Factors affecting mobile commerce acceptance in developing countries: Saudi Arabia

A thesis submitted for the degree of Doctor of Philosophy

By

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Declaration

Some of the material contained herein has been presented in the form of the following publications:

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[C2] Alkhunaizan, A., & Love, S. (2013). An empirical study of the social individual differences on mobile social network service use. *Paper presented at the Proceedings of the European and Mediterranean Conference on Information systems (EMCIS2013),* Windsor, United Kingdom.

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ABSTRACT

When developing and aiming to achieve success in the area of mobile commerce, user acceptance and usage are key aspects for consideration. The key aim of this thesis is to explore a way to understand and explain the issues related to users' adoption of m-commerce, by revision of Ventakesh *et al.*'s (2003) United Theory of Acceptance and use of technology (UTAUT) for the Saudi context. This thesis examines a conceptual model in three studies. The first study aims to empirically validate the research model and hypotheses, by conducting a quantitative questionnaire survey of 574 participants. The results emphasise that cost, effort expectancy and performance expectancy all affect the intention to use m-commerce. In addition, it was found that age has an impact on usage. Subsequently, the author narrows down to confirm the finding and applies the same revised model to an m-commerce application, a mobile network service. The study collected data from 363 participants, and confirmed the findings. Based on the first and second study results, the first model was revised to remove insignificant factors, and a personal innovativeness construct was added. The incorporation of this aspect was dependent on the findings from the other studies. The new revised model was examined on one social network service, namely Twitter, with 1,252 participants being surveyed. The final result was that all the hypotheses were supported, emphasising that Personal innovation, Cost, Performance expectancy and Effort expectancy all considerably affect the intention to use Mobile Social Network Services (MSNS's). In this regard, usage intention actually decides utilisation. The outcomes from this research are considered valuable in the fields of m-commerce and telecommunications. This research has created a conceptual model for studying m-commerce in Saudi Arabia. The theoretical and practical implications of the findings have been discussed and offer recommendations for future research directions.

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Factors affecting mobile commerce acceptance in developing countries: Saudi Arabia

Chapter one

Introduction

1.1. Introduction

The growth of information and communication technologies (ICT) seems to have had a significant impact on everyday life. It is believed that the role that ICT plays in today`s world environment is as important as electricity and water. Especially in the few years (Smart phone revolution), the cultural fabric has been significantly impacted by this phenomenon, allowing us to enter a newly digitized world, with electronic systems, online shopping, contacts made on cloud and automated systems in full swing.

The ICT domain has played an evident role in generating employment, together with fiscal progress in many countries. ICT is now considered a major source of capital, ultimately converting the economy by manipulating the business and education sectors, which have consequently become more efficient. This scenario is recognised as having a multiplier effect on commercial evolution and employment. In the ICT sector, direct impacts have become overshadowed by the appearance of these indirect effects, which are now part of worldwide ICT procedures.

Smart phones and new mobile gadgets with robust Internet technologies have currently transformed the old-fashioned market into an innovative marketplace, known as mobile commerce services. Hence, customers have a broader and more diverse area in which to accomplish their desired tasks. For instance, users can enjoy dynamic online games, send and receive messages, carry out business, shop

electronically, buy a variety of tickets and chat remotely with friends using mobile services. Mobile commerce services vary from basic features like Short Messaging Services (SMS) to indefinite cutting-edge features (Islam *et al.*, 2011;Benou and Bitos, 2009; Huang, Liu and Wang, 2007), such as mobile socializing, mobile wallet, mobile retailing and purchasing, with mobile ticketing services all available. Users of these powerful technological gadgets have customized options to manage their tasks.

Constant progress is being made by experts to enhance the features of mobile technologies like mobile gadgets (e.g. colour schemes with screen resolution) and mobile networks (e.g. the LTE and 3G). Mobile tools have been transformed into interactive computing gadgets, with the provision of optimized solutions that can smartly manage sound, images, video and other types of multimedia programmes. In the past, such devices were only simple voice transfer and receiving machines. With the introduction of new features, cell phones are now commonly used by large communities to meet daily needs, whereas in the past, these phones were expensive and had limited functionality, unlike in the modern scenario. According to ITU estimates, there will be approximately 6.8 billion mobile-cellular subscriptions by the end of 2013, which is considered to be almost equal to the number of people world-wide.

M-commerce trading zones have become most powerful areas in countries such as the USA, the UK, Korea and Japan, because advancements have been made with regard to mobile skills development, user friendly technologies, availability, speedy expansion of consumer bases and improved, cost-effective measures. The domain of m-commerce applications has led to some studies on rapidly developing countries

(Chong, 2012). Saudi Arabia is one such kingdom, emerging into the field of mobile gadgets and infrastructure management; this study has in particular a major focus on countries like Saudi Arabia.

In accordance with the literature on mobile commerce adoption and usage by individuals, the research presented in this thesis places emphasis on the factors that relate to consumer acceptance. Through conceptualization within an m-commerce adoption model using the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.,* 2003) as a theoretical base, this study helps in providing a better understanding of citizens‘ adoption of m-commerce in Saudi Arabia.

1.2. Importance of the research

The beginning of the 21st century is considered as the start of m-commerce, mobile technology and cloud computing, while the era of the late 1990s was about e-commerce and internet technology. The 1980s were, on the other hand, considered to be the age of personal computing machines (Min, Ji and Qu, 2008). M-commerce ensures a wonderful market gateway for consumers and businesses, but the sure gains have not yet been announced. Some countries, especially Saudi Arabia, report limited m-commerce services with respect to mobile subscribers. Saudi Arabia ranks first, with 186% mobile subscribers (CITC, 2011). The level of services offered in m-commerce is still insignificant, compared to other countries like the USA, the UK, Korea and Japan.

1.2.1 The aim of the research

The key aim of this thesis is to explore a way to explain and understand the issues related to users' adoption of m-commerce, by the revision of Venkatesh *et al.'s* (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) model for the context of Saudi Arabia. The IT acceptance models, including UTAUT, were initially created for personal computers or/and static line internet apps, because the said model cannot be applicable to m-commerce users, without significant modifications (Min, Ji and Qu, 2008) .

1.2.2 Research objectives

- This research is based on a comprehensive and detailed review of the literature, to develop a deeper understanding of m-commerce adoption issues.

- It seeks to develop an initial theoretical model and research hypotheses to study m-commerce adoption in Saudi Arabia, based on UTAUT with two additional constructs, namely Cost and Trust, which have an effect on user intention. This model also follows Dwivedi and Lal's (2007a) proposition, which considers gender, age and education level as independent social variables.

- From this revised model, the first study aimed to empirically validate the research model and hypotheses, by conducting a quantitative questionnaire survey in Saudi Arabia. The author discusses the results in this study.

- Subsequently, the author narrows down and applies the revised model to one m-commerce application, a mobile social network service.

- Based on the first and second study results, the first model was revised to remove insignificant factors, and a new construct was added. The new revised model was examined on one mobile social network service, namely the Twitter mobile application (m-twitter).

