks. Therefore, WiMAX is capable of delivering data several times faster than 3G mobile networks.

Usage and Impact

WiFi can be used as an extension of the current LAN of the Dubai Police. WiFi networks can be used in events that require fast network deployment. It can be implemented in the new Dubai Police stations and offices without implementing wired networks providing faster network speed than coaxial cables. It also saves the time needed to deploy the network, add or remove users or make changes to the

network (Chang, Yu & Tsai 2006:253). Due to its flexibility, the Dubai Police will save resources and costs devoted to expanding the network.

WiFi will facilitate the Dubai Police employees to have access to the network using their notebook or wireless device while they roam around in the building. Clients will be able to wirelessly access the data or documents of the Dubai Police or the Dubai government when they are in the Dubai Police departments. For example in the traffic departments, clients will be able to use their laptops to access traffic laws, fines, forms and other information.

The main objective of WiMAX is to provide a broadband wireless area network that covers a large area. The Dubai Police can create and have their own network broadband wireless infrastructure without the need to lease it from service providers.

WiMAX can be used to establish a wireless network connection between the Dubai Police departments, police stations and other Dubai government departments including the offices that are located in remote areas that presently may not have any network connection. Thus, a network connection is easily established with remote offices that were difficult or impossible to connect with.

WiMAX can help create a wireless community within the Dubai region. The Dubai Police can provide wireless access to its services for

citizens, businesses, tourists and other government departments. This will meet the participant's need of having an electronic link between the Dubai Police and its sectors. Hence, it meets one of the most important objectives of e-government which is to provide a cost effective and efficient infrastructure that enables citizens to access online resources anytime and anywhere irrespective of availability of wired networks (Stanoevska-Slabeva & Hongisto 2006).

The Dubai Police can provide this service free of charge for users who would like to access their electronic information and services. This will meet the requirements of proving services to reach the entire population.

People prefer to access these services anytime regardless of their device type or location (Ranatunga, Withanage & Arunatileka 2008:140). Hence, WiMAX encourages people to access the Dubai Police electronic services and save their time of travelling to the Dubai Police office in the present traffic conditions.

The Dubai Police can provide different community services through wireless networks such as discussion forums, awareness and cultural development programs, alerts and news. Tourists can access these services to be aware of rules and regulations. In an emergency situation, the Dubai Police can communicate with the entire population in a short span of time. All this encourages citizens to

build a rapport with the Dubai Police supporting "always-on" society which is an important objective of m-government.

WiMAX can be used to provide a wireless network as a means to connect and communicate not only between fleets but also field workers enabling them to have real-time access to the Dubai Police network. Thus they can access, receive and upload data or information directly, increasing their mobile workers productivity and improving the accuracy of the data. For example, policemen working in the field can access real-time information such as wanted cars, details of a specific person, criminal records, reports, photos and so on. All information will be available at hand enhancing public and community safety. Moreover, the Dubai Police Head Quarters will have direct contact with all its field workers and patrols through WiMAX free network. This will improve decision making, transform the image of the Dubai Police and provide a competitive service to its citizens. As stated by Kopstopoulos and Rivera (2002), government departments should lead the way in the use of future technologies, not only for saving money but also to provide better services to its citizens.

WiFi and WiMAX are compatible, and will be used for other proposed m-government service enablers such as M-GIS communication (Tsou & Sun 2006:222). Different devices such as wireless camera and sensors can be connected through the wireless networks that will be used by the Dubai Police to monitor high traffic areas, crime locations,

etc. These devices can be installed anywhere, without the need to dig roads for laying network cables. (Intel 2003:3).

5.1.3 WAP

Task

According to the requirements gathered, stakeholders of the Dubai Police want to access the Internet and the Intranet for various purposes (Theme 3, Category A) but, there is a lack of different electronic means of access. The Dubai Police attempts to provide different means (traditional and electronic means) of access through different channels to its services (Theme 1, Category A).

Technology

Referring to the conducted survey with participants, 100% of participants have mobile and wireless devices (Figure 4.12) and 54% of participants use mobile devices more than computers (Figure 4.10). Therefore, it is important to cover this group in order for the Dubai Police to provide its services to more people. Unfortunately, technologies and applications used and developed for the Internet are intended for the wired world (fixed networks) and have not been developed to work in the wireless world (Cannataro & Pascuzzi 2000:178). Therefore, WAP can meet this requirement by providing access for mobile and wireless devices and supporting slow wireless connections.

Developers at the Dubai Police can use the current standard tools for developing applications for both web browsers and WAP application devices at the same time. This will help reduce the work done and prevent developing the work twice; once for web browsers and once for mobile devices. As a result, this will reduce development cost. Moreover, as WAP is an open standard, it can be built on any operating system and works with most mobile networks.

Usage and Impact

WAP will create a new channel and opportunity for the Dubai Police sectors to access police information using their wireless and mobile devices. This will satisfy the lack of different electronic means of access. Citizens will be able to access information of the Dubai Police through their WAP enabled mobile device. WAP services can be provided in different languages such as English and Arabic, and this will cover a variety of people and meet one of the needs identified in the data collection. Beside the Internet, different information and services of the Dubai Police departments can be provided through the WAP standard, allowing clients to have several choices and ways to access this information. This will help reach a large number of people, thus fulfilling an important objective of the government which is to attain one-stop government by providing multi channels (such as MMS, SMS, Internet and WAP) that are accessible through different devices (Carroll 2006:5).

5.1.4 WSA

Task

One of the main challenges that face businesses and governments, including the Dubai Police, is that they have many systems that exist in different languages on different operating systems at different locations (Theme 3, Category A). It is important for the Dubai Police to integrate these systems, share data and provide services. It is important to create communication between these systems and provide access to them from different means including mobile and wireless devices (Theme 5, Category E).

Technology

As a suitable solution to this problem, WSA can be used for application integration. It provides a standard way for creating a connection between different software applications that are written in different languages and are operating on different platforms.

Usage and Impact

Web services present at least three main application areas. Firstly, mobile device or terminal can act as a client of the web service, accessing the Dubai Police backend databases from any location. Secondly, a mobile device can provide web services to other service departments or service providers. For example, a mobile device can offer a service to provide information stored on the device. Thirdly, the Dubai Police can pull information provided by the mobile

infrastructure. For example, the Dubai Police can get the geographic location of a mobile device from a mobile infrastructure web service, which can then be used to provide customized information, such as weather or traffic status near the current geographic location of the user of the mobile device. WSA supports delivering contents to different devices. These devices could be desktops, laptops, PDAs, mobile phones, wireless phones and so on. Therefore, web service is an important service enabler as part of the m-government solution for the Dubai Police.

Using web services provided by the Dubai Police, different current systems and other future systems could be integrated. For example, the Dubai Police can use this solution to integrate different systems that exist independently such as Electronic Messaging System, GRP and Police Criminal System. Thus, many applications can be integrated to provide fewer applications that are easier to manage rather than having several independent systems. Hence, it fulfills one of the main objectives of e-government which is the interoperability infrastructure (Comert & Akinci 2003:2).

Web services will make it possible for mobile and wireless devices to use it to communicate with different applications. It will, in turn, reduce the costs associated with excess staff and maintenance. Hence, the Dubai Police will continue to use its applications normally while modifying it without halting its services. As web services are

independent of any technological platform, it will allow different systems, including legacy systems to talk and communicate to each other. It will make it possible to use legacy systems along with the new systems that were earlier not possible.

Web services will guarantee interoperability and interconnectivity for the Dubai Police. It allows application integration within the Dubai Police and the Dubai Police with other government and business departments (Hogg et al. 2004:333). It reuses information and application and share already developed applications (Isaias & Macedo 2007:1036). This will reduce the costs of systems integration and the development time (Chen 2005:273). As a result of integration between these departments, time and effort spent in visiting different government departments will be reduced. Furthermore, it will help the Dubai government to reach the vision of one stop m-government.

5.1.5 IVR

Task

Today, organizations such as the Dubai Police provide their services and information to their clients through physical offices, web or through telephone. It has been identified in the data collection that it takes sometimes a long time until somebody picks up the call when kept on hold or may the call wait in a queue until one of the customer service representatives is free to handle it (Theme 2, Category B and

Theme 3, Category e). It can be a request for information about a simple thing, but this may take a while and may not satisfy the customer. It also requires a lot of staff in order to handle the increased number of calls (Theme 4, Category A).

Employees want to have access to organisation information such as emails while they are offsite. As identified in the data collection, the Dubai Police acknowledges the need to respond to the changing needs of people and communities by continuing to evaluate and assess the ways in which services are being provided and increasing the level of service delivery (Theme 1, Category A).

Technology

Voice recognition is recommended as part of the m-government. A voice recognition system is a solution to these limitations and a way for accessing the information and services of the Dubai Police. It provides a way for interaction with the organisation through a mobile or a telephone device. It connects the mobile and telephone users with information and services they need anytime and anywhere by merely speaking. Voice information portals can serve a lot of people who cannot read or type (Townsend 2002). Voice is considered as the input and the output of the system. Voice systems are becoming the target of many organizations.

Usage and Impact

IVR will provide access to the Dubai Police information and handle customer calls 24/7. Callers can have access to services at their convenience. It will help the Dubai Police to save money, reduce costs and provide better services since handling customer requests on the phone consumes a lot of resources (staff). For example, 60% of contact centre costs is associated with personal (Alcock & Millard 2006:71). IVR will enable the staff to have more time to focus on other things such as dealing with complex or important situations, reduce the waiting calls due to automation and respond faster to more clients in a short time. It is an alternative to talking with a customer service representative. For example, employees of the Dubai Police may answer same questions repeatedly and these answers can be automated through IVR. It will enable the Dubai Police clients to find information themselves, reducing the cost of handling clients.

IVR will be useful to provide access to older citizens who may have difficulties to access the Internet due to poor vision, literacy issues, and other disabilities, users who have mobile devices with a small screen and tiny keyboard, and other similar groups. Many employees do not have access to the Dubai Police while they are outside their department and hence IVR can provide that access. By using IVR, the Dubai Police information and services can also be provided in various languages. Clients can hence choose their preferred channel. IVR will increase the ability of the Dubai Police to deliver information and

services 24 hours a day and increase client satisfaction. It will create a new channel of communication between the Dubai Police and its sectors.

IVR can be integrated with different data sources such as Customer Relationship Management, Web services, emails and so on. It can be used to automate different services and requests for information. Examples are:

- The Dubai Police Information Services
- Call Center Automation
- Email access
- Call routing
- Directory of employees
- City Traffic Information
- News and Events

5.1.6 M-GIS and MRM

Task

The data collection revealed that currently, a desktop GIS is used to monitor the police car patrols (Theme 3, Category C). Only the operational department is capable of tracking their police patrols in the field (Theme 3, Category C). It can only track vehicles but not policemen in the field. Other departments cannot track their vehicles

or employees in the field. One of the main issues identified during the data collection is traffic jams (Theme 2, Category B).

Technology

Local governments around the world are using GIS for emergency operations (Sadoun 2008:972). At present, homeland security and military are driving the market for collaborative GIS enterprise applications and it is important to have real-time, mobile geospatial applications of GIS across an enterprise (Morris-Jones and Carter 2009:1650). There is an increasing need for mobile and portable GIS as they can be used by decision makers to provide best actions for pre, during and post disaster response and management (Chen 2009:1661). It is important that M-GIS, is incorporated as part of the m-government. M-GIS can provide real-time geographic and LBS in the field. An important component of M-GIS is LBS, which means, to provide services and information according to the location of the client or user. M-GIS can be integrated to support many other applications such as cameras with live video data on the roads to monitor traffic, people, events and ground conditions.

Usage and Impact

M-GIS will meet many needs of the Dubai Police and its sectors. By using M-GIS, the Dubai Police will be able to manage, track and monitor not only police cars but also policemen in the field. The location of police cars and policemen movements will be known and

hence appropriate orders can be given. For example, when there is an accident in a specific area, the Operation Department can locate the nearest police patrol and give them directions which will be displayed on their GIS device showing the best route to reach the accident area in the shortest possible time, avoiding the traffic. The M-GIS can be used by policemen to collect and update field data obtained from the scene and forward any necessary information such as pictures and videos to the operation department.

M-GIS, provides real-time electronic information browsing and exchange, navigation, monitoring, tracking and digital maps. The field workers of the Dubai Police can take their M-GIS devices to the field to collect data, validate tasks, update and exchange data in real time with the central headquarter or with other field workers (Tsou 2004:153). This will enable the Dubai Police to improve decision making, appropriate use of resources, maximizing field workers productivity, saving time, improving the accuracy of the data, and enhancing customer service and satisfaction. It will reduce mobile calls, paper work and the cost of field operations by giving field workers access to information while on the field and, in turn, increase efficiency and productivity of workers.

The location of the client provided by LBS decides the content such as directions and instruction to reach a specific destination (Petrova 2006:769). Many LBS service applications are useful for the Dubai

Police and will meet many of the needs such as road assistance and emergency, destination guides and real-time navigation, stolen car or child finder, messaging between different parties in a specific area, the location of the nearest Dubai Police departments and police stations, location traffic services, advertising for businesses and local events and decision making during emergencies and disasters (Agrawal & Agrawal 2003, Li 2006:24 and Hurson & Geo 2009:2456).

MRM is a crucial requirement and an important part of the M-GIS in order to manage the efficiency of mobile workers and fleets. It will help the administration to track the real-time progress of mobile resources and assign the right task to the right resource at the right time in the right location. Administrators will know the location of the mobile resource as they have a visual representation on the geographic maps. They will be able to check the status of each resource, the tasks assigned and the requirements to complete them. There are different areas of the Dubai Police that would be benefited such as managing and allocating policemen, service workers, technical workers, vehicle fleets, community services workers and road rescue personals.

The benefits of MRM to the Dubai Police and its stakeholders are as follows:

- Monitoring and matching tasks with the available mobile resources (Fraunholz, Unnithan & Jung 2005:148).
- Reducing costs and time by improved allocation and management of resources. For example, Aberdeen Group (2007)

stated that MRM will lead to savings such as 15% in vehicle maintenance and repair costs, 12% reduction in vehicle downtime and 10% reduction in operating costs

- Enhancing customer service as the result of better resource management and response to clients needs
- Better fleet tracking by allowing the administration to track their vehicles at any one time (Tang & Selwood 2003:49)
- Having a visual system make it easier to have an overview of all mobile resources and tasks.
- Increasing productivity and the number of jobs performed per day

5.1.7 Mobile Procurement

Task

As identified in the data collection (Theme 1, Category B; Theme 3, Category A and Theme 3 Category C), the Dubai Police has shifted to GRP and Tejari. However, e-procurement still lacks some options that could make it completely useful. For example, as the data analysis revealed, the Dubai Police may request to check the inventory for a specific item in the electronic procurement system of the field worker. The user will therefore call the office to check the availability of the item, or may wait till returning to the office. In order to approve the orders, managers who spend much time outside the office would like to access the procurement system from any place. This is not

available in the current e-procurement as it can be accessed only through the Internet. In addition, employees spend considerable amount of time manually entering details to the GRP system.

Technology

It is recommended to include m-procurement system for the Dubai Police as part of the m-government solution. M-procurement will enhance the current e-procurement system and will enable the system to be independent of the location that can be used from anywhere and provide the needed mobility. M-procurement will depend on different technologies which consist of mobile and wireless devices and the use of wireless networks.

Usage and Impact

M-procurement system will have many benefits and will meet many needs of the Dubai Police such as:

- ◆ Providing a new channel for accessing, communicating and submitting information while out of the office.

- ◆ Providing a way for notifying the managers and users of the procurement system such as notifying managers of waiting and pending orders through SMS. As a result, managers and employees are better informed about required tasks and activities.

- ◆ Accelerate the process of ordering by making it possible to check the inventory and ordering from the field, thus reducing the processing time. Approximately half of the time for purchasing requests is as a result of managers being out of the office and therefore, providing anytime access to managers will reduce the procurement time (Ruhi & Turel 2005:107).

- ◆ Providing full automation of the procurement process. This will lead to decrease in administration costs and unauthorized spending, reduction in the time and number of people associated with the process and providing a system to analyze spending patterns (Raisinghani et al. 2008:1483) (Reddick 2007:902). Hence, it enables the Dubai Police to manage their purchases efficiently.

- ◆ Since the Dubai Police can perform tasks from outside the office and respond to urgent situations immediately, it increases the productivity of the employees, efficiency of operations and the flexibility of the organisation (Gebauer, Shaw & Zhao 2002:9).

5.1.8 M-payments

Task

A major need identified in the data collection is the need to introduce different payment methods and facilities in order to decrease the waiting time to reach the required department by providing payment services through mobile (Theme 6, Category B). The penetration of mobile and wireless devices is growing rapidly.

Technology

People pay for the products or services they purchase through different modes of payment. These payments are traditionally done at the place where the purchase or service occurs. Traditional methods of payment include cash, cheques, credit cards and debit cards. The Internet has created a new mode to pay for services such as electronic payments and digital payments. The Dubai Police clients can pay for some of the services online. They try to provide different modes of payment for their clients. The penetration of mobile and wireless devices is more than other devices (Figure 4.12) among the stakeholders of the Dubai Police. According to the survey, 74% of participants have dealt with a paying service during their last visit to the Dubai Police (Figure 4.2). It is important to have the m-payment service enabler as part of the m-government solution for the Dubai Police. M-payment is a key component of most wireless information applications and services (Gao et al 2005) and the next decade will be a decade of m-payment and digital cash (Hu, Li & Hu 2008:1).