This approach allowed the study to gain a good understanding of m-commerce service delivery practices in a real-life context, and offered a perspective on the factors that affect mobile commerce acceptance in Saudi Arabia, and, at a broader level, across other developing countries.

1.2.3 Research contributions and novelties

This research is ground breaking on a number of counts. The first one is that previous research suggested that UTAUT might be integrated with other acceptance theories, or with new constructs added to improve understanding of consumer acceptance and usage (Lai and Lai, 2013; Xiaolu Cheng and Luzhuang Wang, 2010; Shin, 2009; Tao Zhou, 2008; Zhou, 2008; Chong, 2012). This research model is based on previous work in the literature and, to the best of the author`s knowledge, is novel. It aims to better predict and explain user acceptance and usage of m-commerce.

The second novelty derives from the industry point of view: mobile commerce service providers are making efforts to identify the m-behaviour of users internationally, although most studies concentrate on emergent nations like the UK, the USA and China. The procedures, performance and behaviour of users were not observed in many countries apart from those. There is a significant lack of research in online acceptance in general, even in countries with enormous economies like Saudi Arabia, which has 186% mobile subscribers, representing the largest usage in the world (CITC, 2013).

Chong *et al*. (2012) claim that only the developed nations are emphasized in this irresistible stream of technological study. M-commerce as a specific area received only minor focus, irrespective of the fact that the emerging nations are quite advanced in IT-based operations. Indeed, research scientists have not observed any other study regarding m-commerce applicability and recognition in the Kingdom of Saudi Arabia.

Finally, the impact of personal innovativeness is assessed statistically. Based on the author's knowledge, no other study was observed to measure this particular factor statistically in Saudi Arabia.

1.3. Research motivation

In the last hundred years, in Saudi Arabia and numerous other developing countries, there was a shortage of adequate customer services provided by the private sector, due to neglect and a number of other aspects and reasons that led to poor service and delivery structures.

Firstly, the number of competitors in some sectors was close to zero. For example, there was a single electricity supplier, one phone provider, one airline company and only twelve banks. In a number of other industries, there were only one or two key stakeholders, or there was only one centrally-owned firm through which services were provided. Secondly, because there were no rules to protect customers, greedy traders exploited the public. There were even imprecise and unfavourable guidelines regarding client rights. Thirdly, complaints by clients were not encouraged in the Saudi community. Saudi Arabia made great efforts to join the World Trade Organisation (WTO) between 2000 and 2003. As a result, a number of local firms were concerned about infiltration by multinational companies via the open marketplace. This led to a rise in the value of customer dedication and satisfaction, as firms began to accept that the key approach to attaining new customers and maintaining their customer base was customer care and amenable customer services. To enhance customer care after open internet services became available in 2001, many industries began providing services according to customers' requests, creating superior, quality distribution channels.

Saudi Arabia joined the WTO in 2004, and two airline and two mobile companies bought effective licences worth billions of dollars. Four international banks commenced services directly for the purpose of financing. In addition, international trading firms have been requested by the recently appointed Commerce and Industry minister to establish services in Saudi Arabia, and efforts have been made in terms of contributions to assist companies in bringing about quality improvements. The ministry used Twitter, a social network, to

report any violations perpetrated by the firms; this has led to improvements in numerous industries.

Many local and global firms have slowly come to acknowledge the value of customer care. Multinational and local firms were unaware of the services that were really needed by the Saudi population. Much work still needs to be done on various important matters regarding customer care, such as the issues: “Are appropriate services being provided by the business sector? “Are those services similar to what is required by customers in the West? “Do their hopes differ in terms of desired value and specific price?”

In consideration of all these ambiguities, the researcher took the opportunity to discover, through research, what considerable contribution could be made towards knowledge and management in such matters. Research was therefore conducted regarding customer behavioural modelling apps, in terms of which e-tech services used in developed countries could be applied in lesser developed countries like Saudi Arabia. Firms are nowadays encouraged to make use of m-commerce service technology, so as to provide the utmost care and satisfaction to customers.

1.4. Structure of the thesis

This section provides a brief summary of the eight chapters that make up the thesis.

Chapter two (the next chapter) discusses specific areas from past research. The current position of m-commerce is also outlined.

Chapter three describes in detail the conceptual model used in the thesis.

Chapter four presents, reports, reviews and explains the overall methodologies and approaches utilised in the empirical studies.

Chapter five explains the first study ('What drives m-commerce adoption? An empirical study'), and provides an in-depth description of it. The purpose of the study was to develop and empirically prove the research model and hypothesis. The research techniques, participants and instruments used to gather data for subsequent analysis are described. Finally, it reports, analyses and discusses the findings, and a conclusion to the chapter is given.

Chapter six introduces the second study, which follows the model developed in the first study. This second study focuses on the mobile social network, which is represented as a subset of m-commerce services. A comparison between the findings is its main purpose. The research techniques, participants and instruments used to gather data for subsequent analysis are also described. Finally, it reports and analyses the findings, and a conclusion to the chapter is given.

Chapter seven explains the third study. It follows the model of the first and second studies. A new model is developed to study the twitter mobile application, which is one of the mobile social network services. The key purpose of the research was to conduct a detailed study and empirically assess the new model on one of the most prosperous mobile social network applications in Saudi Arabia.

A synopsis of the research findings from Chapters five to seven are provided in Chapter eight. Then, an analysis of the outcomes of the research is made, which leads to addition to knowledge on the topic of the thesis. The limitations of the study are also observed through this study, and recommendations are provided for future study to improve on the current study.

1.5. Chapter summary

This chapter has briefly presented and explained the motivation behind the research work in this thesis. A background to the research was given, and the importance, aims and objectives of the research were presented. Finally, the structure of the thesis and a brief description of it were supplied.

The next chapter gives detailed and relevant background to the research, providing a backdrop to its aims and objectives.

Chapter Two

Literature Review

2.1. Introduction

Several works relating to m-commerce from past research are discussed in this chapter. They help to focus the PhD thesis within this specific field. This chapter begins with background to m-commerce (Section 2.2). Adoption theories are discussed in Section 2.3, leading to a detailed discussion of the existing m-commerce adoption literature (Section 2.4). Next, it is important to give a generic overview of the country (Saudi Arabia). The main elements of the overview are to provide information regarding its background and some details regarding this research. All this is presented in Section 2.5. Lastly, Section 2.6 is a conclusion and summary of the findings from the literature.

2.2. M-commerce background

In the past few years, the extensive use of mobile devices has continued to increase further. With regard to popularity and numbers of subscribers, the mobile cellular market is the fastest growing telecommunications market. ITU estimates that, by the end of 2009, worldwide mobile cellular subscriptions had reached around 4.6 billion. An equivalent number of subscriptions has not been achieved by any other ICT service, especially in the developing world in such a short time (ITU, 2010).

Sub-section 2.2.1 provides a definition from the standpoint and major classifications of m-commerce. Sub-section 2.2.2 covers the many different

perspectives regarding the application and services of mobile commerce. Sub-section 2.2.3 gives a short overview of this enabling technology.

2.2.1. Definitions

The concept of mobile commerce is regarded as being a complicated development, with capacity to support a number of different activities, such as social interaction, work and gaming, through its use of various services, software and hardware. Such activities and their corresponding supporting technologies are not fixed, but experience change depending on the mobile service in question, the context of use and the criteria of such. As expected, the literature on mobile commerce provides a number of different definitions for the concept. With this noted, the thesis explores the different distinct rationales acknowledged as possible in explaining the differences in definition of mobile commerce, with the definition utilised through this research then highlighted.

Variance of definition may be caused by the perspective from which mobile commerce is viewed, with some academics and investigators in this field adopting a more technical standpoint, where the characteristics of the concept are explained through the definition, as well as the types of connection used. For instance, mobile commerce, otherwise referred to as m-commerce, has been described as remote purchases made through the use of mobile phone- and network-facilitated data connection features (Wolfe and Genin, 2003), as well as transactions carried out through various mobile communications in a wireless environment and over a wireless telecommunications network (Yang, 2005). Others, such as Varshney, Vetter and Kalakota (2000), highlight the

business-related elements of such an innovation, explaining mobile commerce as business transactions carried out whilst 'on the move'. Moreover, the definition offered by Mohsin, Muqtadir and Ishaq (2003a) relates to business-related communication carried out between members of the public and organisations, which does not necessarily comprise transactions of a financial nature. Such a definition does not always refer to the technologies utilised during the transaction, but essentially focuses on business-related applications and the results of such.

The definitions of m-commerce also contrast in terms of their scope, with some scholars tending to provide in-depth descriptions specifying the types of networks and tools used to facilitate technology use, whereas others take a more simplistic approach. One example of the former is that provided by Wu and Wang (2005a), who explain that m-commerce refers to any direct or indirect transaction comprising a monetary value, which is carried out through the use of a wireless telecommunications network; an example of the latter, on the other hand, is provided by Prtm (2003), who states that mobile commerce is wireless commerce. As a further definition, Tiwari and Buse (2007) explain the concept as referring to any transaction involving the assignment of rights to, or ownership of, goods and service use, which is instigated or finalised through the use of mobile access and mobile devices to computer-mediated networks.

Another rationale for the differences in definition may derive from a clear

supposition made by some authors, that m-commerce must comprise the application of the Internet through wireless devices and connections. For instance, m-commerce is explained by Forrester Research as the use of handheld devices with the purpose of communicating, interacting and transacting through the adoption of high-speed connections to the internet (Kauffman and Techatassanasoontorn, 2005). Although it can be seen that this definition encompasses a number of m-commerce services and applications that utilise mobile internet connections, it may be inadequate to include, within this, other potential m-commerce transactions that may not be accessed through conventional internet mobile versions. Examples include mobile commerce transactions carried out through the private networks of vendors, as can be seen through SMS (Short Messaging Services) and MMS (Multimedia Messaging Services (Kauffman and Techatassanasoontorn, 2005).

Other reasons may derive from the fact that mobile commerce could be viewed either as new business or as an extension of electronic commerce to wireless media. With this taken into account, Mohsin, Muqtadir and Ishaq (2003b) point out that the most widely accepted definition of mobile commerce is actually seen to signify the development and expansion of electronic commerce; otherwise stated, m-commerce may be viewed as being a type of e-commerce that is carried out with the use of wireless instruments (Varshney, 2005). Nevertheless, it has been posited by Feng, Hoegler and Stucky (2006) that m-commerce comprises much more than e-commerce, owing to variations in its interaction style, value chain and usage pattern, with

scholars putting emphasis on the fact that m-commerce is an innovative and new business opportunity, and delivers a number of individual characteristics and roles, including wide-ranging reachability and mobility.

The above rationales emphasise the fact that mobile commerce, as an overall concept, is broad and may be explained in various ways. Overall, if an exchange or interaction is to be viewed as an m-commerce-related activity, certain aspects must be involved, namely:

1. A handheld mobile device, such as a smart cell phone, PDA, or any other handheld device that facilitates its user in carrying out a number of tasks, irrespective of time or location.
2. A wireless connection between a network and handheld mobile device.
3. Data exchange through a data-enabled handheld mobile device, such as MDS (Mobile Data Services). Thus, those handheld devices that utilise wireless connections only for the purpose of facilitating voice communications cannot be taken to mean advanced mobile commerce service.
4. A medium or network, such as the internet, a vendor's private network, or other types of network.
5. Services that either directly or indirectly deliver services to consumers.

From the above analysis, we can define m-commerce in this thesis as follows:

M-Commerce is described as being the application of data-enabled mobile handheld devices with the objective to carry out various actions namely communication, entertainment, information gathering, and transactions—that have some monetary value, either direct or indirect, through the use of wireless connections to vendors' private networks or to the internet generally.

It is clear from the above analysis that the concept of mobile commerce encompasses a number of applications and transactions. In this vein, it may also be explained that a transaction does not need to be complex, and may involve only the use of an SMS service; on the other hand, transactions can also be complicated, such as when procuring a product online. Accordingly, through the course of this study, the term mobile commerce, or m-commerce, is used to infer any mobile service that is seen to fall within the aforementioned categories.

In the following sub-sections, the service of mobile commerce is considered and discussed.

2.2.2. M-commerce services and applications

It may be stated that there are an indefinite number of mobile commerce applications, which therefore results in a classification requirement, owing to the fact that, at present, it is not at all possible to encompass the entire range of possibilities (Benou and Bitos, 2009b; Huang, Liu and Wang, 2007).

As recognised by various scholars in the field (Huang, Liu and Wang, 2007 and Autio *et al.* (2001), m-commerce can be categorised according to four different classes of market, namely mobile communication services, mobile financial services, mobile information services and mobile interacting services, as illustrated in Figure 2.1, below.

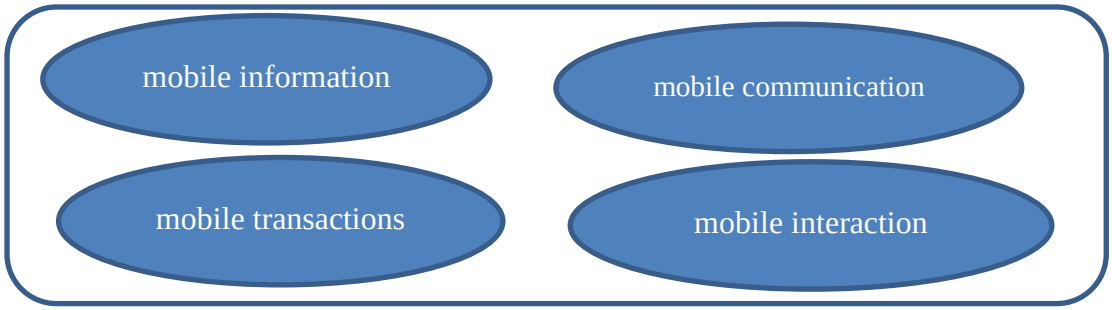


Figure (2.1) M-commerce markets

2.2.2.1. Mobile communication services

Through mobile communication, users are able to interact and make contact with others at any location and at any time. Although short messages and voice messages are, at present, the main type of mobile communication, future mobile devices, such as 4G mobile phones, have the capacity to handle a great deal more data and accordingly to deliver greater ranging bandwidth, so that ever-present communications may be positioned as a fundamental application in the field of mobile commerce, in the form of emails, MMS and SMS.