Usage and Impact

M-payment can provide the Dubai Police customers the opportunity for paying for services through their mobile or wireless devices. Hence, they will have two modes of payments, the current electronic payment method that is available online on the Dubai Police website or the m-payment services. This will enable the Dubai Police to create multiple points of contacts with its clients and bring products and services directly to them. M-payments will become a complement to other methods of payment currently provided. Clients of the Dubai Police can pay for services remotely without the need to visit Dubai Police departments or stations. Other benefits include convenience, flexibility, swiftness, low cost, cheap, scalable security and ease of use (Tong, Zhou & Liu 2005:880; Ho, Fong & Yan 2008:347). M-payment can be provided by using different means such as SMS, WAP and IVR (Siwen 2008:49).

5.1.9 M-participation*Task*

According to the data collection (Theme 2, Category A), the Dubai Police is looking for creating different ways and channels to communicate with its sectors.

Technology

M-participation is considered as an important aspect of the m-government. Mobile channel will enhance the interaction between the Dubai Police and its sectors (citizens, businesses, tourists, internal employees and other government departments) and will provide access beyond the reach of other means (Sinisalo 2007:775). The Dubai Police can provide two levels of citizens' participation:

- One way information Flow: The Dubai Police can provide and distribute information to the citizens. Many different services can be provided in this category such as using the SMS technology to send latest information regarding changes in law about the Dubai Police. Another example is to provide accessibility for citizens to this information through the WAP technology.
- Two-way relationship: The Dubai Police requires the opinions and feedback from the citizens on an issue and the citizens will respond electronically through their mobile or wireless devices expressing their views and feedback through mobile messaging.

Usage and Impact

Citizens are updated about different information related to the Dubai Police. This creates transparency, openness and brings the Dubai Police closer to the citizens. M-participation will enable the Dubai Police to encourage people to participate with them and will provide

the ability to share information among people and groups, create networks of communities, and obtain the views of the citizens. Citizens can express their opinions and recommendations to the Dubai Police. This will enable Dubai Police to enhance its services.

People, who would like to report complaints to the Dubai Police will normally have to complain personally or by phone, mail or through a service provided on their website. For example, a person may complain about a policeman who had an issue with him on the street. At present, the person may contact the Dubai Police by visiting a police station, via a phone call, mail or through the website. An alternative method that can be provided is the use of mobile and wireless service enablers to report the complaint. People will be able to send their complaints directly from their location at anytime using their mobile devices. The complaint will be processed by the Dubai Police and forwarded electronically to the responsible department. Different features could be provided along with this service such as:

- Providing access to WAP sites that provide people with the options to select from different complaint areas such as services, police treatment, traffic, and so on. The interface should also provide selection features requiring less input text from the user. They can also send a complaint by SMS to a specific complaint number of the Dubai Police.

- Providing different ways of notification to people via SMS, email, voice call, mail or WAP. The user will be notified when the complaint is received by the Dubai Police and sent a reference number.
- The ability to check the status of the complaint anytime. For example, a person could use the reference number using WAP sites or SMS to check the status of his complain. This will give him with a faster response and increase his satisfaction.
- The Dubai Police will have the ability to check electronically the status or progress of each complaint. Complaints through WAP can be forwarded automatically to the needed department depending on the type of complaint selected by the citizen.

Table 5.1 summarizes the outcome of the application of TTF theory to the findings in Chapter 4.

Task	Technology	Usage	Impact
Procurement	M- Procurement	Automation, services on the move, access using mobile and wireless devices	Better handling of emergency situations, reduce overall processing time, convenient access and notification
Alerting people	Mobile Messaging	Alerting people about emergencies	Reach large people in very short time, that are not possible before
Passing information between independent software applications	WCA	Integrating independent applications, and providing plug and play applications	Reducing the time of application integration, sharing information between the different applications.
Linking Dubai Police H.Q. with a Police department exists in remote location that there is no telecommunication infrastructure	Wireless Network (WiMAX)	Linking Dubai Police H.Q. with remote departments through fast and free network.	Creating a communication channel with remote departments where communication do not exits and not provided by telecommunication provider
Notifying and reminding people	Mobile messaging	Notifying people about different services.	Providing different notification information that can reach people easily, reminding people about different things that can lead them to avoid things such as traffic jams
Rapid deployment for infrastructure for information access for a field event	Wireless networks (WLAN and WiMAX)	Access to information and services on the spot. Connecting the field spot with Dubai Police H.Q.	Reducing the time needed to provide access for events. Reducing cost (cheap setup, no telecommunication or cable charges)

Task	Technology	Usage	Impact
Tracking Policemen in the field and assigning them tasks	M-GIS	Locating and tracking Policemen in the field. Showing movement on a screen. Guidance (through digital maps) and information access through mobile or wireless devices	Tracking Policemen in the field that was not possible before. Assigning the right task to the right resource with the right equipment at right time in right place to the right with the right information.
Answering to huge number of calls to answer similar enquires	IVR	Access by voice portal to information and services	Fast mean of access to information and services Decrease the number of enquires that needs staff handling. Reducing cost of handling clients.
Creating a discussion environment between Dubai Police and people	M-participation	Discussion mean between Dubai Police and people about different manners through mobile devices	Enhancing people participation with Dubai Police which lead to enhances the services and increase people satisfaction
People would like to pay for the fine on the same time a Policeman issued him a fine	M-payment	Paying through a wireless terminal in the field and receive receipt immediately	New and easy way of payment. Paying at the same time of receiving traffic fine by a Policeman. Complementing other current ways of payment.

Table 5.1 Application of TTF to the requirements identified in the research

The diagram below in Figure 5.1 shows the components of the proposed m-government solution for the Dubai Police.

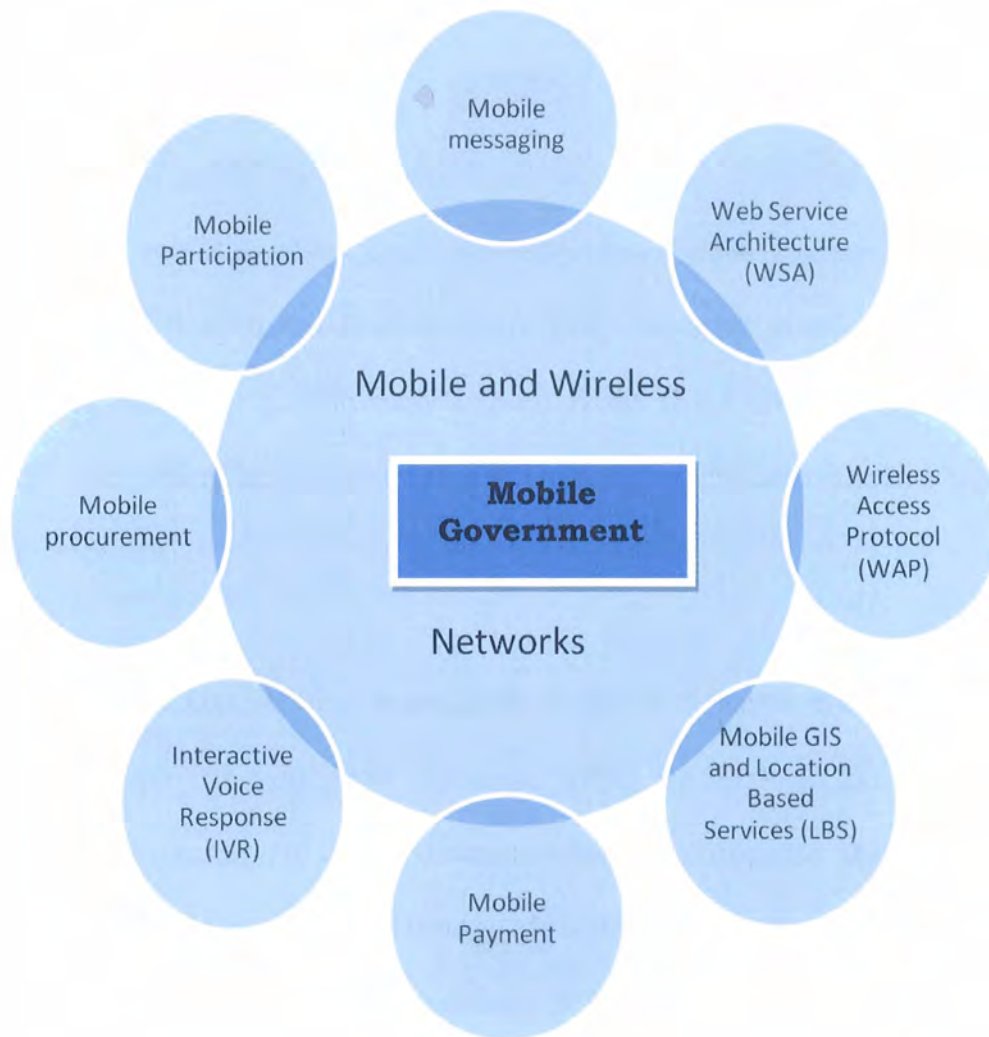


FIGURE 5.1 M-GOVERNMENT FOR THE DUBAI POLICE

5.2 A Policy Statement for the Dubai government in transition to m-government

In Section 3.2.1 of Chapter 3, it was pointed out that the sample created was a probability sample, meaning that although a stratified sample was taken from the stakeholders of the Dubai Police, this sample is a good representative of the Dubai government. However, since the questionnaire and the interviews were constructed for the scenario of the Dubai Police, there may be additional m-government services that the public may expect from the Dubai government. As such, the policy document for the Dubai government should take this into account.

Despite this fact, there is another important issue that the decision makers have to take into account when embarking on information systems projects. It is the time needed to complete the project and the fast rate at which technology develops or changes. Requirements of users also change fast. Therefore, it is anticipated that the complete transition to m-government should take place as soon as possible, but with the author's own experience in the E-services Department of the Dubai Police in implementing information systems solutions, a reasonable time frame would be five years.

5.2.1 Policy Statement

It is recommended that the Dubai government follow the following guidelines to implement its m-government.

1. Implement the m-government system to provide the technologies and services discussed in Chapter 5.
2. Extend the data collection and analysis undertaken in this study to cover a number of departments of the Dubai government
3. Identify any other user requirements and a set of mobile and wireless technologies and services needed to satisfy them
4. Incrementally upgrade the m-government system by incorporating these additional technologies and services.

5.3 Implications and Limitations

The research suggests that the people are keen to use m-government services. This involves the need of having systems that are easy to use and that are efficient and effective for the Dubai government and its sectors. Another implication of this research is that the Dubai government should take into consideration of the infrastructure, human and capital resources that are required before and during the implementation of m-government. Moreover, Dubai government should raise the awareness level and knowledge of people and train them on how to access and use m-government services and obtain the

benefit of the system. The mobile and wireless technologies and services are changing and developing fast and therefore, the Dubai government should be up-to-date with them and undertake various surveys time to time to cater for the changing needs of stakeholders.

Just like any other study, due to scope and resource constraints, this study has some limitations. One of the limitations of this research is that it focuses only on one department of the Dubai government, which is the Dubai Police. Sampling of this type assumes that the requirements of the other departments of the Dubai government are similar. This makes it difficult to generalize the findings. A generalization requires using a stratified sampling where each department of the Dubai government has been taken into consideration. However, considering the large number of departments involved (20 general departments) such a sampling would be a daunting task to be included in a 2 to 3 year research project. Alternatively, a generalised framework could be developed using a hypothesis testing to see if the finding of this research could be validated for the other departments of the Dubai government or elsewhere. Again, this should be carried out in a separate research project as it needs more resources. However, it is beyond the scope of this project.

Another limitation is that the sample didn't include all the departments of the Dubai Police as a result of the security issues of

some departments of the Dubai Police. Security aspect is a major concern of the Dubai Police as well as of the Dubai government. Therefore, it is valuable to carry out a separate research on the security aspect of m-government for the Dubai government.

5.4 Chapter summary

This chapter proposed m-government solution for the Dubai Police describing the task, technology, usage and impact of each of the mobile and wireless technology or service recommended.

Some of the mobile and wireless technologies recommended are mobile procurement, mobile messaging, WiMax and WiFi, M-GIS, IVR, etc. These technologies fulfil major problems of the Dubai Police as revealed from the data collection such as procurement, communication between departments and people, interoperability, resource management, providing real-time information, different payment modes and so on.

The proposed m-government solution will create a new channel of electronic services besides the current traditional services provided by the Dubai Police, creating competitive advantage. It will enhance the services provided by the Dubai Police and increase client satisfaction. It will support e-government efforts of the Dubai Police to have a more

efficient, effective and open government. The inclusion of m-government in the Dubai Police will improve the quality of service of its citizens through mobile and wireless service enablers. M-Government is an opportunity to carry ahead some crucial innovative efforts (Rossel, Finger & Misuraca 2006:80). The proposed solution fulfilled most of the needs of the Dubai Police and its stakeholder's that were identified through the data collection stage.

The m-government solution provided for the Dubai Police was extended to propose an m-government solution for the Dubai government. To this end, a policy document has been prepared to incrementally complete the project within 5 years.

Implication and Limitations section discussed the issues arising from this study that are important to the successful establishment of m-government. The most important issue revealed in this study is the user willingness to receive m-government services and technologies. The analysis of findings also revealed that the Dubai government should be increase the awareness of the users about the services of the m-government.

It was recognised that there were limitations of this study and the issues that were not handled were beyond the scope of this research. One such limitation was the inability to include all the departments of

the Dubai Police in the sample due to security restrictions of these departments of the Dubai Police. It has also been identified that a complete security study of m-government is required and a generalization is possible only if the research is extended to several government departments of the UAE or elsewhere in the world.

Chapter 6

Conclusion

This research topic concentrated on the information and services of the Dubai Police in the context of providing m-government for the Dubai government. This is embedded in the research question "What are the service enablers for the transition of the Dubai government to a mobile government over a five year period?".

The two major problems identified through the research were inadequate access and participation and, inefficient cost, services and resource management. The Dubai government has focused solely on the Internet portal as the important component of the e-government initiative. According to International Telecommunication Union statistics (2008), the Internet subscription in the UAE is 26.77 subscribers per 100 people. This shows that there is still a limited Internet penetration and therefore, a limited access to services through the wired Internet. The Dubai government does not deliver much of its services online. The lack of real-time information available, lack of means of access and communication, inefficient and inadequate use of ICT and lack of use of mobile and wireless applications and technologies to enable citizen participation are some

of the problems of access and participation. This had led to inefficient services, increased cost of services and lack of resource management.

There are many drivers that push the implementation of m-government for the Dubai Police. These are fast developments in mobile and wireless technologies and functions such as wireless networks, Internet mobile phones, PDA's and other technologies that support to create new channels for delivering government services in an efficient and cheaper manner. Furthermore, people always carry mobile phones and there is a high penetration of mobile and wireless devices around the world in general, and in the UAE specifically, indicating that the PC will soon lose its dominance in accessing the Internet. According to the latest statistics by the International Telecommunication Union (2009:URL), the penetration of mobile devices in the UAE is 208.65% at the end of 2008. Another driver is to solve the problems associated with traditional and electronic services provided by the Dubai Police and to satisfy the Dubai government and the needs of its departments. Solutions provided through the m-government will help make it easier for the public to work in their communities and connect with the government for less cost than hardwired solutions (Intel 2004).

The different m-government initiatives around the world are planning or in the process of adopting m-government. However, most of these initiatives were based only on SMS. Moreover, copying solutions from

other cities is not suitable for the Dubai Police and hence, this research identified many objectives, needs and requirements of the Dubai Police and its sectors in the area of service delivery.

These were investigated through a survey in the Dubai Police. Collected data were analysed using TCA method and the needs were identified. Multiple channels of communication, real time information, reduced costs, LBS, interoperability and overall improvement in the delivery of the Dubai Police services are some of the needs identified. Finally, the needs were matched to the technologies and suitable mobile and wireless technologies and services for m-government were identified. Analysis of these requirements led to the development of six themes and a number of categories under them.

Hence, the research provides the necessary foundation of having an m-government solution for the Dubai Police. It deals with different areas such as providing access and communication through different mobile and wireless means such as wireless networks, voice access and mobile messaging, geographic and LBS, interoperability and integration, payment services and procurement. M-government will make the lives of people easier, increase the productivity and the efficiency of the government, reduce the gap between the government and the citizen, satisfy the needs of the different sectors of the community and create a new range of options and alternative ways to deliver information and services of the Dubai Police to its stakeholders

including other government departments, public, businesses and employees.

Even though, it is proposed for the Dubai Police, it can be a model solution for other Dubai government departments or the Dubai government.

Some of the benefits of the proposed solution to the public are as follows:

- Timely access to government information and services 24 hours a day, seven days a week through their mobile and wireless device.
- Ease of access and communication with the government.
- Multiple channels of communication, reducing time and effort.
- Overall improvement in the delivery of services and hence increase satisfaction.

Some of the benefits of the proposed solution to the Dubai Police are as follows:

- Enhance communication with all its sectors.
- Improve utilization and employees productivity by providing real time information.
- Greater flexibility and adaptability to the needs of the Dubai Police.

- Reduce time and resources and hence reduce cost and increase efficiency of services.
- Enhance the image and reputation of the Dubai Police.

This research provided several benefits to the researcher as well. They include a strong knowledge on e-government and m-government, mobile and wireless technologies and services that form a part of the m-government and a broad view and understanding of the transdisciplinary research.

Completion of this research has opened doors to several other research questions such as:

- Evaluating customer experience of m-government services in Dubai
- Applying m-government to country level such as to the UAE, or to regional level such as Gulf Cooperation Council (GCC) countries.
- The use of m-government to bridge the digital divide and inclusion in the UAE.
- The creating and implementation of public policies and laws to support, facilitate, and promote m-government in Dubai

- Legal issues and m-government of Dubai
- Legal and ethical implications of m-government and expanding the use of ICT in the public sector of the UAE
- Quality assurance and risks of m-government Services in Dubai
- Mobile democracy and mobile politics in Dubai

These problems could be handled in future by the researcher or other Professional Doctoral candidates of the CQUniversity.

Reflection

This research report is about the problems confronting the Dubai government in enhancing the delivery of its current information and services. This is related to the proposed research topic concerning the information and services of Dubai government in the context of providing enhanced mobile and wireless environments for the delivery of them. This is embedded in the research question "What are the service enablers for the transition of the Dubai government to a mobile government over a five year period?".

In this reflection, I will go through the journey of the whole doctoral program that ends with producing this research report and qualifying me to be a professional in the area of m-government.

The project idea began as a result of my experience in working in the IT department of the Dubai police, which is part of the Dubai government. One of the objectives of this department is to provide e-government services as part of the Dubai e-government initiative. One of the main goals of the Dubai government was that all Dubai government departments have to provide at least 90% of the services provided traditionally through electronic services. The Dubai Police

was one of the first departments of the Dubai government to reach this target. However, these services are provided only through the Internet. An important, new, and fast spreading means which is the mobile and wireless technology and service that is now used by most people in their daily life as a communication means was not taken into consideration by the Dubai Police. Also, there is a high penetration of mobile and wireless devices and is considered more than the penetration of the computers. This pushed me to think about the mobile and wireless services in order to take e-government to the next step and help the Dubai Police to be the first department of the Dubai government to take this step in order to enhance its services.

The Dubai Police agreed to sponsor me and send me to a university to do a research in this area in order to develop and have knowledge that will be useful for myself and for the Dubai Police in specific and the Dubai government in general. As a result, when I did my Master degree in Australia, I decided to look at a doctorate program at Australian universities. At the beginning, I was looking for PhD degrees, but when I was doing my search, I came across a degree that is called the Professional Doctorate. This pushed me to find more information about this type of doctorates and compare it to the PhD. I decided to select the Professional Doctorate degree program for many reasons. The professional doctorate degree differs from other doctoral degrees as it is based on transdisciplinary problem solving. Professional doctorate produces new knowledge from many disciplines

and across multiple disciplines that is why it is called transdisciplinary, whereas other doctoral degrees are based on a single discipline. This transdisciplinary perspective of Mode-2 knowledge production allows me to combine and explore multiple disciplines in research relevant to technology, government, business and society; that is, socially robust knowledge production. Professional Doctorate Program is an innovative future focussed program that involves the identification and solution of practical problems and to make significant development or change in context such as an organisation, whereas the PhD is a purely academic study in order to make original contribution to knowledge. Therefore, it will help me to solve the issue in my own field as part of the program and develop practical knowledge and skills that can be applied to future opportunities and future problems.

Another attractive thing in the program of Professional Doctorate at CQUniversity is that it has the coursework component in the first year. It includes six workshops that assist to build and develop knowledge and research in a systematic way. These workshops consist of critical foresight, market positioning, creating futures, futuring, net solutions and working in the knowledge society. The first step was to build and formulate the research topic and the research question. Then, a literature review was undertaken that discusses the major problems confronting the resolution of the research question. Then, mobile government initiatives around the world were explored to

have an idea about what is happening in this area. But, I found that most of the initiatives were based on one solution which is SMS and there was no complete m-government solution. This showed me that there is a gap in knowledge and there is a need for more research in order to find a suitable solution for the Dubai government. Therefore, the next step was to look and search for the latest and key technology advances in the area of mobile and wireless that can be applicable for the Dubai government. This led me to gain a good knowledge about the advances of technology in the mobile and wireless world.

The next step was to develop a research methodology and a theoretical framework to research the problem statement. This part was seemingly new to me. Therefore, I did a search of different methodologies that is suitable for information systems research. I learned about many types of methodologies that could be of benefit to me later in my life in other research. The selected methodology of my research project involves qualitative research which focuses on contextualization and has an interpretive nature and was suitable to be undertaken within the context of the Dubai government.

After doing these steps, I prepared my presentation and I had to defend my research proposal by way of colloquium. I received useful feedback and advice from the colloquium members. One of the main advices was to narrow the research as it was based in the context of the Dubai government and the Dubai government has a lot of

government departments (more than 25). Therefore, they advised me to select one government department in order to be focused and to obtain more specific information and therefore, have better results. Therefore, I took their advice and chose the Dubai Police as the selected department of the Dubai government for my research.

Thereafter, I sought permission from the Dubai Police to undertake the data collection that consisted of interviews and questionnaires. I received permission from the Dubai Police. Before I started my Professional Doctorate, I was unaware that it was necessary to get an ethical clearance if research was conducted outside Australia and thought that I just needed to get permission from the Dubai Police. Then, I got to complete the ethics application form, which was a complex and a long process, where I had to answer all the questions and prepare the interview and the questionnaire questions. After completing it with the help of my supervisor Dr. Rohan de Silva, I submitted the application to the Human Research Ethics Committee. However, the application was rejected twice due to some issues that I had to resolve. One of the main issues the committee was concerned with was how to assure the safety of participants as the research was proposing a significant change to standard practices which might have an effect on the participants. All issues had been dealt with, and the ethics clearance was approved on the third submission. Therefore, the whole ethics clearance took around 6 months which was considered a very long time and delayed my research. It also made me

upset for sometime, but when I received the ethics clearance, I was happy that I would be able to continue my research and start the data collection.

The primary data were collected from semi-structured face-to face interviews. An industry advisor from the Dubai Police was appointed to ensure that the information gathering and use by the researcher were performed ethically according to the guidelines specified in the ethics clearance application and specified by the ethics committee of CQUniversity. The industry advisor had organised and scheduled the interviews. There were 20 interviews that were organised. However, it was difficult to organise the interviews as it was in the month of Ramadan (where Muslims were fasting) and the working hours were too short. Therefore, the interviews were held from 9 am to around 2 pm. between the 1st of September 2008 and the 15th of November 2008. The second method used for the data collection was the questionnaires. One hundred questionnaires were distributed and collected from participants. Questionnaires were started in the beginning of November 2008 and were completed by the end of December 2008. Questionnaires were distributed by the industry advisor to the participants. Participants responded to the questionnaires either by ticking one choice from several possible answers listed below a question or by writing out an answer in the space provided below the question. The whole data gathered gave a clear overview about all related information regarding the service

delivery of the Dubai Police. As the data need to be analysed, I searched for a suitable method. Thus, the collected data were analysed using TCA Method. This method is useful to extract the real picture about the situation under research. The collected data were organised into major themes and categories. One of the strong points about this method is that it helps to ensure that the results are true and valid. Also, by organising the data into themes and categories, it was easier to understand the whole situation and all related data were grouped together. Furthermore, this method simplified the task of interpreting the data. Quantitative data from the questionnaire results were represented in the form of graphs and, as a result, the real meaning of the obtained information could be presented systematically.

After analysing the data and gaining awareness of the current situation, I started to link between the identified m-government service enablers and match them with the needs that will enhance the current way of delivery of the Dubai Police services. Therefore, in chapter 6, I presented and proposed the m-government solution for the Dubai Police based on the collected data and the literature review, and applied and discussed the service enablers that are suitable in this context. This solution can be gradually implemented for the Dubai Police over the next five years, which will lead to enhance the Dubai Police services and create an innovate solution.

The Professional Doctorate has improved my knowledge and skills in both the professional and the academic fields. This doctoral research has broadened my mindset. Initially, my mind was focused only on the research in the technical side of IT. This research has broadened my knowledge to cover different disciplines. I have now learnt the required skills to do other research papers and also to publish papers for either conferences or journals. Moreover, it created a strong foundation that I can use to build on to do research within my workplace that can be useful for any future required work. Furthermore, it has enabled me to search for in-dept information in a specific area that is still considered a new area especially, for the government, which will lead to a bright future for them. The project has assisted me to become a specialist in m-government which is an important area of e-government. M-government is still a field which is in its early stages of development and is one of the most important directions in the progress of e-government. I discovered and gained in-depth knowledge about m-government that would lead to complement and enhance the way of delivering and providing government services in contrast to the services that is currently provided through traditional ways (face-to-face) and e-government. Now, I will be able to go back to the Dubai Police and propose this solution. I am sure that this research will enhance the Dubai Police service and take them to the next important level in the e-government initiative. Also, this research can be gradually used by other Dubai government departments in order to transit the Dubai government to be an m-

government and to be one of the leading governments around the world to have a successful implementation of m-government. As such, the Dubai government will achieve a high rank in creating an 'always on society' that is not useful only for them but also to the different sectors of the governments such as citizens, businesses, employees, tourists and other government departments.

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Appendix I



FIG AI-1:MAP OF THE UNITED ARAB EMIRATES (SOURCE: NATIONAL ONLINE PROJECT

[HTTP://WWW.NATIONSONLINE.ORG/ONEWORLD/MAP/UNITED_ARAB_EMIRATES_MAP.HTM](http://www.nationsonline.org/oneworld/map/UNITED_ARAB_EMIRATES_MAP.HTM))

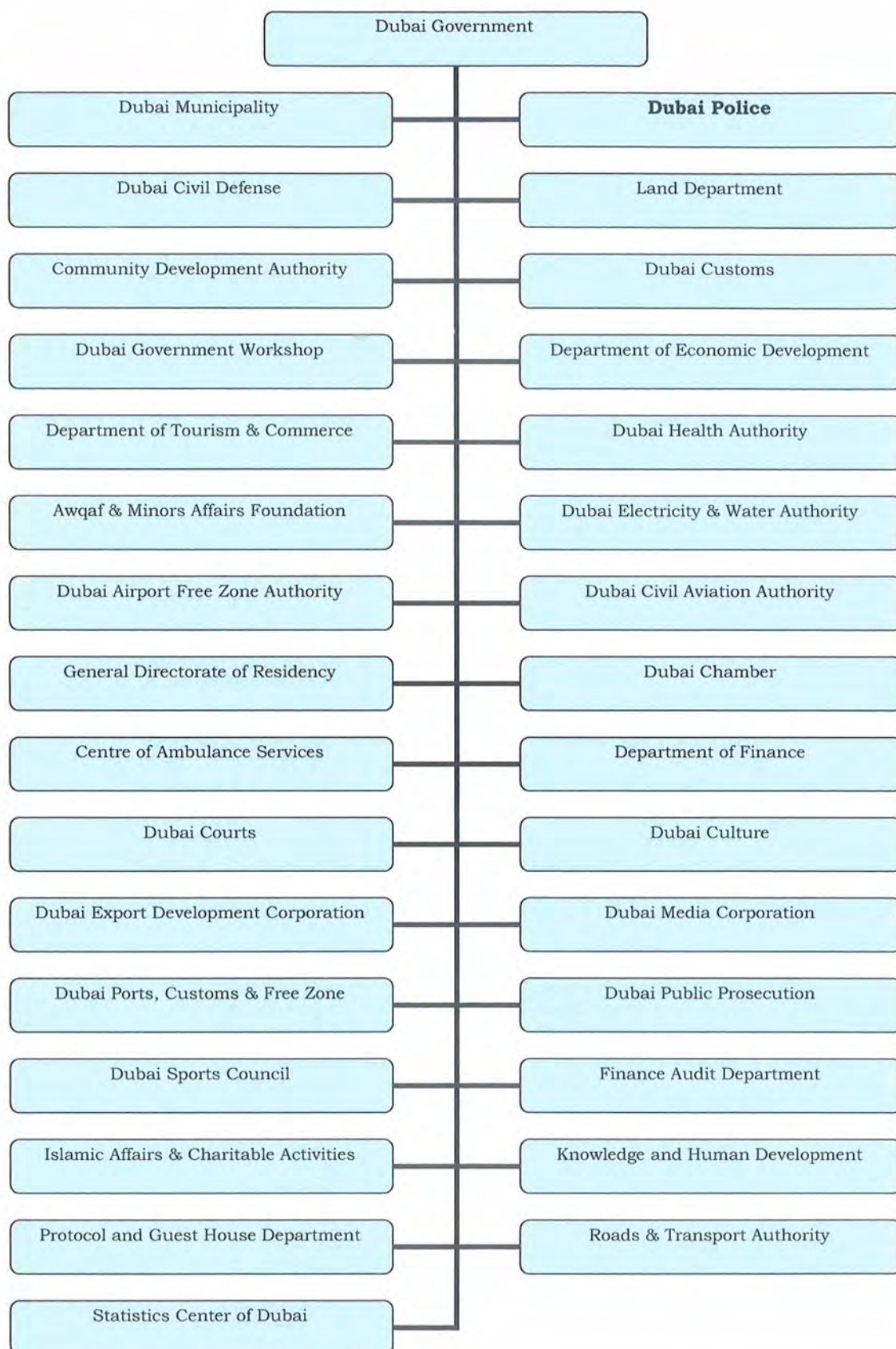


FIG AI-2: DUBAI GOVERNMENT CONSISTS OF THE FOLLOWING DEPARTMENTS

(DUBAI GOVERNMENT WEBSITE 2010: [HTTP://WWW.DUBAI.AE](http://www.dubai.ae))

Appendix II

MEMORANDUM

From the Office of Research



Central Queensland
UNIVERSITY

Secretary, Human Research Ethics Committee

Ph: 07 4923 2603

Fax: 07 4923 2600

Email: ethics@cqu.edu.au

27 June 2008

Mr Mansoor Alrazooqi
1201, 23 Shelley Street
Sydney NSW 2000

Dear Mr Alrazooqi

**HUMAN RESEARCH ETHICS COMMITTEE ETHICAL APPROVAL
PROJECT: H08/02-009, THE TRANSITION OF THE DUBAI GOVERNMENT TO A
MOBILE GOVERNMENT (M-GOVERNMENT)**

The Human Research Ethics Committee is an approved institutional ethics committee constituted in accord with guidelines formulated by the National Health and Medical Research Council (NHMRC) and governed by policies and procedures consistent with principles as contained in publications such as the joint Universities Australia and NHMRC *Australian Code for the Responsible Conduct of Research*.

At its meeting on 24 June 2008, the Human Research Ethics Committee of the Central Queensland University granted ethics approval for the research project, *The transition of the Dubai Government to a Mobile Government (m-government)* Project number H08/02-009

The period of ethics approval will be from 15 July 2008 to 1 May 2009. The approval number is H08/02-009; please quote this number in all dealings with the Committee.

The standard conditions of approval for this research project are that:

- (a) you conduct the research project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments required to be made to the proposal by the Human Research Ethics Committee;
- (b) you report immediately anything which may warrant review of ethics approval of the project, including:
 - (i) serious or unexpected adverse effects on participants;
 - (ii) proposed changes in the protocol;
 - (iii) unforeseen events that might affect continued ethical acceptability of the project;

(A written report detailing the adverse occurrence or unforeseen event must be submitted to the Committee Chair within one working day after the event.)
- (c) you provide the Human Research Ethics Committee with a written "Annual Report" by no later than 28 February each calendar year and "Final Report" by no later than one (1) month after the approval expiry date;
(A copy of the reporting pro formas may be obtained from the Human Research Ethics Committee Secretary, Sue Evans please contact at the telephone or email given on the first page.)

-
- (d) if the research project is discontinued, you advise the Committee in writing within five (5) working days of the discontinuation;
 - (e) you make submission to the Human Research Ethics Committee for approval of any proposed variations or modifications to the approved project before making any such changes;
 - (f) you comply with each and all of the above conditions of approval and any additional conditions or any modification of conditions which may be made subsequently by the Human Research Ethics Committee;
 - (g) you advise the Human Research Ethics Committee (email: ethics@cqu.edu.au) immediately if any complaints are made, or expressions of concern are raised, in relation to the project.

Please note that failure to comply with the conditions of approval and the *National Statement on Ethical Conduct in Human Research* may result in withdrawal of approval for the project.

You are required to advise the Secretary in writing within five (5) working days if this project does not proceed for any reason. In the event that you require an extension of ethics approval for this project, please make written application in advance of the end-date of this approval. The research cannot continue beyond the end date of approval unless the Committee has granted an extension of ethics approval. Extensions of approval cannot be granted retrospectively. Should you need an extension but not apply for this before the end-date of the approval then a full new application for approval must be submitted to the Secretary for the Committee to consider.

The Human Research Ethics Committee wishes to support researchers in achieving positive research outcomes. If you have issues where the Human Research Ethics Committee may be of assistance or have any queries in relation to this approval please do not hesitate to contact the Secretary, Sue Evans or myself.

Yours sincerely,

Dr Lorna Moxham
Chair, Human Research Ethics Committee

Cc: Dr Rohan De Silva
Project File

Application Category: A

Appendix III

Permission from the Dubai Police



Dubai Police General H.Q
General Department
Of Human Resources

القيادة العامة لشرطة دبي
الإدارة العامة للموارد البشرية



Ref: P/F : 895
Date: 10 / 04 / 2008

To Whom it May Concern

Subject: Mr. Mansoor Nasser Abdulrazaq

We are permitting Mr. Mansoor Nasser Abdulrazaq to undertake the collection of information using questionnaires and interviews required for the research of his Professional Doctorate in our workplace.

We are anticipating that the results of the research are going to improve the services provided by Dubai police, but we would like to assure you that there will not be any direct or indirect risk involved either to the researcher or the employees a consequence of his information gathering. In particular, we would like to assure you that no one in the Dubai Police will loose his/her employment as a result of this the research undertaken by Mr Mansoor.

If you require any further information, please do not hesitate to contact me.

Yours faithfully ,

LT. Colonel, Abdulla Ali Bin Zayed
Acting Director
Gen. Dept. of Human Resources
Dubai Police G.H.Q.

Appendix IV

Information sheet for Interviews



Information Sheet

Research Title: The transition of Dubai government into mobile government (m-government)

Dear Sir, Madam,

My name is Mansoor Alrazooqi and I am a Professional Doctorate candidate at Central Queensland University. I would like to invite you to participate in my research study. This study is conducted at Central Queensland University as part of the Professional Doctorate degree under the supervision of Dr. Rohan De Silva. The research is called *the transition of Dubai government into a mobile government (m-government)*. The objective of my research is to identify and propose mobile government service enablers (infrastructure, services, applications and devices) for the transformation of the Dubai government to a mobile government for the next five years. This is related to the research question "What are the service enablers to transition of the Dubai government to a mobile government over a five years period?".