2.2.2.2. Mobile information services

Owing to the fact that individuals all differ in terms of their preferences and requirements, one key challenge in the field of information systems is to take

advantage of the ease and accessibility offered by handheld devices, which deliver data customised to the owner and in the format required, i.e. local services, games and weather, for example.

2.2.2.3. Mobile interaction services

One of the most important interactive services delivered through mobile commerce is that of entertainment, which may be delivered through games, mobile music and on-demand videos, amongst others. The merging of entertainment, the internet and the telecommunication industries has progressed in terms of establishing innovative new ways of passing the time; thus, it may be stated that entertainment is undergoing a revolution through mobile games. Such games are recognised as being of an interactive nature, enabling players to experience virtual words that are described as 'far more exciting than day-to-day life'.

2.2.2.4. Mobile transaction services

Mobile financial applications are regarded as being one of the most fundamental components of mobile commerce, and may comprise a number of different applications, namely brokerage services, mobile banking, mobile micro-payments and money transfer. Such services could mean a mobile device can act as a business instrument, thus replacing the need to use ATMs, banks and credit cards, with mobile money utilised instead. Undoubtedly, a great deal more effort and innovation is required in order to provide transaction support in regard to such applications and their corresponding network infrastructure. Importantly, secure transactions are necessary before

such applications can be implemented on a wide scale.

It may be considered that the aforementioned four groups comprise a type of umbrella for m-commerce applications and services, owing to the fact that all of these services comprise various types of application. As such, in the following sub-sections, some of the more widely acknowledged and recognised m-commerce applications, including m-advertising, m-banking, m-payments, m-reservations and m-ticketing, can be in more than one category. The sub-sections below discuss some m-commerce applications as examples.

Mobile banking

The applications of mobile banking are recognised as being amongst the most essential m-commerce applications, and represent a new service distribution channel centred on financial entities, as highlighted by Lin (2011) and Benou and Bitos (2009b). Such applications facilitate bank-related transactions, with the easiest and least complex mobile banking solution services delivered through new, delivered channels, with banks able to provide new value-added services through the use of technology, whilst simultaneously decreasing operational expenses, with cell phones, smartphones and PDAs able to deliver account balances, bill payments, fund transfers and history enquiries (Liu and Li, 2011;Benou and Bitos, 2009b; Laukkanen, 2007).

Mobile payments

In the field of mobile commerce, mobile payments is one of the most fundamental applications (Wang and Yi, 2012; Tiwari, Buse and Herstatt, 2008); they are classified as being for paying bills, goods and services with a mobile device through the utilisation of wireless and other communication technologies. Mobile devices may be used in various cases, such as for access to electronic payment services, the purchase of digital content, the payment of parking fees and transportation fares, or to access electronic payment services in order to pay bills and invoices (Dahlberg *et al.*, 2008; Tiwari, Buse and Herstatt, 2008) .

Mobile advertising

One of the central parts of mobile commerce applications is mobile advertising (Tiwari, Buse and Herstatt, 2008), with targeted advertising enabled through the utilisation of demographic data gathered through wireless service providers, and also through identifying the user's current location (Huang, Liu and Wang, 2007). With the initiation of Bluetooth and WiFi technologies, advertisements could be communicated as messages (Aalto *et al.*, 2004); such advertisements are able to be communicated across a number of users in particular areas or to users with particular interests and requirements (Kurkovsky and Harihar, 2006). Such an approach to advertising is described as ‘push’ advertising; there is also a ‘pull’ approach, which enables users to gain access on request to a page embedded with information relating to a product or service. In this regard, a good competitive

edge is maintained by mobile network operators in terms of utilising mobile advertising, having possession of the user's demographic data, as well as information as to his or her location and purchasing habits (Benou and Bitos, 2009b).

Mobile ticketing

One of the most powerful mobile services available at the present time is that of ticket purchasing, where flight tickets can be procured with just one phone call, and instantly confirmed via MMS or SMS (Benou and Bitos, 2009b). Detailed information relating to the transaction, such as the name of the customer, payment method, number of people travelling, date and time of departure and arrival is shown on the ticket. Possible mobile ticket applications include events (concerts, fairs, museums, sports events and theatres), facilities (gyms, solariums and spas) and transportation (boats, buses, ferries, flights, trains and trams).

Mobile reservations

Mobile reservations is one of the most common m-commerce applications and features, as indicated by Wang and Wang (2010), this service enabling customers to access reservations systems to check availability or prices, or to change reservation details. At present, the majority of booking organisations provide special applications for mobile phones, including Trip Advisor and Booking.com, for example.

Mobile Social Network Services (MSNS) applications

MSNS (Mobile Social Network Services) is becoming acknowledged as the future of mobile commerce (Kourouthanassis and Giaglis, 2012), with such services becoming more and more popular amongst users of mobile devices. Such services facilitate communication, and is a topic garnering much attention and research efforts from scholars (Boyd and Ellison, 2010). Various SNSs are currently available, all attracting much worldwide attention.

Some social network services facilitate users in establishing their own networks, through which communication can be enjoyed, whereas others facilitate the forming of groups based on mutual interests or nationalities. Boyd and Ellison (2010) see that social network services enable individuals to create a semi-public or entirely public profile, and detail individuals that share the same interests. Such applications do have some variations in terms of their technological requirements, the business and support processes involved and the types of user targeted.

Revenue can therefore not easily be predicted. Some applications, as can be established from the above, may be considered to fall into two different classes of market, such as in the case of mobile reservations, which could be considered as either information or transaction. In regard to m-social networks, such applications may also be viewed as crossing over different categories, for example communication and interaction. From the usage perspective, it can be noted that differences in usage interest should be

considered as being based on the services provided in that country, leading consumers to make use of them.

As stated by Mohan, Agarwal and Dutta (2012), the average time spent on a mobile device in the United States is 2.7 hours a day. Similarly, around the world, in October 2011, social networking sites were visited by 1.2 billion people (82% of the online global population) (ComScoRE, 2011).

Time spent today on social networking sites is estimated to be one in every five minutes, where the most popular activity is building social relations (Aquino, 2012). Social networking websites were accessed by 45% of active Smartphone holders within the EU5 (the UK, Spain, Italy, Germany and France) in one month (comscoredatamine, 2013). In Germany, monthly mobile-based access to social networking websites increased enormously, by 27% in 2013, as user numbers surged to 19 million from 14 million previously.. In regard to the Middle East, Saudi Arabia in particular, mobile social network services are acknowledged to be the most popular.