I believe that the findings of this study will serve several beneficial purposes (for participants, community, university and the researcher) such as:

- To deliver information solutions for Dubai government/ Dubai Police and improve government through information technology for the benefits of the citizens.
- To enhance services, productivity, work arrangements, decision making process.
- To solve traditional and e-government problems.
- To provide a perfect environment for employees as it is not restricted to a wired network.
- To provide people from the wider community with convenient access through different channels to information any time anywhere and help to reduce costs. So people will have the choice to select the preferred means of access to Dubai Police/ Dubai government information and services alongside the traditional ones.
- To provide a likely solution for similar situations that could be applied to other departments in Dubai or any other places.
- The outcomes of the research could create further research questions.
- The research will increase the knowledge of the researcher by exploring multiple disciplines relevant to technology, government, business and society: that is, socially robust knowledge production

If you choose to volunteer for this study, I will request you to participate in one semi-structured interview. You will be asked questions relating to the strategy and role of your department, the current services, issues, needs, opinions, and department plans to deliver and improve services. This will help me to identify the area where mobile and wireless enablers could be useful for Dubai Police. The length of the interview will be 30-60 minutes and one interview

only. A follow up meeting regarding the validation of transcript may be necessary. However email communication is the preferred option for validation of the transcription. I am going to take notes during the interview, and there will be no tape recording. I will phone or email you to arrange the date, time and place convenience to you

I would be grateful if you did participate in this study but you are free to refuse to participate. Even if you decide to participate, you may withdraw from the research at any time without any liability. I would like to assure you that non-participation will not affect your employment or academic standing and progress. There are no specific risks associated with this study.

I guarantee you that I will protect your confidentiality and would like to assure you that no name will be used in reports. I am the sole collector of the data and all information given to me will be considered confidential and the only people who will have access to this information will be myself. My research supervisor, Dr Rohan, at Central Queensland University, will have access to summary information produced from the interview. The interviews will be coded and transcribed electronically to avoid linking to any particular person. Any specific information that could identify you will be changed to protect your anonymity. All data are password protected and also protected using fingerprint technology in the researchers own place with no unauthorized access. Data will be stored for five (5) years in accordance with the CQU Code of Conduct policy. The information collected from you will only be used for this research and possibly for any other publication resulting from this research.

If you have any question or you would like further information regarding the project, please contact me at:

Mobile No (in Australia): +61 4 06069555

Mobile No (in UAE): +971 50 6514143

Email: s0069314@student.cqu.edu.au

Or Please contact Central Queensland University's Office of Research (Tel +61 7 4923 2307, Email ethics@cqu.edu.au) should there be any concern about the nature and/or conduct of this research project.

I would like to thank you for your interest and look forward to your participation. If you agree to participate, please read the attached Consent Form that you are asked to complete before commencing the interview. Please note also that if you do agree to participate you have the right to withdraw at any time. A policy document will be submitted to Dubai Police at the end of the research and you will receive a summary of the outcomes of this research.

Information sheet for questionnaires



Information Sheet

Research Title: The transition of Dubai government into a mobile government (m-government)

Dear Sir, Madam,

My name is Mansoor Alrazooqi and I am a Professional Doctorate candidate at Central Queensland University. I would like to invite you to participate in my research study. This study is conducted at Central Queensland University as part of the Professional Doctorate degree under the supervision of Dr. Rohan De Silva. The research is called *the transition of Dubai government into a mobile government (m-government)*. The objective of my research is to identify and propose mobile government service enablers (infrastructure, services, applications and devices) for the transformation of the Dubai government to a mobile government for the next five years. This is related to the research question "What are the service enablers to transition of the Dubai government to a mobile government over a five years period?".

I believe that the findings of this study will serve several beneficial purposes (for participants, community, university and the researcher) such as:

-
- To deliver information solutions for Dubai government/ Dubai Police and improve government through information technology for the benefits of the citizens.
 - To enhance services, productivity, work arrangements, decision making process.
 - To solve traditional and e-government problems.
 - To provide a perfect environment for employees as it is not restricted to a wired network.
 - To provide people from the wider community with convenient access through different channels to information any time anywhere and help reduce costs. So people will have the choice to select the preferred means of access to Dubai Police/ Dubai government information and services alongside the traditional ones.
 - To provide a likely solution for similar situations that could be applied to other departments in Dubai or any other places.
 - The outcomes of the research could create further research questions.
 - The research will increase the knowledge of the researcher by exploring multiple disciplines relevant to technology, government, business and society: that is, socially robust knowledge production

If you choose to volunteer for this study, I will request you to participate in completing a questionnaire. You will be asked questions about your opinion about the current information and services provided by Dubai Police and the things that you think need improvements. This will help me identify the area where mobile and wireless enablers could be useful for Dubai Police. Depending on your choice, the questionnaires could be given to you as a hardcopy or could be sent to you as an electronic file.

I would be grateful if you did participate in this study but you are free to refuse to participate. Even if you decide to participate, you may withdraw from the research at any time without any liability. I would like to assure you that non-participation will not affect your employment or academic standing and progress. There are no specific risks associated with this study.

I guarantee you that I will protect your confidentiality and would like to assure you that no name will be used in reports. I am the sole collector of data and all information given to me will be considered confidential and the only people who will have access to this information will be myself. My research supervisor, Dr Rohan, at Central Queensland University will have access to summary information produced from the questionnaires but not to the individual questionnaires completed by the participants. The questionnaires will be coded and transcribed electronically to avoid linking to any particular person. Any specific information that could identify you will be changed to protect your anonymity. All data are password protected and also protected using fingerprint technology in the researchers own place with no unauthorized access. Data will be stored for five (5) years in accordance with the CQU Code of Conduct policy. The information collected from you will only be used for this research and possibly for any other publication resulting from this research.

If you have any question or you would like further information regarding the project, please contact me at:

Mobile No (in Australia): +61 4 06069555

Mobile No (in UAE): +971 50 6514143

Email: s0069314@student.cqu.edu.au

Or Please contact Central Queensland University's Office of Research (Tel +61 7 4923 2307, Email ethics@cqu.edu.au) should there be any concern about the nature and/or conduct of this research project.

I would like to thank you for your interest and look forward to your participation. If you agree to participate, please read the attached Consent Form that you are asked to complete before commencing the questionnaires. Please note also that if you do agree to participate you have the right to withdraw at any time. A policy document will be submitted to Dubai Police at the end of the research and you will receive a summary of the outcomes of this research.

Consent form



Consent Form

Research Title: The transition of Dubai government into a mobile government (m-government)

Researcher's Name: Mansoor Nasser Alrazooqi

I consent to participation in this research project and agree that:

- An Information Sheet has been provided to me; it provides details about the nature and purpose of the research.
- I have had any questions I had about the project answered to my satisfaction by the Information Sheet and any further verbal explanation provided;
- I understand that I have the right to withdraw from the project at any time without penalty or loss of benefit to myself;
- I understand that my identity will remain confidential and anonymous;
- I understand that information from me will be used for a thesis and possibly other published studies.

Participant's Name: _____

Participant's Email (optional): _____

Participant's Signature: _____

Date: _____

Would you like to receive a Plain English Statement of results at the end of the research?

Yes ☐ (Make sure to include your email address above)

No ☐

Appendix V

Schedule of interviews

Sending information sheets to participants took place from 01-Sep-08
to 9-Sep-08

Participant	Interview date
1	15-Sep-08
2	16-Sep-08
3	18-Sep-08
4	21-Sep-08
5	21-Sep-08
6	22-Sep-08
7	24-Sep-08
8	24-Sep-08
9	28-Sep-08
10	28-Sep-08
11	13-Oct-08
12	17-Oct-08
13	19-Oct-08
14	21-Oct-08
15	28-Oct-08
16	29-Oct-08
17	07-Nov-08
18	07-Nov-08
19	09-Nov-08
20	15-Nov-08

Interview questions

1. Briefly describe the strategic vision of your department in the area of increasing the effectiveness of service delivery
2. What is the role of your department and what are the services provided?
3. Who would you identify as the main stakeholders?
4. How do you reach your stakeholders? AND how could the stakeholders get the services? (such as face-to-face, email, mail, Internet, etc)
5. In your opinion, which services should be provided that are still not provided?
6. How does the organisation ensure information and services is accessible to all stakeholders?
7. What channels are offered today to clients for any queries or complaints?
8. What are the problems, shortcomings and needs of your department to enhance services and citizens participation
9. What are the current problems of the traditional (face-to-face) and electronic services?

-
10. How does the department manage assets, resources and procurement?
11. What are the main Systems and Software applications?
12. Could you please tell me if any wireless or mobile networks are used within Dubai Police?
13. What are the usage of mobiles and terminals, of your department, in the field?
14. What are the services that are provided to citizens and businesses through mobile and wireless (such as messaging service, mobile parking, free wireless access, wireless networks with business, etc)?
15. How do different Dubai Police departments communicate and pass information between them? What types of networks are used?
16. Do your department integrate functions and processes with other Dubai Police departments? If yes, How?
17. What are the electronic services Dubai Police currently provide? If possible could you categorise them based on the services that are provided to :
- a. Citizens
 - b. Businesses
 - c. Employees
 - d. Other Government Departments
-

18. Which services have higher priority?

19. What other e-services you are planning to provide?

20. How do customers pay for the services?

21. What is done to encourage people to use the website and get involved?

22. What are your department's future plans in the area of service delivery?

23. Are there specific ICT technologies that your department thinks may become relevant in the medium term but has not yet embraced?

Questionnaires



Researcher Name: Mansoor Nasser ALRAZOOQI

Research Title: The transition of Dubai government into a mobile government (m-government)

1. Would you mind telling me which of the following age groups you belong to?
 - a) 18-29
 - b) 30-39
 - c) 40-60
 - d) 60+
 - e) No Response
2. Where do you live? (Please mention the name of the city/town) -----
3. Are you an employee of Dubai Police?
 - a. Yes (Go to Question 4 and Skip 8,9,10,11)
 - b. No (Skip Questions 4-7)
4. What is the role of your department? (a question for Dubai Police employees)

5. How do you access to Dubai Police information and services while you are outside of your department? (a question for Dubai Police employees)

-
6. Do you work in the field? If yes, how do you access to Dubai Police information and services or communicate with them while you are in the field? (a question for Dubai Police employees)

7. Do you have any difficulties in getting the required information or communicating with the required department while you are outside your department? If yes, what are these difficulties? (a question for Dubai Police employees)

8. How do you access and get the information and services provided by Dubai Police? (a question for non-employees of Dubai Police)

9. Do you have difficulties in reaching the departments of Dubai Police? If yes, what are these difficulties? (a question for non-employees of Dubai Police)

10. Please specify any disability that prevents you from accessing Dubai Police information and services (either in person, on the telephone or via the Internet) (a question for non-employees of Dubai Police)

11. Do you access to Dubai Police information and services using the website of Dubai Police? If yes, how often? (a question for non-employees of Dubai Police)

12. Do you prefer to have Dubai Police services through traditional means (face-to-face) or electronic means (such as the Internet) and why?

13. What are the most important services to you that you get from Dubai Police?

14. Please indicate how likely you would be to use the following forms of communication, if they were available to you, to contact the department of Dubai Police.

	Very Likely	Likely	Unsure	Unlikely	Very Unlikely
Face-to-face contact					
By Mail					
By telephone					
By e-mail					
Through a Web site on the Internet					
Self Service Kiosks					
Mobile or Wireless					
Other Mean (please specify): ----- -----					

15. Which one do you use more than the other?

a. Computer B. Mobile or wireless device

16. Have you used the mobile or wireless device to get information or some services?

a. Yes b. No

17. If mobile services are going to be provided to you, are you going to use them?

a. Yes b. No

18. If the following services provided to you, could you rank them accordance to the importance and usability to you. (from 1-6 which is 1 is the most important)

Service	Rank
a) Mobile messaging and notifications services (such as SMS)	
b) Mobile and wireless networks	
c) Mobile Geographic information systems (maps with navigations capabilities)	
d) Access to information and services through mobiles and wireless devices	

e) Mobile payment for services	
f) Access to information and services using Voice	

19. What other services that you would like to get through the mobile and wireless means?

20. How likely are you to use a free wireless network to access government information and services?

Please state the statement that most applies.

- a) I am very likely to use it
- b) I would possibly use it
- c) I am unlikely to use it

21. How important is it to you that government information/services are available for mobile and wireless access? (Please circle your response)

- a) Extremely important b) Important c) Not important d) No Idea

22. Government services provided through electronic means bring people closer to government by making it easier to get and find information. (Please circle your response)

- a) Strongly agree b) Agree c) Disagree d) Strongly Disagree

23. Government services provided through electronic means bring people closer to government by making it easier for people to communicate their views to government. (Please circle your response)

a) Strongly agree b) Agree c) Disagree d) Strongly Disagree

24. According to the last service you had with Dubai Police though visiting on of its departments? Could you tell me...

The number of trips you made to complete the service	
Traveling time to reach service location (in minutes)	
Queuing and Waiting time (in minutes)	
The time the employee took for Service completion (in minutes)	
Number of trips required to other government departments to complete the service?	
How satisfied are you with the current level of service?	1) Extremely satisfied 2) Somewhat satisfied 3) Somewhat dissatisfied 4) Extremely dissatisfied 5) No Comments
Was a payment made to get the service?	(1) Yes (2) No If yes, how did you pay? 1) Cash 2)Credit 3)Others (please specify)

	----- -----
--	----------------

25. Technology Ownership and Usage

	Do you own any of these communication devices? (please circle the letter on the left)	What is the frequency of usage? (Please write the number for each choice) 1 -Daily 2 -Weekly 3-Fortnightly 4-Monthly 5-Rarely used 6-Never used
(a)	Computer (Desktop)	
(b)	Computer (Laptop)	
(c)	Telephone (fixed line)	
(d)	Mobile phone	
(e)	Wireless Device	
(f)	How often do you use the Internet?	
(g)	How often do you use the mobile phone to communicate using SMS or text messaging service?	

26. How do you rate the overall quality of services provided?

- a) Outstanding b)Excellent c) Average d) Fair e) Poor

27. What is your usage rate of the services provided by Dubai Police Department in the past six months?

1. 1 - 3 times per month
2. 4 - 6 times per month

-
3. 7 - 9 times per month
 4. 10 – 12 times per month
 5. more than 12 times per month

28. Do you agree that "the current services, provided by Dubai Police, are efficient enough to meet customer needs and demands"

- a) Yes b) No (Please Specify)

29. What are the strong points in the existing electronic services provided by Dubai Police?

30. What are the weak points in the existing electronic services provided by Dubai Police?

31. Any other comments and suggestions you would like to make or recommend for enhancing the services provided by Dubai Police?

Schedule of questionnaires

Questionnaires Distribution process started 1 Nov and finished 19 Dec 2008; 72 questionnaires were distributed in November and 28 questionnaires were distributed in December.

Date	No. of responded questionnaires received
02-November-2008	2
04-November-2008	12
06-November-2008	2
09-November-2008	27
10-November-2008	2
11-November-2008	2
12-November-2008	1
13-November-2008	2
15-November-2008	1
16-November-2008	3
17-November-2008	1
18-November-2008	1
19-November-2008	1
24-November-2008	6
25-November-2008	2
27-November-2008	6
30-November-2008	1
20-December-2008	1
21-December-2008	1
22-December-2008	1
24-December-2008	13
25-December-2008	1
27-December-2008	1
29-December-2008	6
30-December-2008	2
31-December-2008	2
Total	100

Participants' responses to questions in the interviews

(The summaries of the responses for each question are described in Themes, Categories in chapter 4).

1. Briefly describe the strategic vision of your department in the area of increasing the effectiveness of service delivery

- ♦ Theme 1 Category A

2. What is the role of your department and what are the services provided?

- ♦ Theme 1 Category B

3. Who would you identify as the main stakeholders?

- a. Theme 3, Category B

4. How do you reach your stakeholders? AND how could the stakeholders get the services? (such as face-to-face, email, mail, internet, etc)

- b. Theme 2 Category A

5. In your opinion, which services should be provided that are still not provided?

- c. Theme 2 Category C, Theme 3 Category A, Theme 5 category C, Theme 5 Category E

6. How does the organization ensure information and services is accessible to all stakeholders?

- d. Theme 6 category A, Theme 6 category B

7. What channels are offered today to clients for any queries or complaints?

e. Theme 2 Category A

8. What are the problems, shortcomings and needs of your department to enhance services and citizens participation

f. Theme 2 Category B&C

9. What are the current problems of the traditional (face-to-face) and electronic services?

g. Theme 2 Category B&C, Theme 3 Category E, Theme 4 Category A

10. How does the department manage assets, resources and procurement?

h. Theme 3 category A&C

11. What are the main Systems and Software applications?

♦ Theme 3 Category A

12. Could you please tell me if any wireless or mobile networks are used within Dubai Police?

♦ Theme 1 category B, Theme 2 category A, Theme 3 category C, Theme 5 category A

13. What are the usage of mobiles and terminals, of your department, in the field?

♦ Theme 3 category C

14. What are the services that are provided to citizens and businesses through mobile and wireless (such as messaging service, mobile parking, free wireless access, wireless networks with business, etc)?

♦ Theme 5 Category A

15. How do different Dubai Police departments communicate and pass information between them? What types of networks are used?

♦ Theme 2 category A

16. Do your department integrate functions and processes with other Dubai police departments? If yes, How?

♦ Theme 3 category A

17. What are the electronic services Dubai Police currently provide? If possible could you categorize them based on the services that are provided to :

- i. Citizens**
- ii. Businesses**
- iii. Employees**
- iv. Other Government Departments**

♦ Theme 3 Category A, C, D

18. Which services have higher priority?

♦ Theme 3 Category A, C, D

19. What other e-services you are planning to provide?

♦ Theme 6 category B

20. How do customers pay for the services?

♦ Theme 3 category D

21. What is done to encourage people to use the website and get involved?

♦ Theme 3 category A

22. What are your department's future plans in the area of service delivery?

- ◆ Theme A category B, Theme 6 category B

23. Are there specific ICT technologies that your department thinks may become relevant in the medium term but has not yet embraced?

- ◆ Theme 6 category A

24. Other things you would like to add or mention?

- ◆ Theme 5 category E

Participants' responses to questions in the questionnaires

Q1. Would you mind telling me which of the following age groups you belong to?

Age	18-29: 44% 30-39: 33% 40-60: 20% 60+: 1% No response: 2%
------------	--

Q2. Where do you live?

City	Abu Dhabi: 11% Dubai: 69% Sharjah: 11% Ajman: 2% Umm Al Quwain: 1% Ras al-Khaimah: 3% Al Ain: 3%
-------------	--

Q3. Are you an employee of Dubai Police?

Employment	Dubai Police Employee: 22% Non Dubai Police Employee: 78%
-------------------	--

Q4. What is the role of your department? (a question for Dubai Police employees)

The summaries of the responses are described in chapter 4 in:

THEME 1: Strategies and roles of Dubai Police general department

- Category B: Strategies and roles different Dubai police department's (C& W)

Q5. How do you access to Dubai Police information and services while you are outside of your department? (a question for Dubai Police employees)

The summaries of the responses are described in chapter 4 in:

THEME 2: Access to Dubai Police information and services

- Category A: Access, feedback and communication means to Dubai police information and services (C)

THEME 5: Mobile and wireless service enablers

- Category A: Current usage by Dubai Police (C)

Q6. Do you work in the field? If yes, how do you access to Dubai Police information and services or communicate with them while you are in the field? (a question for Dubai Police employees)

The summaries of the responses are described in chapter 4 in:

THEME 2: Access to Dubai Police information and services

- Category B: Difficulties in accessing and obtaining information and services (C & W)

THEME 5: Mobile and wireless service enablers

- Category A: Current usage by Dubai Police (C)

Q7. Do you have any difficulties in getting the required information or communicating with the required department while you are outside your department? If yes, what are these difficulties? (a question for Dubai Police employees)

The summaries of the responses are described in chapter 4 in:

THEME 2: Access to Dubai Police information and services

-
- Category C: problems, shortcomings and needs of the departments (C & W)

THEME 4: Traditional and electronic services

- Category A: Advantages and disadvantages/Strength and weaknesses (C)

Q8. How do you access and get the information and services provided by Dubai police? (a question for non-employees of Dubai Police)

The summaries of the responses are described in chapter 4 in:

THEME 2: Access to Dubai Police information and services

- Category A: Access, feedback and communication means to Dubai police information and services (C)

Q9. Do you have difficulties in reaching the departments of Dubai police? If yes, what are these difficulties? (a question for non-employees of Dubai Police)

The summaries of the responses are described in chapter 4 in:

THEME 2: Access to Dubai Police information and services

- Category B: Difficulties in accessing and obtaining information and services (C & W)

Q10. Please specify any disability that prevents you from accessing Dubai police information and services (either in person, on the telephone or via the Internet) (a question for non-employees of Dubai Police)

The summaries of the responses are described in chapter 4 in:

THEME 2: Access to Dubai Police information and services

- Category B: Difficulties in accessing and obtaining information and services (C & W)

Q11. Do you access to Dubai police information and services using the website of Dubai Police? If yes, how often? (a question for non-employees of Dubai Police)

The summaries of the responses are described in chapter 4 in:

THEME 2: Access to Dubai Police information and services

- Category A: Access, feedback and communication means to Dubai police information and services (C)

Q12. Do you prefer to have Dubai police services through traditional means (face-to-face) or electronic means (such as the Internet) and why?

The summaries of the responses are described in chapter 4 in:

THEME 4: Traditional and electronic services

- Category B: Preference (C)

Q13. What are the most important services to you that you get from Dubai police?

The summaries of the responses are described in chapter 4 in:

THEME 4: Traditional and electronic services

- Category B: Preference (C)

Q14. Please indicate how likely you would be to use the following forms of communication, if they were available to you, to contact the department of Dubai Police.

	Very Likely	Likely	Unsure	Unlikely	Very Unlikely
Face-to-face contact	25%	44%	8%	13%	10%
By Surface Mail	14%	23%	16%	22%	25%
By telephone	33%	47%	12%	6%	2%
By e-mail	40%	42%	10%	4%	4%
Website	62%	24%	7%	6%	1%
Self Service Kiosks	28%	40%	26%	3%	3%
Mobile or wireless	43%	36%	15%	3%	3%

Q15. Which one do you use more than the other?

54% of participants use mobile or wireless devices more than computers.

Q16. Have you used the mobile or wireless device to get information or services	Total
Yes	82
No	18
Grand Total	100

Q17. If mobile services are going to be provided to you, are you going to use them?	Total
Yes	96
No	4
Grand Total	100

Q18. If the following services provided to you, could you rank them accordance to the importance and usability to you. (from 1-6 which is 1 is the most important)

Rank	mobile messaging	mobile and wireless networks	Mobile GIS	Access to information using mobile and wireless devices	Mobile payment	Access to information using voice
1	41	19	8	13	13	6
2	18	21	14	25	13	9
3	22	14	8	25	17	14
4	12	20	18	18	19	13
5	3	17	27	12	23	18
6	4	9	25	7	15	40

Q19. What other services that you would like to get through the mobile and wireless means?

The summaries of the responses are described in chapter 4 in:

THEME 5: Mobile and wireless service enablers

- Category E: Recommended mobile services (W)

Q20. How Likely are you going to use a free wireless network to access government information and services?	Total
I am very likely to use it	74
I would possibly use it	23
I am unlikely to use it	3
Grand Total	100

Q21. How important is it to you that government information/services are available for mobile and wireless access?	Total
Extremely important	59
important	37
not important	4
Grand Total	100

Q22. Government services provided through electronic means bring people closer to government by making it easier to get and find information	Total
Strongly Agree	58
Agree	42
Disagree	0
Strongly Disagree	0

Q23. Government services provided through electronic means bring people closer to government by making it easier for people to communicate their views to government	Total
Strongly Agree	49
Agree	41
Disagree	10
Strongly Disagree	0
Grand Total	100

Q24: According to the last service you had with Dubai Police through visiting on of its departments? Could you tell me...

	Average	Highest	Lowest
Traveling time to reach service location	30	120	1
Queuing and waiting time	28	240	1
The time the employee took for service completion	14	60	1

	Average	Highest	Lowest
No. of trips made to complete the service	2	15	1
Number of trips required to other government departments	2	7	0

Satisfaction level	
extremely satisfied	14
somewhat satisfied	33
somewhat dissatisfied	8
extremely dissatisfied	0
no comments	3

Payment Service!	
payment	43
Non payment	15

Payment type	
Cash	35
Credit Card	8

Q25. Technology Ownership and Usage

Usage	Daily	Weekly	Fortnightly	Monthly	Rarely used	never used	Total
Computer (Desktop)	61	12	3	1	9	14	100
Computer (Laptop)	67	12	3	0	5	13	100
Telephone (fixed line)	48	11	5	3	27	6	100
Mobile or wireless device	99	0	0	1	0	0	100

Usage	Daily	Weekly	Fortnightly	Monthly	Rarely used	Never used	Total
Internet Usage	82	14	2	0	1	1	100
Mobile Messaging	81	9	1	1	7	1	100

Q26. How do you rate the overall quality of serviced provided?	Total
Outstanding	12
Excellent	58
Average	25
Fair	5
Poor	0

Q27. What is your usage rate of the services provided by Dubai Police Department in the past six months?	Total
1-3 times per month	71
4-6 times per month	14
7-9 times per month	6
10-12 times per month	4
More than 12 times per month	5
Grand Total	100

Q.28 Do you agree that "the current services, provided by Dubai Police, are efficient enough to meet customer needs and demands"	Total
Yes	75
No (Please specify)	25
Grand Total	100

The summaries of the responses are described in chapter 4 in:

THEME 3: Services

- Category E: Satisfaction (C & W)

Q29. What are the strong points in the existing electronic services provided by Dubai Police?

The summaries of the responses are described in chapter 4 in:

THEME 4: Traditional and electronic services

- Category A: Advantages and disadvantages/Strength and weaknesses (C)
- Category B: Preference (C)

Q.30 What are the weak points in the existing electronic services provided by Dubai Police?

The summaries of the responses are described in chapter 4 in:

THEME 4: Traditional and electronic services

- Category A: Advantages and disadvantages/Strength and weaknesses (C)

Q.31 Any other comments and suggestions you would like to make or recommend for enhancing the services provided by Dubai police?

The summaries of the responses are described in chapter 4 in:

THEME 4: Futuring

- Category B: Suggestions and recommendations

Appendix VI

National Ethics Application Form

National Ethics Application Form

Version 1.1

PROPOSAL TITLE: The transition of the Dubai government to a mobile government (M-government)
FOR SUBMISSION TO: Central Queensland University's Human Research Ethics Committee (EC00158)
PROPOSAL STATUS: Complete
COMPLETION DATE: 10/06/2008

APPLICANT: Mr MANSOOR ALRAZOOQI
INSTITUTION: Central Queensland University
ADDRESS: 1201, 23 Shelley Street
Sydney NSW 2000
CONTACT NUMBERS:

Business Hours	0406069555
After Hours	-
Mobile	-
Fax	0292902630

PROPOSAL DESCRIPTION:

The objective of my research is to identify and propose mobile government (m-government) infrastructure, services, applications and devices for the transformation of the Dubai government to a mobile government for the next five years. This is related to the research question "What are the service enablers for the transition of Dubai government to a mobile government over a five year period?". M-government is a subset or a complement to the electronic government (e-government) through the utilization of the different mobile & wireless technologies, services, applications and devices to provide information and services to citizens, businesses, employees and other government units and create more opportunities for citizens participation [Kushshu & Kuscu 2003:1-2]

The proposed methodology of my research involves qualitative research. Qualitative research is used to study everyday life in the researcher's own culture and society. This helps and covers what lies behind the subject that is little yet known, such as m-government. The selected government department to conduct the research is Dubai Police. Data will be collected in the field through interviews and questionnaires. Questionnaires will be conducted with Dubai police research

participants. I propose to conduct semi-structured interviews with research participants within Dubai police in different levels related to experiences, opinions, information and feelings about the current government environment and services. This will help to determine the services currently delivered with specific reference to:

The strategic vision of Dubai Police departments to increase the effectiveness of service delivery

The problems and needs of Dubai police to enhance services and citizens participation

I then intend to match 'identified requirements' against a service enablers grid in order to determine

An appropriate match between Dubai police requirements and mobile and wireless technologies and applications

Next, I propose to:

Undertake a cost-benefit analysis and quantify the cost of the transition to the relevant m-government provision

Finally, I propose to Synthesis and analyze the research data in order to develop a policy document proposing the mobile government infrastructure for the following five years to enable standardized development of mobile e-government

POINTS TO REMEMBER:

This document has been created using the online National Ethics Application Form (NEAF) - available at www.neaf.gov.au. The set of questions that appear in this document have been generated as a result of answers you have provided to specific questions in NEAF. For this reason, the contents of this document are unique to this research ethics proposal and should not be used as the basis for future proposals. New proposals for submission to Human Research Ethics Committees must be generated using NEAF online.

Should you wish to use the contents of this document for other purposes:

- You can copy and paste text out of a PDF document in Adobe Acrobat by using the 'Tools> basic> text select' button.

1. TITLE AND SUMMARY OF PROJECT

1.1. Title

1.1.1 What is the formal title of this research proposal?

The transition of the Dubai government to a mobile government (M-government)

1.1.2 What is the short title / acronym of this research proposal (if applicable)?

Dubai m-government

1.2. Description of the project in plain language

1.2.1 Give a concise and simple description (not more than 400 words), in plain language, of the aims of this project, the proposal research design and the methods to be used to achieve those aims.

The objective of my research is to identify and propose mobile government (m-government) infrastructure, services, applications and devices for the transformation of the Dubai government to a mobile government for the next five years. This is related to the research question "What are the service enablers for the transition of Dubai government to a mobile government over a five year period?". M-government is a subset or a complement to the electronic government (e-government) through the utilization of the different mobile & wireless technologies, services, applications and devices to provide information and services to citizens, businesses, employees and other government units and create more opportunities for citizens participation (Kushshu & Kuscu 2003:1-2)

The proposed methodology of my research involves qualitative research. Qualitative research is used to study everyday life in the researcher's own culture and society. This helps and covers what lies behind the subject that is little yet known, such as m-government. The selected government department to conduct the research is Dubai Police. Data will be collected in the field through interviews and questionnaires.

Questionnaires will be conducted with Dubai police research participants. I propose to conduct semi-structured interviews with research participants within Dubai police in different levels related to experiences, opinions, information and feelings about the current government environment and services. This will help to determine the services currently delivered with specific reference to:

The strategic vision of Dubai Police departments to increase the effectiveness of service delivery
The problems and needs of Dubai police to enhance services and citizens participation

I then intend to match 'identified requirements' against a service enablers grid in order to determine
An appropriate match between Dubai police requirements and mobile and wireless technologies and applications

Next, I propose to:

Undertake a cost-benefit analysis and quantify the cost of the transition to the relevant m-government provision

Finally, I propose to Synthesis and analyze the research data in order to develop a policy document proposing the mobile government infrastructure for the following five years to enable standardized development of mobile e-government

1.3. Type of Research

1.3.1 Tick as many of the following 'types of research' as apply to this project. Your answers will assist HRECs in considering your proposal. A tick in some of these boxes will generate additional questions relevant to your proposal (mainly because the National Statement requires additional ethical matters to be considered), which will appear in Section 4 of NEAF.

This project involves:

- ☒ Qualitative research
- ☒ Research on workplace practices or possibly impacting on workplace relationships
- ☒ Research conducted overseas involving participants NS 1.21
- ☐ Research involving deception of participants, concealment or covert observation NS 17
- ☐ Epidemiological research NS 14
- ☐ Administration of a drug for research but is not clinical research
- ☐ Clinical research (excluding those under the CTN/CTX schemes) NS 12

- ☐ Clinical trial under CTN/CTX scheme NS 12
- ☐ Research involving ionising radiation NS 10
- ☐ Research involving the use of embryos and/or gametes
- ☐ Genetic testing/research NS 16
- ☐ Research involving the collection and / or use of human samples NS 15
- ☐ Research involving assisted reproductive technologies (ART) NS 11
- ☐ None of the above

1.4. Research participants

1.4.1 The National Statement requires additional information to be provided to an HREC where research participants are certain or likely to include any of the categories of people listed in this question. HRECs need to know whether you intend to include or to exclude any of these categories. Answer this question by

- (a) selecting any of those categories that are targeted or likely to be included as participants in this research project,
- (b) selecting any other of these categories that will be excluded from participation, and
- (c) selecting any other of these categories who may be adversely affected by this research..

Where you select a category for inclusion, you will be required to answer additional questions later in the form.

1.4.1 Where any of the following participant populations may be involved, the National Statement requires additional information to be provided to the HREC. Tick as many of the following 'types of research participants' as apply to this project. If none apply please indicate this below. A tick in some of these boxes will require you to answer additional questions later in the form.

The participants who may be involved in this research are:

	a) Intended or targeted	b) Probable coincidental recruitment	c) Design specifically excludes	d) Research has potential to adversely affect this population
People whose primary language is other than English [LOTE] NS 2.26	☒	☐	☐	☐
Children and/or young people (ie. < 18 years) NS 4	☐	☐	☐	☐
People with an intellectual or mental impairment NS 5	☐	☐	☐	☐
People highly dependent on medical care NS 6	☐	☐	☐	☐
People in existing dependent or unequal relationships with any member of the research team, the researcher(s), and/or the person undertaking the recruitment/consent process [eg. student/teacher, employee/employer, warden/prisoner, officer, enlisted soldier, patient/doctor] NS 7	☐	☐	☐	☐
People who belong to a collectivity NS 8	☐	☐	☐	☐
Aboriginal and/or Torres Strait Islander peoples NS 9	☐	☐	☐	☐

1.5. Research techniques

1.5.1 The research techniques to be used in this project include (You must tick at least one. Tick as many as apply):

- ☐ Observation of non-identified people in public places
- ☐ Covert observation of identifiable people in non-public places
- ☐ Interviews - telephone
- ☒ Interviews - face to face
- ☐ Documentary/records analysis
- ☐ Focus groups
- ☐ Data linkage
- ☐ Physical activities / exercises / tests
- ☐ Taping - audio / video
- ☐ Biomedical / clinical interventions, tests, samples

-
- ☐ Use of complementary or alternative medicine, or a natural therapy
 - ☐ Photos
 - ☐ Use of gene therapy
 - ☒ Survey instrument / questionnaire / diary
 - ☐ Use of a medical device
 - ☐ Internet / web based research
 - ☐ Computer based tests
 - ☐ Other techniques

2. RESEARCHERS

2.0. Applicant

Provide the following information for the person making this application to the HREC.