2.2.3. Enabling technology

One key example of m-commerce-facilitated technologies is mobile service networks, and these are undergoing continuous development and improvement. During recent times, mobile networks were utilised only or mainly for the transmission of text and voice data; these days, however, such networks have the capacity to transmit data in various formats, including text, pictures and video. Furthermore, a number of fundamental supporting

technologies have also been introduced in regard to handsets and network technologies; there are also a number of other critical developments, namely browsers, operating systems and special device accessories. With the passing of time, mobile technologies have undergone much progression and achieved many developments (Khan *et al.*, 2009).

First Generation

1G was a system that began in the 1970s. The majority of first-generation systems were analogue in nature, with voice the main data transmitted.

Second Generation (2G)

Second generation (2G) systems emerged in the 1980s, and continued to use voice data, although these were mainly digital in nature. Such systems provided circuit-switched data communication services at low speed. This generation's standards were digital in form and commercial-centred. The wireless mobile communication systems of the second generation were a significant development, because the services and technology introduced to users were revolutionary. In addition to high-quality speech service, 2G terminals were widely purchased, because mobility had become global. This generation also introduced GPRS and GSM (Andreas, 2003).

2.5G

2.5G is the intermediate generation between 2G and 3G cellular wireless technologies, with the term adopted in the case of those systems adopting a packet-switched domain as well as the circuit-switched domain. This particular term is not recognised in an official capacity, but is rather utilised for the sake of marketing. Moreover, 2G delivers a number of 3G advantages (packet-switched) and can also utilise various 2G infrastructures in CDMA networks and GSM.

Third Generation (3G)

In order to fulfil increasing demands in terms of network capacity and the rates necessary for high-speed data transfer and multiple applications, 3G technology was developed, with systems within this generation recognised as being a direct improvement by comparison with 2G systems. They are based on there being two corresponding pillar infrastructures, one comprising packet-oriented nodes and the other encompassing circuit-switched nodes. The 3G approach has so far been introduced in many different regions across the globe, although the success of 2G would be difficult to duplicate (Andreas,2003).

Fourth Generation (4G)

It is one of the most well-developed types of mobile technology available at the present time, and delivers greater network and multimedia capabilities. This generation is an amalgamation of all previous generations'

characteristics in terms of delivering data and streamed and voice multimedia at greater speeds (Khan *et al.*, 2009).

Overall, technologies in m-commerce seem to be experiencing much development, irrespective of wireless technologies' restrictions, including data transfer speed (Lu *et al.*, 2008). Ultimately, the main objective of stakeholders within this industry is to achieve customer satisfaction and to deliver services that fulfil their requirements and offer service providers revenue and profit.

Accordingly, and irrespective of the technology applied, mobile commerce places emphasis on consumer satisfaction (Choi *et al.*, 2008). More specifically, it is critical that the market continues to experience growth and development; undoubtedly, consumer-specific elements will encourage consumer demand in the arena of mobile services, regardless of the technology used to facilitate it (Choi *et al.*, 2008). Therefore, it is clear that insight into customer preferences and requirements, as well as the elements encouraging the acceptance and utilisation of the service provided, are fundamental to success within this market. There are a number of academic writers in this field, such as Chong *et al.* (2010), Wang and Wang (2010), Kuo and Yen (2009), Lu *et al.* (2008), Zhou (2008) and Luarn and Lin (2005). All hold the belief that enhancing insight into the factors impacting the behaviours and acceptance of new mobile service users is essential if continuous development within the mobile services market is to be achieved.

The section to follow provides a discussion of the most well-known theories in IT.

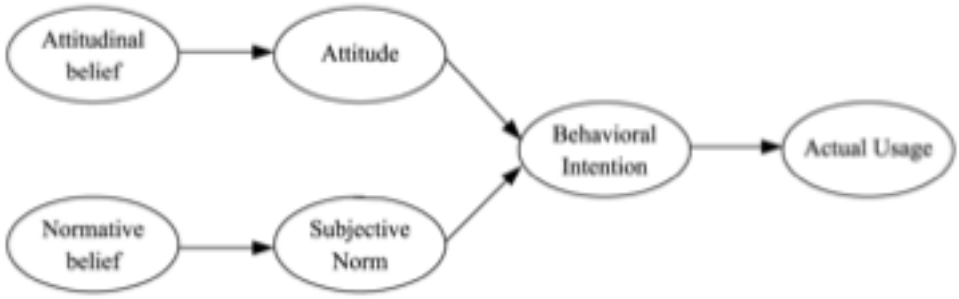
2.3. Theories and models of Technology Acceptance

The study of adoption and user acceptance are fundamental to the successes achieved following enterprises' adoption of new technology (Venkatesh *et al.*, 2003). Over the last three decades, a number of researchers have adopted, modified and validated many theoretical models in order to understand and predict technology acceptance and usage (Venkatesh *et al.*, 2003; Davis, 1989a), in an attempt to describe users' acceptance of information technology. The most important, well-known and influential IT-adoption theories are TRA, TPB, TAM and UTAUT (Min, Ji and Qu, 2008).

2.3.2. The Theory of Reasoned Action (TRA)

During the mid to late 1960s, Martin Fishbein, a social psychologist based at the University of Illinois at Urbana, came up with the idea of the relationship between beliefs and attitudes (Sharma and Kanekar, 2007). Later, he teamed up with Icek Ajzen at the University of Massachusetts, Amherst, to write the book, *"Belief, attitude, intention and behavior. An introduction to theory and research"*. In 1980, a second book was written by Ajzen and Fishbein, entitled: "*Understanding attitudes and predicting social behaviour."* This simplified the Theory of Reasoned Action, and made it practical for use in a variety of areas (Sharma and Kanekar, 2007).

Their model is considered the backbone of studies associated with attitude behaviour and it is widely used in academic and business research (Fishbein and Ajzen, 1975a). It proposes to explain behavioural intention towards new information technology. According to this theory, the most important of an individual's behaviour is behavioural intention. An individual's intention to perform a behaviour is a combination of subject norm and attitude towards that behaviour, according to Ajzen (1991a). See Figure 2.2, below.