2.0.1. Name and contact details

2.0.1.1 Title	Mr
2.0.1.2 First Name	MANSOOR
2.0.1.3 Surname	ALRAZOOQI
2.0.1.4 Mailing Address 1	1201, 23 Shelley Street
2.0.1.8 Suburb/Town	Sydney
2.0.1.9 State	NSW
2.0.1.10 Postcode	2000
2.0.1.11 Country, if not Australia	Australia
2.0.1.12 Organisation Name	Central Queensland University
2.0.1.13 Faculty/department/school or centre name as appropriate (optional)	The Faculty of Education and Creative Arts
2.0.1.14 Position in organisation	Professional Doctoral candidate
2.0.1.15 Business Hours Phone Number	61406069555
2.0.1.17 Mobile Phone Number (optional)	971506514143
2.0.1.19 Fax Number	61292902630
2.0.1.20 Email Address	s0069314@student.cqu.edu.au

2.1. Principal researcher(s)

2.1.0 How many principal researchers are there? 1

2.1.1. Principal researcher 1

2.1.1. Name and contact details

2.1.1.1 Title	Mr
2.1.1.2 First Name	MANSOOR
2.1.1.3 Surname	ALRAZOOQI
2.1.1.4 Mailing Address 1	1201, 23 Shelley Street
2.1.1.8 Suburb/Town	Sydney
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2.1.1.19 Fax Number	0292902630
2.1.1.20 Email Address	s0069314@student.cqu.edu.au

2.1.2. Describe the qualifications, expertise and experience of the principal researcher relevant to this project.

2.1.2.1 Qualifications	Higher Diploma in Business Information Technology Bachelor of Applied Science in Business Information Technology
------------------------	---

2.1.2.2 Expertise 2.1.2.3 Experience 2.1.2.4 Name the site(s) for which this principal researcher is responsible. 2.1.3 Describe the role of the principal researcher in this project.	Master of Information Technology Master of Information Technology with Honours Information Technology Working within the IT Department of Dubai Police as part of Dubai government since 1998 to provide electronic services and IT support. Dubai Police as the selected department of Dubai government This project is part of the requirements of the Professional Doctorate Degree at Central Queensland University My main objective is to provide a mobile government solution for Dubai Police as part of Dubai government. I intend to have interviews with research participants from within Dubai Police to know their strategic vision to increase the effectiveness of service delivery. Also to know the problems and needs of Dubai police to enhance services and citizens participation. Also I am going to have questionnaires with the research participants of Dubai police in order to know their opinion about the current information and services provided by Dubai Police, and the services that they would like to have or improve I then intend to match these against a service enablers grid (applications/technologies & requirements and needs) in order to determine An appropriate match between Dubai Police provision and mobile and technologies and applications Next, I propose to: Undertake a cost-benefit analysis and quantify the cost of the transition to the relevant m-government provision Finally, I propose to Synthesis and analyze the research data in order to develop a policy document proposing the mobile government infrastructure for the following five years to enable standardized development of mobile e-government services. 2.1.4 Is the principal researcher a student? Yes 2.1.4.1.1. What is the educational organisation, faculty and degree course of the student? <table border="0"> <tr> <td>2.1.4.1.1.1 Organisation</td> <td>Central Queensland University</td> </tr> <tr> <td>2.1.4.1.1.2 Faculty</td> <td>The Faculty of Education and Creative Arts</td> </tr> <tr> <td>2.1.4.1.1.3 Degree course</td> <td>Professional Doctorate</td> </tr> </table> 2.1.4.1.3 Is this research project part of the assessment of the student? Yes 2.1.4.1.4 What training or experience does the student have in the relevant research methodology? Since 1998, I am working with an IT department that is responsible to provide electronic services. In my work, I dealt with many users, interviewing them as part of my job, to identify their requirements and needs to provide electronic services. In my previous studies, I had many courses that were relevant to the research methodology. 2.1.4.1.5 What training has the student received in the ethics of research? I have received training through exercises and assignments of courses of my Degrees. For example in the Master of IT, I learned through System Analysis and Design and electronic commerce courses. the ways to collect information such as interviews and questionnaires 2.1.4.1.6 Describe the supervision to be provided to the student. The supervisor, Dr Rohan, has been appointed by CQU university. The supervisor and the student has face-to-face meetings or through the chat, once or twice a week. The supervisor provides the help to edit the proposal and provides the student with guidelines an advice throughout the project. 2.1.4.1.7 How many supervisors does the student have? 1 2.1.4.1.7.1. Supervisor 1	2.1.4.1.1.1 Organisation	Central Queensland University	2.1.4.1.1.2 Faculty	The Faculty of Education and Creative Arts	2.1.4.1.1.3 Degree course	Professional Doctorate
2.1.4.1.1.1 Organisation	Central Queensland University						
2.1.4.1.1.2 Faculty	The Faculty of Education and Creative Arts						
2.1.4.1.1.3 Degree course	Professional Doctorate						

2.1.4.1.7.1. Provide the name, qualifications, and expertise, relevant to this research, of the students' supervisor

2.1.4.1.7.1.1 Title	Dr
2.1.4.1.7.1.2 First Name	Rohan
2.1.4.1.7.1.3 Surname	De Silva
2.1.4.1.7.1.4 Qualifications	PhD (UNSW), SMIEEE MEngSc UNSW, BSCEng UNIVERSITY OF SRI LANKA
2.1.4.1.7.1.5 Expertise	Dr. Rohan has supervised many students in IT projects including theses.

2.2. Associate researcher(s)

2.2.1 How many known associate researchers are there? (You will be asked to give contact details for these associate researchers at question 2.2.1.1)

0

2.2.2 Do you intend to employ other associate researchers?

No

2.3. Other personnel relevant to the research project

2.3.1 How many known other people will play a specified role in the conduct of this research project?

0

2.3.2 Is it intended that other people, not yet known, will play a specified role in the conduct of this research project?

No

2.4. Certification of researchers

2.4.1 Are there any relevant certification, accreditation or credentialing requirements relevant to the conduct of this research?

Yes

2.4.1.1 Describe the certification, accreditation or credentialing requirements.

A Qualification deemed to be equivalent to Masters degree of the University (the researcher has Master of IT from Bond University); or

a combination of training and relevant professional experience deemed by the Program Executive Director to be the equivalent of an Australian Masters degree

The Scope of the research has been agreed upon at the professional Doctorate Colloquium and also by the supervisor

2.4.1.1.2 Specify and advise whether the principal researcher or any of the associate researchers have been so certified and/or accredited or credentialed.

My academic and employment expertise in the field of the electronic government (e-government) is relevant to the proposed research topic area, namely:

The higher Diploma in Business Information Technology
Bachelor in Business Information Technology,
Master of Information Technology; and
Master of Information Technology with Honours.

I undertook my Master's research in the field of the electronic government implementations in the Gold Coast City Council (GCCC). This research informed me about e-government and the problems and issues facing its implementation.

From 1998 to 2005, I worked in the IT department of Dubai Police that is responsible for all the IT requirements and services. My industrial expertise is thus relevant to the problem of the research topic

2.5. Training of researchers

2.5.1 Do the researchers or others involved in any aspect of this research project require any additional training in order to undertake this research? No

3. PROJECT

3.1. Duration and location

3.1.1 In how many Australian sites, or site types, will the research be conducted? 0

3.1.2 In how many overseas sites, or site types, will the research be conducted? 1

Provide the following information for each site or site type (Australian and overseas, if applicable) at which the research is to be conducted

3.1.3. Site / Site Type 1

3.1.3.1 Site / Site Type Name

Dubai Police (part of Dubai government)

3.1.3.2 Site / Site Type Location

Dubai, United Arab Emirates (UAE)

3.1.4. Provide the start and finish dates for the whole of the study including data analysis

3.1.4.1 Anticipated start date 15/07/2008

3.1.4.2 Anticipated finish date 01/05/2009

3.1.5 Are there any time-critical aspects of the research project of which an HREC should be aware? No

3.2. Research plan

3.2.1 Describe the theoretical, empirical and/or conceptual basis, and background evidence, for the research proposal, eg. previous studies, anecdotal evidence, review of literature, prior observation, laboratory or animal studies. NS 1.13

Many governments around the world have a poor reputation in the level of services they provide [Bassara, Wisniewski and Zebrowski 2005:204]. Problems with traditional government provision include:

1. The low throughputs involved with traditional communication channels which are expensive to operate and require intensive human processing;
2. The lack of a single point of contact with government
3. Staff overload involving repetitive and manual tasks at government offices which are time consuming and affect worker morale.

The rapid development of Information and Communication Technologies (ICTs) coupled with the desire to overcome traditional government limitations and so improve government functions and services, are factors driving many governments, including the UAE government and Dubai government as part of the UAE government, towards electronic government (e-government) [Ndou 2004:1]. The e-government initiative aims to deliver government information and services to citizens, businesses, employees and other government departments twenty-four hours a day, seven days a week through a single government portal.

There are many problems and limitations associated with both traditional and e-government. Such problems and limitations have led some governments to shift their attention to mobile government as the target of e-government [Sharma and Gupta 2004:1]. Mobile government (m-government) is a subset or a complement to e-government through the utilization of the different mobile and wireless technologies, services, applications and devices. The aim of m-government is to provide information and services to citizens, businesses, employees and government units and create more opportunities for citizens to participate [Kushchu and Kuscu 2003:1-2]. This means to use mobile and wireless technologies to provide government information and services.

The UAE e-government vision has three goals;

1. To become a world-class e-government,
2. To create a knowledge-based society, and
3. To integrate policy formulation [UAE government 2006 URL].

However, according to UN statistics [United Nations 2005:URL], the UAE ranks 42 in e-government services, and 67 in e-participation. The UAE is thus far from achieving the e-government vision to become a world-class e-government provider.

For countries, such as the UAE, which is in an early stage of e-government, the possibility of implementing m-government as the foundation of e-government is higher than the countries that have significant experience with e-government [Cilingir and Kushchu 2004:818]. There are multiple drivers to towards mobile technology. For example, there is a high penetration of mobile and wireless devices in the UAE: for every 100 people, there are 100.86 mobile subscribers [International Telecommunication Union 2005:URL]. Also, mobile phone penetration is well above PC penetration [Euromedia 2003:1]. Cilingir and Kushchu [2004:818] contend that it is important to include m-government within the scope of e-government in order to have effective, efficient and future government services.

The development of infrastructure based services in this regard is in its infancy [Rossel, Finger and Misuraca 2006:80]. Hence, there is a gap in the knowledge required for the provision of m-government. Thus, my research will analyze and propose key mobile and wireless technologies and their application in order to build a foundational model of m-government for the Dubai police as part of the Dubai government.

3.2.2 State the aims of the research and the research question and/or hypotheses, where appropriate.

The objective of my research is to identify and propose m-government infrastructure, services, applications and devices for the transformation of the Dubai government to mobile government for the next five years. This is related to the research question "What are the service enablers for the transition of Dubai government to a mobile government over a five year period?"

Project aims

The project aims to meet the following objectives.

An identification of the problems and needs of the Dubai police to enhance services and citizens participation,

The identification of current and emerging mobile and wireless technologies, applications and services for the Dubai police in order to create a competitive and more participative UAE society,

The development of a policy document proposing the mobile government infrastructure for Dubai Police for the ensuing five years to enable standardized development of mobile e-government services.

3.2.3 Describe how the research design and the methods to be used will enable the research aims to be achieved.

The objective of my research is to identify and propose m-government infrastructure, services, applications and devices for the transformation of the UAE government to mobile government for the next five years. Mobile government (m-government) is a subset or a complement to the electronic government (e-government) through the utilization of the different mobile and wireless technologies, services, applications and devices to provide information and services to citizens, businesses, employees and other government units and create more opportunities for citizens participation [Kushshu & Kuscu 2003:1-2]. This is related to the research question "What are the service enablers for the transition of Dubai government to a mobile government (m-government) over a five year period?"

In order to solve the research question, I am using the following work plan for the research:

- 1) Literature Review that includes identifying the research problems, the current position of mobile government around the world, and identification of the key current and emerging mobile and wireless service enablers. This concentrates on research on today's technologies, up to the end of 2007. I have identified candidate key mobile and wireless service enablers that could be useful for Dubai Police. Reviewing literature helped me to find that there is a gap in knowledge required for the provision of the mobile government (m-government)
- 2) Data gathering in the field, from Dubai Police as part of the Dubai Government, from research participants (internal and external to Dubai Police), through interviews and questionnaires, in order to find out about their strategies, service delivery problems and their needs.
- 3) Determination of appropriate services enablers, this will involve in-dept review of mobile and wireless technologies and applications in the light of information gathered in 2) above and the possibilities of using them as part of the m-government;
- 4) Developing a policy paper recommending an appropriate strategy for Dubai police to adopt

m-government.

I am following the Soft System Methodology (SSM) which is one of the well-known methodologies for information system development (Oura and Kijima 2002:77) and one of the most widely used methodologies in many parts of the world (Rodriguez-Ulloa and Paucar-Caceres 2005:5). It has been used in the public sector and in industry (Crawford and Costello 2000).

SSM is an interpretive approach to solve organizational problems (Crawford and Costello 2000); in my case is Dubai Police service delivery problems. It is applied to the early stages of IS development to identify problems and propose corrective actions (Oura and Kijima 2002:79). I choose SSM methodology because it focuses on making system development as a subset of the problem solving (Panagiotidis and Edwards 2001:215).

SSM offers a methodology to deliver multiple views of the problem situation and launch a new product (such as m-government) that can be seen differently by different people (Christis 2005: 12). SSM is involved in my research in the definition of what problems need to be solved, clarification of problems that exist in order to define the options for improvement (Sofer and McIntosh 2004:235). In order to develop an information system effectively, the real problem situation should be examined through 'whats' and 'hows' of the problem before making an effort for a solution (Walters, Broady and Hartley 1994).

SSM is divided into seven stages (Checkland 1981). These are:

1. Problem situation unstructured. In this stage, it is discovered by the researcher, that there is a need to review or change the way the work or task is performed. There is a problem or space for improvement. So, the researcher gets understanding and wider view of the problem. In this stage, I found that there is a need to improve the services provided by Dubai Police through m-government.
2. Problem situation appreciated. The researcher collects information from as many as possible and sorts the information and provide description of the problem. Information will be collected through interviews and questionnaires. The sample size is between 100 and 120. I will be conducting questionnaires with research participants (internal and external to Dubai Police). Also, I will be conducting semi-structured interviews with research participants pertinent to experiences, opinions, information and feelings about the current information and services provided by Dubai police. I am going to have interviews with research participants from Dubai Police at different level in order to determine the services currently delivered with specific reference to
 - The strategic vision of Dubai Police to increase the effectiveness of service delivery.
 - The problems and needs of Dubai Police to enhance services and citizens participation.
3. Root definition: In this stage, the root definitions are developed, which are the basic descriptions of the proposed system. It gives explanations of potential information systems that are then used to choose the needed and suitable ones. (Rose 2002:251). I identified different key mobile and wireless services enablers, and I am going to choose the suitable ones for Dubai Police. In this stage.
4. Conceptual model: Soft System Methodology involves developing conceptual model on how the system should operate so it can be compared to the real world situation (Ingram et al. 1997:119). In this stage, I attend to match the needs and service delivery problems of Dubai police (discovered through information collection from research participants) to find an appropriate match between Dubai police provision and mobile and wireless services enablers technologies and applications. I propose to undertake a cost-benefit analysis and quantify the cost of the transition to the relevant m-government provision.
5. Comparison conceptual model with real world: Compare the real world with conceptual model to see the similarities and differences and what has been changed. In this stage, I am going to compare my proposed system to what is currently available at Dubai Police to see the similarities and differences and what has been changed with the new system.
6. Feasible and desirable change: All changes recommended and proposed as part of m-government solution for Dubai police are discussed and expressed and a plan of schedules is developed, and the requirements are prioritized.
7. Action to improve the situation. It is considered the development and implementation phases. In this stage, I will develop a policy paper recommending an appropriate strategy for Dubai police to adopt m-government.

3.3. Research significance

3.3.1 What is the value of answering the research question and conducting the project? NS 1.13 NS 1.14 NS 1.15

Mobile government (m-government) can deliver information solutions for Dubai police as part of Dubai government and improve government through information technology for the benefit of the citizens.

M-government has the capacity to solve traditional and electronic government problems, provide a perfect environment for employees as it is not restricted to a wired network. It also provide an opportunity to improve the internal processes of government, provide citizens with convenient access to information any time anywhere and helps to reduce costs.

The proposed research project adopts the transdisciplinary perspective of Mode-2 knowledge production by exploring multiple disciplines in research relevant to technology, government, business and society: that is, socially robust knowledge production.

The value of answering the research could create value for the wider community. So, the solution could be probably useful in similar situations in other places or countries.

Also, Central Queensland University could benefit from this project, as this research outcomes may generate further research questions.

It will be useful for the researcher to answer the research question and gain in-depth knowledge in the area of the m-government.

3.4. Peer review

3.4.1 Has the research proposal, including design, methodology and evaluation undergone, or will it undergo, a peer review process? No

3.4.1.2 Explain why the research proposal will not undergo a peer review process.

It will be reviewed by the supervisor

Also, The Scope of the research has been agreed upon at the professional Doctorate Colloquium and also by the supervisor

The following questions sets (Q 3.5 – 3.11) relate to the collection, use and disclosure of information for research purposes. In answering these questions please ensure that you address all issues relevant to the type of project and type of participants that will be involved in your research project. Refer for guidance to relevant chapters of the National Statement, NEAF Guidance and other NHMRC guidelines as appropriate.

3.5. Source and description of information about participants

3.5.1 Indicate the source of the information about participants which will be used in this research project.

- ☒ Information will be collected directly from the participant.
- ☐ Information will be collected from another person about the participant
- ☐ Information will be collected by accessing a record or an information database held by an organisation other than your organisation.
- ☐ Information will be used which you or your organisation collected previously for a purpose other than this research project.

3.5.1.1.0. Information which will be collected for this research project directly from the participant

3.5.1.1.1 Describe the information that will be collected directly from participants. Be specific where appropriate.

The main information that will be collected is about the strategic vision of Dubai Police (as the selected department of Dubai government). Also, information will be collected about the problems of information and services delivery and needs of the Dubai Police services. Also, information will be collected about the current information technology system and the services it delivers. This include experiences, opinions and information about the Dubai Police environment and services. This will cover the services that are currently provided by Dubai Police through traditional and electronic means. (See the attached questionnaire)

3.5.1.1.2 The information collected by the research team about participants will be in the following form(s). Tick more than one box if applicable.