Source: (Shih and Fang, 2004, p. 215)

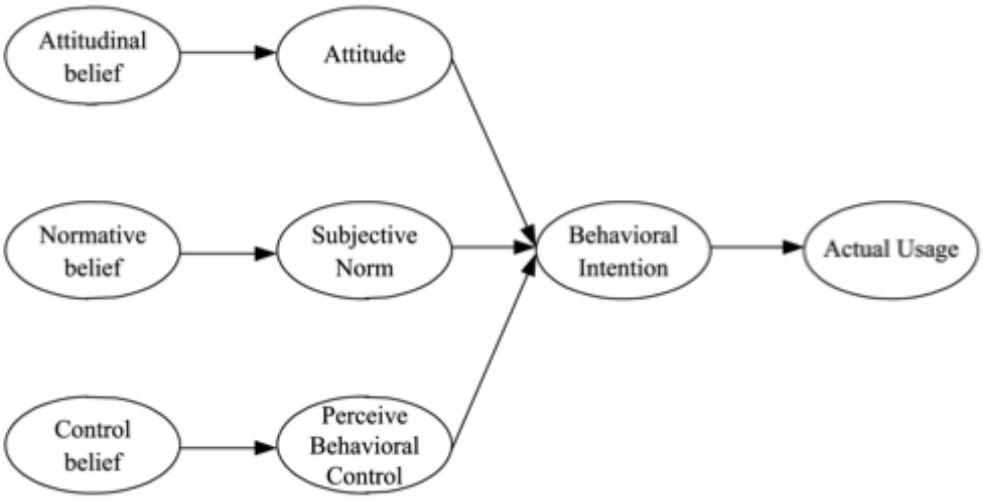
Figure 2.2: TRA Theory

2.3.3. Theory of Planned behaviour (TPB)

The development of TPB is originally based on the theory of reasoned action (TRA) (Ajzen, 1991a), which is designed to explain almost any human behaviour and has been proven successful in predicting and explaining human behaviour across various application contexts (Liao, Chen and Yen, 2007). According to TRA, a person's actual behaviour in performing a certain action is directly guided by his or her behavioural intention, which in turn is jointly determined by the subjective norm and attitude towards the behaviour. By

definition, behavioural intention is a measure of the strength of one's willingness to try, while performing certain behaviours (Ajzen, 1991a).

Grounded on the effort of TRA, TPB is proposed to eliminate the limitations of the original model when dealing with behaviour over which people have incomplete volitional control (Liao, Chen and Yen, 2007). In fact, TPB differs from TRA in its addition of perceived behaviour control (Figure 2.3), which potentially has a direct effect on behavioural intention (Ajzen, 1991).



Source: Shih and Fang (2004) p. 216

Figure 2.3: TPB theory (Shih and Fang, 2004, p. 216)

2.3.4. Technology Acceptance Model (TAM)

In 1989, Davis was the first researcher to present the technology acceptance model, based on TRA (Ajzen, 1991a). Since then, TAM has been a well-received model because it is flexible and able to fit with diverse types of technology (Hong, Thong and Tam, 2006). TAM is designed to provide a conceptual model with a theoretical basis, to clarify the actual behaviour of

information technology users and predict behavioural intention, based on acceptance and use of information technology (Kuo and Yen, 2009).

Based on suggestions from previous studies, Davis (1989a) found two factors that directly affect consumers' acceptance or rejection of information technology, namely perceived ease of use and perceived usefulness. Consumers have a positive impression and attitude when they believe the system is easy to use, and the opposite when they think the system is complicated to deal with, leading the user to have a negative attitude. In addition, perceived ease of use can increase perceived usefulness, whereas attitude and perceived usefulness have significant positive effects on behavioural intention (Kuo and Yen, 2009) (see Figure 2.4).

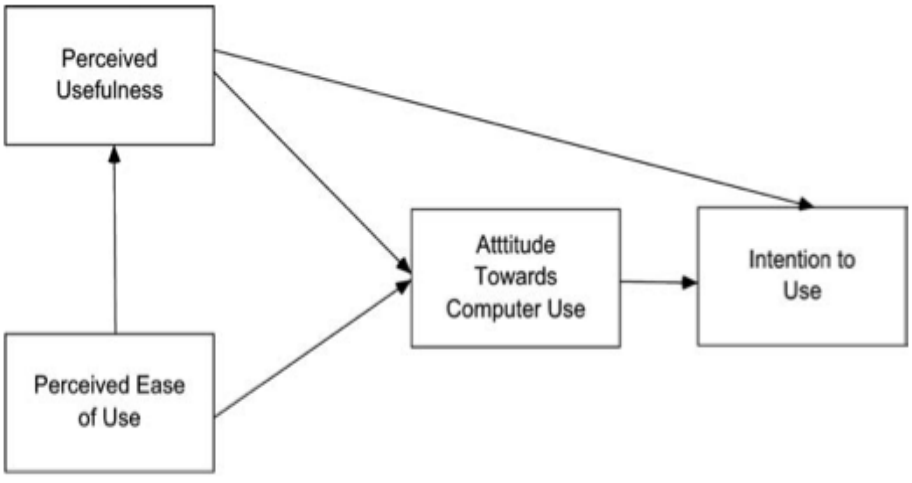


Figure 2.4: TAM model

Source: Davis (1989)

Research has validated TAM as a robust framework in a multiplicity of contexts, including e-shopping (Ha and Stoel, 2009), email messaging,

(Huang *et al*., 2003), e-marketing (Almagraby, 2009), telemedicine technology (Chau and Hu, 2001), online gaming (Hsu and Lu, 2004), e-banking (Alsaudieh, 2009, Chau and Lai, 2002) and other contexts.

As explained above, many studies had been adopting TAM to investigate individual attitudes on information system adoption. However, many limitations were commonly reported in the literature on the use of TAM for predicting user behaviour. The most important was the lack of context focus, where constants of TAM do not reflect the variety of user task environments, and so failed to predict IT usage, as many factors can affect users‘ utilization of it (Venkatesh *et al.*, 2003; Mathieson, Peacock and Chin, 2001; Moon and Kim, 2001).

2.3.5. Unified Theory of Acceptance and Use of Technology (UTAUT)

In 2003, Venkatesh and his team put forward the UTAUT model, based upon the combination of the eight models: TRA, TPB, TAM, the model of PC utilisation, the innovation diffusion theory, the motivational model, the integrated model of technology acceptance and planned behaviour, as well as social cognitive theory. Table 2.1 provides information concerning the eight frameworks and their key factors. Venkatash *et al*.'s model has been validated in empirical settings as having superior explanatory power over past models (Park, Yang and Lehto, 2007).

The main purpose of UTAUT is to describe consumers' intention to use information technology and their successful usage behaviour. The model

showed 70% accuracy in predicting user acceptance of information technology innovations (Venkatesh *et al.*, 2003). By generating a significantly higher percentage of successful innovation, UTAUT was deemed a metric superior to previous ones (Shin, 2009).