- ☒ Identified
- ☐ Potentially identifiable (coded)
- ☐ De-identified

3.5.1.1.2.1 Give reasons why it is necessary to collect information in identified or potentially identifiable (coded) form.

The researcher will conduct interviews, which is considered identifiable. Interviews will help to get as much information as possible from the right people in order to collect the right and needed information from the right people. The researcher ensuring that the data collected will not be released to Dubai Police

Department and will not use and direct quotations from the interview which could reflect either the position held by the participant or the geographic location of his/her workplace

3.5.1.1.3 Will consent be sought from participants (or for participants from persons with legal authority) for the collection and use of information about them? Yes

3.6. Use of information about participants

3.6.1 Describe how information collected about participants will be used in this project.

The collected information (needs, services problems, improvements required, feelings, opinions about the current Dubai police services) will be used to identify the main problems of information and services delivery with Dubai Police. Then, These problems and needs will be matched with the needed and proposed service enablers (applications, technologies and services) as part of the proposed mobile government solution for Dubai Police.

3.6.2 Will any of the information used by the research team be in identified or potentially identifiable (coded) form? Yes

3.6.2.1 Give reasons why it is necessary to use information in identified or potentially identifiable (coded) form.

It is necessary to gather information in identified form to get the required information. The information will not include any identification information (no names). The information will be used just for the purpose of the research and for any related publications and will not be used for any other purpose.

3.6.2.1.2 Indicate whichever of the following applies to this project:

- ☒ Information collected for, used in, or generated by, this project will not be used for any other purpose
- ☐ Information collected for, used in, or generated by, this project will/may be used for another purpose by the researcher for which ethical approval will be sought.
- ☐ Information collected for, used in, or generated by, this project is intended to be used for establishing a database/data collection/register for future use by the researcher for which ethical approval will be sought.
- ☐ Information collected for, used in, or generated by, this project will/may be made available to a third party for a subsequent use for which ethical approval will be sought

3.6.4 List ALL research personnel and others who, for the purposes of this research, will have authority to use or have access to the information and describe the nature of the use or access. Examples of others are: student supervisors, research monitors, pharmaceutical company monitors .

The researcher who is the prime person doing the research

Student supervisors: Dr. Rohan De Silva will have access to the deidentifiable information, to provide help and advice for the student in the research.

Industry Advisor: Badran Saeed Al Shamsi, head of Human Resource Development in Dubai Police, will ensure that the information gathering and use by The researcher will be performed ethically according to the guidelines specified in the ethics clearance application he will be making to the CQU and any conditions specified by the ethics committee of CQU. He will also help to provide access and necessary advice in the workplace.

The information will be used just for the purpose of the research and for any related publications and will not be used in other cases.

3.7. Storage of information about participants during and after completion of the project

3.7.1 In what formats will the information be stored during the research project? (eg. paper copy, computer file on floppy disk or CD, audio tape, videotape, film)

Interview and questionnaire will be stored as computer files on personal computer at home and on USB memory)

3.7.2 Specify the measures to be taken to ensure the security of information from misuse, loss, or unauthorised access while stored during the research project? (eg. will identifiers be removed and at what stage? Will the information be physically stored in a locked cabinet?)

- Notes from the interviews will be typed directly on a electronic document file on the personal computer and the paper notes will be destroyed directly.

- Questionnaires [paper copies] will be scanned and saved as a computer file and the paper copies will be destroyed. Questionnaires [electronic version] will be saved as an electronic copies

- There will be two electronic copies, one on the personal computer [at home] and the second copy as a backup on a USB. The copy on the personal computer are password protected. The USB is protected by fingerprint. So, this will protect the information from unauthorized access.

The personal computer are kept in a secure room that prevent unauthorised access.

Each saved interview and questionnaires will be identified by in ID, and no names will be stated or mentioned in the saved files. A table will be created that have an ID and the person who is interviewed or who have the questionnaire and will be saved as an electronic file stored on separate USB that is stored in safe place. This table will be used to identify the data provided by individual participants in case they would like to withdraw their data. So, interviews or questionnaires will not include names in order to protect their identities and their information.

3.7.3 In what formats will the information be stored after project completion? (eg. paper copy, computer file on floppy disk or CD, audio tape, videotape, film)

There will be two electronic copies, one on the personal computer [at home] and the second copy as a backup on a USB.

The stored information are processed data and are deidentifiable .

3.7.4 Specify the measures to be taken to ensure the security of information from misuse, loss, or unauthorised access while stored after project completion (eg. will identifiers be removed and at what stage? Will the information be physically stored in a locked cabinet?)

- There will be two electronic copies, one on the personal computer [at home] and the second copy as a backup on a USB. The copy on the personal copy are password protected. The USB is protected by fingerprint, so in order to access to the information, the user fingerprint will provide the mean of of access. So, this will protect the information from unauthorized access.

The personal computer is kept in a secure room that prevent unauthorized access.

3.7.5 The information which will be stored at the completion of this project is of the following type(s). Tick more than one box if applicable.

- ☐ Identified
- ☐ Potentially identifiable (coded)
- ☒ De-identified

3.7.6 For how long will the information be stored after the completion of the project and why has this period been chosen?

The process data will be kept until finishing the degree of the Professional Doctorate and for any related publication. Data will be stored for five (5) years in accordance with CQU Code of Conduct policy. Then it will be destroyed.

3.7.7 What arrangements are in place with regard to the storage of the information collected for, used in, or generated by this project in the event that the principal researcher ceases to be engaged at the current organisation?

All information will be stored at the the researcher personal computer at home or on the finger print protected USB. So all information collected will be secure and no information will be stored at the organization.

3.8. Ownership of the information collected during the research project and resulting from the research project

3.8.1 Who owns the information collected for the research project?

Student researcher normally own the data that he collect

3.8.2 Who is understood to own the information resulting from the research, eg. the final report or published form of the results?

The principle owner of the result from the research is the researcher. The university also own the result of the information [the research] as part of the Professional Doctorate Degree.

3.8.3 Does the owner of the information or any No

other party have any right to impose limitations or conditions on the publication of the results of this project?

3.9. Disposal of the information

3.9.1 Will the information collected for, used in, or generated by this project be disposed of at some stage? Yes

3.9.1.1 At what stage will the information be disposed?

The information will be disposed after finishing the research and any related publication and after completing the degree of the Professional Doctorate. The Central Queensland University requires that data should be stored for five (5) years in accordance with CQU Code of Conduct policy.

3.9.1.1.2 How will information, in all forms, be disposed?

The information will be deleted from the personal computer [at home] and from the USB and the drives will be reformatted.

3.10. Reporting individual results to participants and others

3.10.1 Is it intended that results of the research that relate to a specific participant be reported to that participant? No NS 1.18

3.10.1.2.1 Explain/justify why results will not be reported to participants.

The results will be part of the thesis. Also, a policy document will be submitted to Dubai police as a solution, and not to a specific participant. However, the participant will receive a summary of the results of the research but not that relates to any specific participant.

3.10.2 Is the research likely to produce information of personal significance to individual participants? No

3.10.3 Will individual participant's results be recorded with their personal records? No NS 1.20

3.10.4 Is it intended that results that relate to a specific participant be reported to anyone other than that participant? No

3.10.5 Is the research likely to reveal a significant risk to the health or well being of persons other than the participant, eg family members, colleagues? No

3.11. Dissemination of Final Results

3.11.1 How is it intended to disseminate the results of the research? eg report, publication, thesis

Thesis as a requirement of the Professional Doctorate Degree.

As policy paper document to Dubai Police. Also, any conference or a journal publication that results from this research.

3.11.2 Will the confidentiality of participants and their data be protected in the dissemination of research results? Yes NS 1.9

3.11.2.1.1 Explain how confidentiality of participants and their data will be protected in the dissemination of research results

No identification information about participants will be recorded.

No names will be included on any results of the project.

Participants comments and opinions will not be linked with names of individuals or with any identifying data in the report or any article.

The researcher ensuring that the data collected will not be released to Dubai Police Department and will not use and direct quotations from the interview which could reflect either the position held by the participant or the geographic location of his/her workplace. Dubai Police will receive a policy paper document proposing the m-government solution but will not include any actual comments under any names or any information that identify or link to participants. So, it will not be possible to identify participants.

3.11.3 Is there a risk that the dissemination of results could cause harm of any kind to individual participants - whether their physical, psychological, spiritual, emotional, social or financial well-being, or to their employability or professional relationships - or to their communities? No

3.12. Benefits/Risks

In answering the following questions (Q 3.12.0 - 3.12.8) please ensure that you address all issues relevant to the type of participants that will be involved in your research project. Refer for guidance to relevant chapters of the National Statement and other NHMRC guidelines as appropriate.

3.12.0 Does the research involve a practice or intervention which is an alternative to a standard practice or intervention? Yes

3.12.0.1.1 Explain how the practice or intervention differs from standard practice or intervention.

I am proposing a new and a complement mean of providing government information and services through mobile and wireless technologies. It is not going to replace the current way of providing services, but it is going to provide a new mean and complementary channel to provide Dubai police services. It may seem that it will lead to losing jobs as a result of taking up a new technology. However, the current way of providing services will not be changed or replaced as the recommended solution will be a complement and a new channel to the current way of providing services. Also Dubai Police has provided a letter stating that employees status or position will not be affected as the result of participating or implementing the research results (letter attached). Dubai police will not obligate any employee to change his work and will provide them with the choice to stay with their current work position or move to a new position required to provide the new services, once the research proposals and results are accepted and Dubai Police is willing to implement the m-government solution proposed by the researcher. Also, if an employee decided to move to work with the new system, but he/she is unhappy or unsatisfied with the system, then he/she can return back to his previous work position. Also Dubai Police will ensure that the researcher will not be exposed to risks of harm. Moreover, external research participants will have different means of access to Dubai Police services. So, if they are not satisfied with m-government services, they will have other means of access to Dubai Police such as face-to-face, electronic services and means provided by Dubai Police.

The Mobile government will lead to create new jobs and providing the required training to the current employees.

3.12.1 What expected benefits (if any) will this research have for other members of the population to which the participants belong?

The research will provide new means of access and communication internally within Dubai Police to enhance:

- Services
- The work process
- Productivity
- Work arrangements
- Efficiency
- Decision making process

3.12.2 What expected benefits (if any) will this research have for the wider community?

The proposed solution will help provide services through different channels on Information and Communication Technologies (ICT). So the people from the wider community will have the choice to select the preferred mean of access to Dubai police information and services alongside the traditional ones. This provides new means of access in getting public services.

3.12.3 What expected benefits (if any) will this research have for participants? NS 1.6

participants are part of other members of population (3.12.1) and part of the wider community (3.12.2). So the benefits mentioned in 3.12.1 & 3.12.2 are applicable.

3.12.4 Are there any risks to participants as a result of participation in this research project? No

3.12.5 Explain how the risks/burdens of participation are balanced by the any benefits of the research.

The participation is voluntary and at their own convenient time and place. Also Dubai Police has provided a letter stating the employees employment status will not be affected as the result of the research undertaken by the researcher. Also. The researcher ensuring that the data collected from research participants will not

be released to Dubai Police Department and will not use any direct quotations from the interview which could reflect either the position held by the participant or the geographic location of his/her workplace. So, participants' identities are protected.

Participants (either internal or external) will have a new mean and channel of services provided by Dubai Police. So they will have more choices to get the services by Dubai Police either by face-to-face, through electronic government services, mobile and wireless services and through other means. Also, m-government will help to create new jobs or provide the opportunity for Dubai Police employees to move and provide the new service. Also, employees will learn new knowledge and skills through the training that will be provided by Dubai Police.

3.12.6 Is it possible that the research will involve the disclosure of unlawful conduct, or concealment of a crime, by individuals or definable groups?

3.12.7 Explain how the dignity and wellbeing of participants takes precedence over the expected benefits to knowledge.

This research does not attempt to investigate or disclose any unlawful or unprofessional activity of any employee or an organization. As such, the questions for the interviews and questionnaires do not include any questions that have adverse effects on participants. These questions were prepared to collect the needed information without harming the participants or the organizations that they work for. Also, the researcher will ensure that the data collected that relates to specific participants will not be released to the Dubai Police Department. The researcher will not use any direct quotations from the interview which could reflect either the position held by the participant or the geographic location of his/her workplace.

3.12.8 Are there any other risks involved in this research? eg. to the research team, the organisation, others

3.12.9 Is it anticipated that the research will lead to commercial benefit for the investigator(s) and or the research sponsor(s)?

3.13. Monitoring

3.13.1 What mechanisms do the researchers intend to implement to monitor the conduct and progress of the research project?

Since the researcher himself will be collecting the data through interviews and questionnaires, the researcher can easily monitor the progress and conduct of the project. To this end, the researcher has organized a work plan that specifies the start and finish for each task. This will help the researcher to have a deadline point for each task and finish the research project on the specified dates. Also the supervisor will check the progress of the work of the researcher.

4. PROJECT SPECIFIC

Your responses to questions at Sections '1.3 - Type of Research' or '1.4 - Research participants' indicate that the HREC will require additional information which is specific to your research project. The following table indicates the question sets relating to the project that you will need to complete. If this is not correct please return to sections 1.3 or 1.4 to amend your answer.

4.10

Research in the workplace

4.11

Research conducted overseas

4.10. Research on workplace practices or possibly impacting on workplace relationships

You have indicated that the project involves research in the workplace.

4.10.0 Indicate at whose workplace the research is to be conducted (tick more than open if applicable): One or more of the investigator's

4.10.1 What is the relationship of the researcher to the workplace, eg. proprietor, student, consultant, employee? Past or present?

The researcher is an employee of Dubai police, and Dubai Police which is part of Dubai government

4.10.2 What is the status in the workplace of all of the proposed participants, eg. Employee, client, consultant?

Research Participants are either internal to Dubai police (employees of Dubai Police) or external to Dubai Police (clients)

4.10.3 What measures will be taken to minimise the risk to workplace relationships?

A permission has been sought and received from Dubai police general department in order to have access and carry out this research at Dubai Police. This will help to minimize the risk to workplace relationships and get the needed approval for access. Then an information sheet and consent form will be sent to each prospective participant, so each of them will have a good understanding about the data collection and the security of that data. Then, they can decide whether to participate or not

4.11. Research conducted overseas

You have indicated that the project involves research conducted overseas.

4.11.5 Will this research project involve access to, use, collection or acquisition of culturally sensitive artefacts? No

4.11.6 Are there local factors which make it problematic to comply with ethical standards expressed in the National Statement No

5. PARTICIPANTS

5.1. Participant description

5.1.1 How many participant groups are involved in this research project? 1

5.1.2 Expected total number of participants in this project at all sites
100-120

5.1.3. Group 1

5.1.3.1 Group name for participants in this group
Research Participants

5.1.3.2 Expected number of participants in this group
100-120

5.1.3.3 Age range
18-60

5.1.3.4 Other relevant characteristics of this participant group
Some of the participants are internal to Dubai Police (employees) and the others are external (clients) to Dubai Police

5.1.3.5 Why are these characteristics relevant to the aims of the project?
The project requires getting information from research participants either internal participants (employees at Dubai Police) from different departments at different levels or external participants in order to get the required information and knowledge to describe the current services and the needs of improvements. So, this will help me to identify the areas that I have to consider when proposing the mobile government solution for Dubai Police. Also the project requires getting information from research participants in order to know the level of satisfaction of the clients and what services they would like to improve or receive

5.2. Participant experience

5.2.1 Provide a concise detailed description, in not more than 200 words, in terms which are easily understood by the lay reader, of what the participants will experience.

The research participants are either internal or external to Dubai Police. The employees of Dubai police from different levels and ranks, are going to be interviewed to know the strategy of their departments, the current services, problems of delivering services, needs, opinions and their plans of providing services. I am going to have semi structured interviews that last between 30-60 minutes. The participant will choose the suitable time and place to have the interview. I am going also to use questionnaires with other research participants (internal or external to Dubai Police) to get their opinions about the current services of Dubai police and what they would like to have received or improved. The number of questions asked during the interview will be around 20 questions. The questionnaires will be sent either by email as an electronic file or by giving the participant a hard copy. It will have approximately 30 questions.

5.3. Relationship of researchers to participants

5.3.1 Specify the nature of any relationship, existing or possible, between the research team or an organisation involved in the research and the potential participants.

Relationship between the researcher with the organization (Dubai Police): employer/employee

Relationship between the researcher and participants:

if the participant is an employee in Dubai Police --> employee/employee

if the participant is from outside Dubai Police --> employee/ Client

Relationship between Dubai police and participant

if the participant is an employee in Dubai Police --> employer/employee

if the participant is from outside Dubai Police --> Organisation/ Client

5.3.2 Describe what steps, if any, will be taken to ensure that the relationship does not impair participants' free and voluntary consent and participation in the project.

First, the industry supervisor (from Dubai Police) have a records of the employees and clients of Dubai Police. So he will identify them and send the invitations letters the includes the information sheet to the prospective participants. Also a consent form that should be signed and returned will be included. The industry

supervisor will have a contact with them in order to know if they accept to participate or not. So, it is up to them to accept or to refuse having the interview or the questionnaires. It is mentioned in the information sheet and consent form that participation is voluntary and the participant can withdraw from the project any time without any penalty/binding or any effect on his job.

If the participant accepts the invitation and would like to participate, then the research participant will answer the questionnaires, or come to the interview (depends on the type of invitation sent either interview or questionnaire)

5.3.3 Describe what steps, if any, will be taken to ensure that decisions about participation in the research do not impair any existing or foreseeable future relationship between participants and researcher or organisations.