Table 2.1

Model	**Description**	**Key construct**
Theory of reasoned action (**TRA)** (Fishbein and Ajzen, 1975b)	Theory of Reason Action (TRA): describing the approach of innovation implementation, which could be a new data system, such as mobile communication. As highlighted by Lau *et al*. (2001), TRA is based on social psychology, concerning the performance of a certain action carried out by an individual.	Attitude towards behaviour+ Subject norm.
Theory of Planned behaviour (**TPB)** (Ajzen, 1991b)	The Theory of Planned Behaviour (Schifter & Ajzen, 1985) comprises a general framework concerned with describing the behaviours of users in terms of attitude, behaviour, beliefs and intention. More specifically, it is an extension of the Theory of Reasoned Action, as introduced by Crespo & Bosque (2008).	Attitude towards behaviour+ Subject norm+ Perceived Behaviour control.
Technology Acceptance model **(TAM)** (Venkatesh and Davis, 2000a; Davis, Bagozzi and Warshaw, 1989)	Technology Acceptance Model (TAM) is predominantly more concerned with analysing the behaviours of people regarding information system adoption. More specifically, this framework was devised with the aim of taking and securing user acceptance. Markedly, TAM is the most commonly utilised framework in the context of user acceptance and utilisation.	Attitude towards behaviour +Perceived Usefulness+ Perceived ease of use+ Subjective norm.
Decomposed theory of planned behaviour **(DMPCU)** (Taylor and Todd, 1995)	This framework amalgamates the TPB estimators with TAM-related perceived usefulness in order to deliver a hybrid framework (Venkatesh *et al*., 2003).	Attitude towards behaviour+ Subject norm+ Perceived Behaviour control+ Perceived Usefulness.

Innovation diffusion theory **(IDT)** (Moore and Benbasat, 1991)	IDT, introduced by Rogers (1960), is a well-known framework. Notably, during recent years, the model has been widely utilised for a number of IS- and IT-related studies. The characteristics of the framework are utilised in an attempt to describe user implementation and the overall decision-making process. Moreover, the implementation of new technological innovations may be predicted through the framework, as well as clarification concerning the way in which such factors interact with one another. Importantly, the main underlying concept of innovation diffusion is *'the process in which an innovation is communicated through certain channels, over time, amongst the members of a social system'* (Wu & Wang, 2005).	Relative advantage+ Ease of use+ Image+ visibility+ Compatibility+ Result Demonstrability+ Voluntariness of use.
Social Cognitive theory **(SCT)** (Taylor and Todd, 1995)	Known to be one of the most valuable and keenly contributing theories of human behaviours in the context of social cognitive theory.	Affect+ Anxiety+ self- efficacy+ outcome expectations personal+ outcome expectations performance.
Motivation model **(MM)** (Davis, Bagozzi and Warshaw, 1992)	A large volume of psychology-related studies provide support for general motivation theory as an explanation for behaviour.	Extrinsic motivation+ Intrinsic motivation.
Model of PC unitisation **(MPCU)** (Thompson and Higgins, 1991)	Significantly influenced by the Theory of Human Behaviour introduced by Trindis (1977), this framework provides contesting insight into the viewpoints suggested through the TRA and TPB. Markedly, this model was implemented by Thompson *et al*. (1991) in an information system context, and accordingly utilised in order to predict PC utilisation.	Job-fit+ Complexity+ Long-term consequences+ Affect towards use+ Social Factors+ Facilitating conditions.

This model determines three external constructs that can affect intention to use IT: performance expectancy, effort expectancy and social influence; therefore,

intention to use has an influence on real behaviour towards IT adoption with facilitating conditions (Venkatesh *et al.*, 2003).

Specifically, *Performance expectancy* "... is the degree to which an individual believes that using that system will help him or her attention gains in job performance." *Effort expectancy is* "... the degree of ease associated with the use of the system," which is similar to TAM's perceived Ease of Use. *Social influence* is "... the degree to which an individual perceives that important others believe he or she should use a new system. Social influence is system- or application- specific, whereas subjective norms relate to non-system-specific behaviour." *Facilitating conditions* are "... the degree to which an individual that an organisational and technical infrastructure exists to support use of the system" (Al-Gahtani, Hubona and Wang, 2007).

UTAUT model developers identified four additional main mediators, namely gender, sex, experience and voluntariness of use. The mediator elements aim to identify the problem of inconsistency and the limitations in the explanations of the previous models, and to explain the differences in behaviour that depend on the group of people involved (Alqahtany *et al*., 2008). According to Serenko, Turel and Yol (2006), moderators are elements that impact the strength or direction of relationships between dependent and independent variables (Figure 2.5).

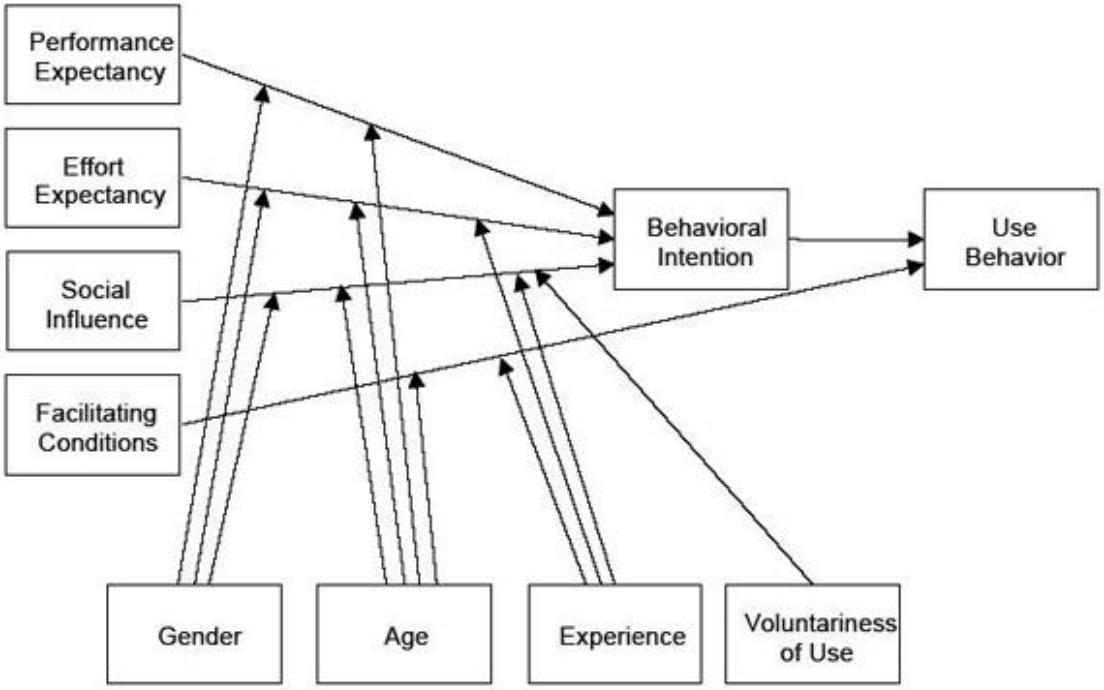


Figure 2.5: UTAUT model

2.4. M-commerce related technology adoption studies

M-commerce has step by step brought the researcher to an understanding of user acceptance, which constitutes a great contribution in this area of study. However, the field of technology adoption is a broad one, and no one theory can cover all aspects. In other words, every adoption theory has its weakness and a gap that needs to be filled, so, in order to improve on the quality of the original theory, several researchers combined other theories in various studies or added some factors.