Participation are voluntary for all participants. So, participants will have the choice to accept or not. Therefore, this will not have any effect on existing or foreseeable relationship between participants and researcher or the organization. The participant is assured in the information sheet and the consent form that participation will not impair any existing or foreseeable future relationship between participants and researcher or organizations.

5.4. Recruitment

5.4.1 What processes will be used to identify potential participants?

In order to have a complete idea about the current services, research participants will be identified by the industry supervisor (who have a record of the employees and clients of Dubai Police). The industry supervisor will select people from different departments of Dubai police at different level and will request from them to have an interview with the researcher. The researcher is going to concentrate on the following Dubai Police departments:

- ☐ eServices Department
- ☐ Operations Department
- ☐ Community Services Department
- ☐ Information and knowledge department
- ☐ Services & Supplies department

Also the industry supervisor will identify research participants (either internal or external to Dubai Police) to have the questionnaires.

The industry supervisor and the researcher will assure research participants that their identities are protected and the data collected from them will not be released to the Police Department, and will not use any direct quotations from the interviews which could reflect either the position held by the participant, or the geographic location of his/her workplace.

This will help to have an overview about the current services of Dubai police, the areas that need improvements and concentrate on specific departments.

5.4.3 Describe how initial contact will be made with potential participants.

Formal letter of invitation with information sheet, telephone call or by request through direct contact or email by the industry supervisor

5.4.2 Is it proposed to 'screen' or assess the suitability of the potential participants for the study? No

5.4.4 Is an advertisement, e-mail, website, letter or telephone call proposed as the form of initial contact with potential participants? Yes

5.4.4.1.1 Provide details and a copy of text/script. NS 2.24
Attached [letter of invitation/information Sheet]

5.4.5 If it became known that a person was recruited to, participated in, or was excluded from the research, would that knowledge expose the person to any disadvantage or risk? No

5.4.6 Will the research involve the intentional recruitment of any groups whose welfare, rights, beliefs, perceptions, customs or cultural No

heritage requires specific regard? NS 1.2

5.5. Consent process

5.5.1 Will consent for participation in this research be sought from all participants? Yes

5.5.1.2.1 Will there be participants who have capacity to give consent for themselves? Yes

5.5.1.2.1.1 What mechanisms/assessments/tools are to be used, if any, to determine each of these participant's capacity to decide whether or not to participate?

It is voluntary to participate in the research. Each prospective participant will receive a consent form, that should be completed and signed before the interview or completing the questionnaire. So each prospective participant has the choice whether to accept or reject the invitation for participation.

5.5.1.2.1.2.1 Will there be participants who do not have capacity to give consent for themselves? No

The following questions relate to participants who are able to provide consent and also to participants for whom consent may be provided by a person with legal authority to do so.

When answering these questions you need to describe any differences in the processes followed, or the documentation used, for different groups of participants in your proposal, e.g. processes and documentation for users of facilities/services will differ from those for providers of those facilities/services. Where your proposal involves participants with an intellectual or mental impairment, or people in dependent relationships, additional questions about their consent appear at 6.3 and 6.5 respectively.

5.5.1.1.3 Describe the consent process, ie how participants or those deciding for them will be informed about, and choose whether or not to participate in, the project.

First I will get approval from the Dubai police to conduct the research and have access to its departments. Then, each intended participant will get information sheet and consent form. The information sheet will cover details of the project and the nature of the project that participants will be involved in. The participant will be assured also that information collected will be confidential and no names will be recorded. Also it is assured that non-participation will not affect the participant's employment and the participant have the right to withdraw at any time without penalties. The Participant will be contacted by phone or email or by direct contact by the industry supervisor to see if he/she is willing to participate. If so, he will choose the time and place to have the interview. He will complete the consent form before conducting the interview or the questionnaire.

5.5.1.1.4 If a participant or person on behalf of a participant chooses not to participate, are there specific consequences of which they should be made aware, prior to making this decision?

No, there are no consequences from not participating.

5.5.1.1.5 If a participant or person on behalf of a participant chooses to withdraw from the research, are there specific consequences of which they should be made aware, prior to giving consent?

No, there are no specific consequences of which they should be made aware and they have the right to withdraw at any time without any penalties.

5.5.1.1.6 Specify the nature and value of any proposed incentive/payment (eg. movie tickets, food vouchers) or reimbursement (eg travel expenses) to participants.

No remuneration or reimbursement will be received by the participants of this study

5.5.1.1.7 Explain why this offer will not impair the voluntary nature of the consent, whether by participants' or persons deciding for their behalf. NS 1.10

The consent for participation is obtained in a voluntary fashion.

5.5.1.1.8 Provide the name and/or position of the contact person for any concerns in relation to the ethical conduct of the research / complaints process? NS 2.39 - 2.42

[Note There are no ethics approval processes in the UAE...]

For any concerns in relation to the ethical conduct of the research / complaints process.

Please contact Central Queensland University's Office of Research [Tel 61 7 4923 2607, email

ethics@cqu.edu.au] should there be any concerns about the nature and/or conduct of this research project.

Dubai Police has appointed Badran Saeed Al Shamsi, head of Human Resource Development, as an industry advisor. The industry advisor will ensure that the information gathering and use by the researcher will be performed ethically according to the guidelines specified in the ethics clearance application he will be making to the CQU and any conditions specified by the ethics committee of CQU. Also he will provide the access to other departments and the necessary advice when needed.

5.5.1.1.9 Will a participant or person on their Yes

behalf who withdraws from the research be able
to withdraw data about the participant?

6. PARTICIPANTS SPECIFIC

6.1. Research conducted in Australia involving persons whose primary language is other than English (LOTE)

You have indicated that the project involves persons whose primary language is other than English (LOTE)

6.1.1 Describe what steps will be taken to ensure each participant's free and voluntary consent and participation in the project given that the person's language is other than English ? NS 2.26

Not applicable. The research is conducted overseas, not in Australia

6.1.2 In what language(s) will the research be conducted?

☒ English

☒ Other

6.1.2.2.1 Specify the language(s)

Arabic

6.1.2.2.2 Will an interpreter to be present during discussions with the participants about the research project? No

6.1.2.2.2.1 Why will an interpreter not be present during discussions with participants about the research project?

As the researcher speak both English and Arabic, and participants will speak either English or Arabic.

6.1.3 Will participants be provided with written information in the language in which the research will be conducted? Yes

6.7. Research conducted overseas

You have indicated that the project involves research conducted overseas.

6.7.1 In what language(s) will the research be conducted?

☒ English

☒ Other

6.7.1.2.1 Specify the language(s)

Arabic

6.7.1.2.2 Will an interpreter to be present during discussions with the participants about the research project? No

6.7.1.2.2.1 Why will an interpreter not be present during discussions with participants about the research project?

As the researcher speak both English and Arabic, and participants will speak either English or Arabic.

6.7.2 Will participants be provided with written information in the language in which the research will be conducted? Yes

6.7.3 Describe the procedures by which overseas participants can obtain further information or complain about the research project?

They will get contact details of the researcher if they would like to get further information such as sending email to the researcher email address[s0069314@student.cqu.edu.au]. So participants can contact the researcher for any information required. Also, for any complaints, participants can contact the researcher for any complaints and he will try to solve the problems. Or they may contact Central Queensland University's Office of Research [Tel +61 7 4923 2607 or Email ethics@cqu.edu.au] should there be any concerns about the nature and/or conduct of this research project. They can also contact the industry supervisor from Dubai Police. The industry supervisor will receive participants responses, questions and complaints about the research. The responses and questions will be handled by the researcher.

6.7.4 What cultural sensitivities are relevant to the participants in this research project?

There are no cultural sensitivities relevant to the participants in this research

7. RESOURCES

7.1. Project Funding / Support

7.1.1. Indicate how the project will be funded? Indicate whether funding is confirmed or sought and whether there will be a budget shortfall.

7.1.1.1. External competitive grant

7.1.1.1.1 Confirmed or Sought? Not Sought

7.1.1.2. Internal competitive grant

7.1.1.2.1 Confirmed or Sought? Not Sought

7.1.1.3. Sponsor

7.1.1.3.1 Confirmed or Sought? Not Sought

7.1.1.4. By researcher's department / organisation

7.1.1.4.1 Confirmed or Sought? Not Sought

7.1.1.5. Other

7.1.1.5.1 Confirmed or Sought? Not Sought

7.1.1.6. Shortfall

7.1.1.6.1 Confirmed or Sought? Not Sought

7.1.2 Will the project be supported in other ways eg. in-kind support/equipment by an external party eg. sponsor No

7.2. Duality of Interest

7.2.1 Describe any commercialisation or intellectual property implications of the funding/support arrangement.

No funding or support arrangement.

7.2.2 Does the funding/support provider(s) have a financial interest in the outcome of the research? NS 2.21 No

7.2.3 Does any member of the research team have any affiliation with the provider(s) of funding/support, or a financial interest in the outcome of the research? NS 2.21 No

7.2.4 Does any other individual or organisation have an interest in the outcome of this research NS 2.21 No

8. APPROVALS

8.1. Ethical review

Some HRECs may require researchers to provide information additional to that contained in a NEAF proposal. For this reason, it is prudent to check whether the HRECs to whom you propose to submit this proposal require additional information.

8.1.1 To how many Australian HRECs
(representing site organisations or the
researcher's organisation) is it intended
that this research proposal be submitted? 1

A list of NHMRC registered Human Research Ethics Committees (HRECs), along with their institutional affiliations and contact details is available on the NHMRC website at the following web address; <http://www.nhmrc.gov.au/ethics/human/hrecs/information.htm#s4>.

8.1.1.1. HREC 1

8.1.1.1.1 Name of HREC Central Queensland University's Human Research Ethics
Committee (EC00158)

8.1.1.1.1.1. Provide the start and finish dates for the research for which this HREC
is providing ethical review.

8.1.1.1.1.1.1 Anticipated start date or date range 15/07/2008

8.1.1.1.1.1.2 Anticipated finish date or date range 01/05/2009

8.1.1.1.1.2 For how many sites at which
the research is to be conducted will this
HREC provide ethical review? 1

8.1.1.1.2.1. Site 1

8.1.1.1.2.1.1 Name of site Dubai Police (part of Dubai government)

8.1.1.1.2.2 Which of the researchers involved in this project will conduct the research at this site?

Principal Researcher(s) Associate Researcher(s)

Mr MANSOOR ALRAZOOQI

8.1.2 Have you previously submitted an application, whether in NEAF or otherwise, for ethical review of this research project to any other HRECs? No

8.2. Research conducted overseas

8.2.1 Are there any local requirements which are necessary for the conduct of this research? No

9. DECLARATIONS AND SIGNATURES

9.1 Project Title

The transition of the Dubai government to a mobile government (M-government)

9.2 Human Research Ethics Committee to which this application is made

Central Queensland University's Human Research Ethics Committee [EC00158]

9.3 Signatures and undertakings

Applicant / Principal Researchers (including students where permitted)

I/we certify that:

- All information is truthful and as complete as possible.
- I/we have had access to and read the National Statement on Ethical Conduct in Research Involving Humans.
- the research will be conducted in accordance with the National Statement
- the research will be conducted in accordance with the ethical and research arrangements of the organisations involved.
- I/we have consulted any relevant legislation and regulations, and the research will be conducted in accordance with these.
- I/we will immediately report to the HREC anything which might warrant review of the ethical approval of the proposal (NS 2.37), including:
 - serious or unexpected adverse effects on participants;
 - proposed changes in the protocol; and
 - unforeseen events that might affect continued ethical acceptability of the project.
- I/we will inform the HREC, giving reasons, if the research project is discontinued before the expected date of completion (NS 2.38);
- I/we will not continue the research if ethical approval is withdrawn and will comply with any special conditions required by the HREC (NS. 2.45);
- I/we will adhere to the conditions of approval stipulated by the HREC and will cooperate with HREC monitoring requirements. At a minimum annual progress reports and a final report will be provided to the HREC.

Applicant / Principal Researcher(s)

Mr MANSOOR ALRAZOOQI
Central Queensland University

Signature

_____/____/_____
Date

Mr MANSOOR ALRAZOOQI
Central Queensland University

Signature

_____/____/_____
Date

Supervisor(s) of student(s)

I/we certify that:

- I/we will provide appropriate supervision to the student to ensure that the project is undertaken in accordance with the undertakings above;
- I/we will ensure that training is provided necessary to enable the project to be undertaken skilfully and ethically

Dr Rohan De Silva

Signature

_____/____/_____
Date

Heads of departments/schools/research organisation

I/we certify that:

- I/we are familiar with this project and endorse its undertaking;
- the resources required to undertake this project are available;
- the researchers have the skill and expertise to undertake this project appropriately or will undergo appropriate training as specified in this application.

Title	First name	Surname
Position		Organisation name
Date		Signature

10. ATTACHMENTS

10.1 List of Attachments

Core Attachments	Attachments which may be required/appropriate.
Recruitment/invitation	Copy of advertisement, letter of invitation etc
Participant Information	Copy or script for participant Copy or script for parent, legal guardian or person responsible as appropriate
Consent Form	Copy for participant For parent, legal guardian or person responsible as appropriate For, optional components of the project eg. genetic sub study
Peer review	Copy of peer review report or grant submission outcome
HREC approvals	Copy of outcome of other HREC reviews

Attachments specific to project or participant group	Attachments which may be required/appropriate.
Research conducted in the workplace or possibly impacting on workplace relationships	Evidence of support/permission from workplace where research will be conducted
Research conducted overseas involving participants	English translation of participant information/consent forms Evidence of support/permission from overseas organisations involved in the research
People whose primary language is other than English (LOTE)	English translation of participant information/consent forms
Survey instrument / questionnaire / diary	Copy of instrument/questionnaire/diary pro forma
Interviews face to face	Copy of script/outline

10.2 Participant information elements

Core Elements

Provision of information to participants about the following topics should be considered for all research projects.

Core Elements	Issues to consider in participant information
About the project	Full title and / or short title of the project Plain language description of the project Purpose / aim of the project and research methods as appropriate Demands, risks, inconveniences, discomforts of participation in the project Outcomes and benefits of the project Project start, finish, duration
About the investigators / organisation	Researchers conducting the project (including whether student researchers are involved) Organisations which are involved / responsible Organisations which have given approvals Relationship between researchers and participants and organisations
Participant description	How and why participants are chosen How participants are recruited How many participants are to be recruited
Participant experience	What will happen to the participant, what will they have to do, what will they experience? Benefits to individual, community, and contribution to knowledge Risks to individual, community Consequences of participation
Participant options	Alternatives to participation Whether participation may be for part of project or only for whole of project Whether any of the following will be provided: counselling, post research follow-up, or post research access to services, equipment or goods
Participants rights and responsibilities	That participation is voluntary That participants can withdraw, how to withdraw and what consequences may follow Expectations on participants, consequences of non-compliance with the protocol How to seek more information How to raise a concern or make a complaint
Handling of information	How information will be accessed, collected, used, stored, and to whom data will be disclosed Can participants withdraw their information, how, when Confidentiality of information Ownership of information Subsequent use of information Storage and disposal of information
Unlawful conduct	Whether researcher has any obligations to report unlawful conduct of participant
Financial issues	How the project is funded Declaration of any duality of interests Compensation entitlements Costs to participants Payments, reimbursements to participants Commercial application of results
Results	What will participants be told, when and by whom

Core Elements	Issues to consider in participant information
	Will individual results be provided What are the consequences of being told or not being told the results of research How will results be reported / published Ownership of intellectual property and commercial benefits
Cessation	Circumstances under which the participation of an individual might cease Circumstances under which the project might be terminated

Research Specific Elements

Provision of information to participants about the following topics should be considered as may be relevant to the research project.

Specific to project or participant group	Additional issues to consider in participant information
Research conducted in the workplace or possibly impacting on workplace relationships	Whether employee performance will be measured Whether results (identified or aggregate) will be provided to employer

Appendix VII

List of Acronyms

Acronym	Meaning
CDMA	Code Division Multiple Access
CPF	Central Provident Fund
CPU	Central Processing Unit
CRM	Customer Relationship Management
CSC	Civil Service Commission
CQU	Central Queensland University
EMS	Enhanced Messaging Service
E-government	Electronic Government
E-participation	Electronic Participation
GIS	Geographic Information System
GPRS	General Packet Radio Services
GRP	Government Resources Planning
GSM	Global System for Mobile communications
HQ	Head Quarters
HTML	HyperText Markup Language
ICTs	Information and Communication Technologies
IT	Information Technology
IVR	Interactive Voice Response
IM	Instant Messaging

ITU	International Telecommunication Union
LBS	Location Based Services
LAN	Local Area Network
M-GIS	Mobile Geographic Information System
M-government	Mobile Government
MIM	Mobile Instant Messaging
MMS	Multimedia Messaging Service
MOBESE	Mobile Electronic System Integration
MRM	Mobile Resource Management
M-library	Mobile Library
M-neighbourhood	Mobile Neighbourhood
M-participation	Mobile Participation
M-payment	Mobile Payment
M-procurement	Mobile Procurement
M-student	Mobile Student
M-teacher	Mobile Teacher
MOBESE	Mobile Electronic System Integration
MOBUD	Mobile Public Services
PC	Personal Computer
PDA	Personal Digital Assistant
SMS	Short Message Service
SSM	Soft System Methodology
TBS	Traffic Bilgi Sistemi
TCA	Thematic Content Analysis

TETRA	Terrestrial Trunked Radio
TTF	Task-Technology Fit
UAE	The country of the United Arab Emirates.
UN	United Nations (an international organisation)
USE-ME.GOV	USability-drivEn platform for MobilE GOVernment
W3C	World Wide Web Consortium
WAP	Wireless Access Protocol
WiFi	Wireless Fidelity
WiMAX	Worldwide Interoperability for Microwave Access
WLAN	Wireless Local Area Network
WIM	Wireless Instant Messaging
WSA	Web Services Architecture