Luran and Line (2005), for example, noted a correlation between TPB and TAM when studying behaviour intention to use m-commerce in mobile banking, and added three factors taken from perceived behaviour control to arrive at the theory of planned behaviour. Two of them are "perceived credibility," which is based on security and privacy, and "perceived self-

effectiveness," based on trust. This is important in understanding individual acceptance of IT. The third one, "perceived financial cost" is associated with economic motivation. This study has a questionnaire with a Likert scale used for measurement. The data were collected from 180 completed surveys of users attending an e-commerce exposition and symposium in Taiwan. The respondents' ages ranged from 17 to 48 years, 92% of whom were male, 75% of the respondents being undergraduates. The results showed that all hypotheses were supported.

Khalifa and Shin (2008) integrated the TAM and the TPB model, intending to analyse the factors influencing the use of B2C transactional mobile commerce. This new model is then assessed to compare with those users who did not opt for mobile commerce. The assessment was carried out by random sampling of mobile users, and data collection through questionnaires. A total of 220 questionnaires were distributed to participants; 202 were returned and used in the study. The results obtained from the survey stressed the positive aspects of particular technical features, and show substantial support for adopting an integrative approach.

Sun *et al*. (2009), basing their study on TAM and TPB, came up with a comprehensive form of TAM, by integrating a trust-related construct ('perceived credibility') and two resource-related constructs ('perceived self-efficacy' and 'perceived cost'). The purpose of integration was to assess the adoption behaviour of users towards mobile commerce.

Primary data collection was carried out using an online survey, with a sample

of 228 participants and adoption of the structural equation modelling approach to evaluate the causal model. The reliability and validity of the model was checked by using a confirmatory factor test. Apart from *perceived ease of use*, every other variable under consideration was found to greatly influence the behavioural intention of users. Yang (2005) adapted TAM by identifying a number of elements that influence behavioural intention and adoption behaviour in m-commerce usage in Singapore, including consumer age, gender, technology clusters, innovativeness, specialization, knowledge, and past adoption. The survey was delivered to 32,145 students at the National University of Singapore. A convenience sample used 866 questionnaires, which were collected in two weeks, and all respondents were over 19 years of age, 67.4% of them being female. The majority of positive relationships between *perceived usefulness*, *perceived ease of use*, *attitude*, *innovativeness, adoption behaviour* and *demographics* are supported by the practical data.

Wu *et al*. (2005) integrated TAM with IDT, as well as with *perceived risk and cost* in order to investigate what drives m-commerce acceptance. Data were collected using a five-point Likert scale. The sample for the study was 310 participants, 62% of whom were male, almost 80% between 20-39 years old and 73.44% undergraduates. The results showed that all factors excluding *perceived ease of use* significantly affected users' behavioural intention. Amongst them, compatibility had the most significant influence. In addition, a surprising result, and 'a bit disconcerting', was the positive influence of perceived risk on behavioural intention to use.

An extended model of TAM was put forward by Liao, Tsou and Hunag (2007). The sample size used for this study was 532 respondents: 392 male (73.7%) and 140 female (26.3%). A web questionnaire survey approach was used to collect the data. The percentage of students out of the total number of respondents was 44.9% and 65.6%, respectively, the respondents having college level education or higher. The percentage of those related to the service sector was 23.5%. The general age bracket for respondents in this study was between 16 and 50 years, the percentage of those being between 21 and 30 years of age was 62.6. According to this study, *perceived enjoyment*, *perceived usefulness*, and *perceived ease of use* had a positive effect on attitude at the same level of priority. The authors furthermore stated that the key factor relating to behavioural intention for 3G services was *attitude*, then *perceived enjoyment* in second place, *perceived ease of use* in third and *perceived usefulness* in fourth. *Perceived usefulness* had a significant indirect effect on intention by attitude; however, the direct effect of perceived usefulness on intention was not significant.

Kuo and Yen (2009) explored the factors that influence consumers' intention to apply 3G mobile value-added services, by presenting *personal innovativeness* as an external variable. It describes the level of interest in trying out new technology, new thinking or innovative services or products (Rogers, 1995a). They added a 'cost' construct in an effort to further understand consumers' behavioural intention to adopt 3G mobile value-added services.

According to this study, behavioural intention is affected by the following constructs: attitude, perceived ease of use, perceived cost, perceived usefulness, and personal innovativeness (the last two have no significance). This study used a pilot study, the first draft of the questionnaire being delivered to a number of students at a university in Taiwan. 50 students completed the questionnaire. Subsequent analysis identified Cronbach's alpha for each item; any item below .4 was deleted. Cronbach's alpha was between .764 and .887, which is below the standard threshold value of .7 (Nunnally, 1978).

The questionnaire in that study adopted a five-point Likert scale. Of the 269 valid respondents, about 51 percent were male and about 48% were college students. Lu *et al.* (2008) extended the applicability of TAM to the context of user acceptance of wireless mobile data services, by adding wireless mobile data service technology (WMDS), which refers to any style of digital data service through the wireless networks available on all types of mobile devices. The participants in the study were individuals living in five cities across China. Of the 1,498 surveys collected, only 66 were incomplete. The study sample included students, managers and ordinary members of the public. The findings suggested that the intention to adopt WMDS in China is determined by the *perceived usefulness* and *perceived ease of use* of WMDS in the opinion of the consumers.

Kim and Garrison (2009) also made modifications to TAM, including

checking the adoption level of mobile data services. They suggested how 'Perceived Ease of Use', 'Perceived Usefulness', 'Job Relevance' (person's perspective about the application of technology in his/her work), 'Perceived Ubiquity' (person's perception about the level of stable connection / communication among different individuals / networks provided by MDS) and 'Perceived Reachability' (person's perspective about the required time within which he/she can get in touch with others through MDS) could directly affect the acceptance level of cell phones for users.

The data was collected by online questionnaire, which used a 7-point Likert scale, ranging from (1) Strongly Disagree to (7) Strongly Agree. Prior to the primary study, a pilot study was done, using 58 participants, with Cronbach's alpa between .772 to .920 being acceptable. The online survey was used in the main study. A medium-sized Korean company, with a workforce of 862 was targeted. The total number of respondents was 242 (28.1%), about 40% of whom were female. Almost half of the respondents (47.6%) fell into the age category 20 to 30 years old.

From the results, it was found out that whether a person uses mobile internet or not is largely determined by Perceived Ubiquity and Perceived Reachability. Reachability means that the user and the technology can be linked and reached by other parties. The results are in line with the new model, which indicates precision as well as statistical importance. The research further shows that Job Relevance can play a significant role in moderating the link between Perceived Usefulness and Behavioural Intention,

and that Perceived Ease of Use and Perceived Usefulness are positively connected. The study also states that Behavioural Intention is influenced by Perceived Usefulness, as well as by Perceived Ease of Use.

A study by Kim *et al.* (2008) shed light on the reason(s) for which users stopped using MDS (mobile data services) after first use (MDS constitute wireless access to the internet using a mobile communication network). The study discussed the factors that influenced users when they chose to discontinue services following first-time use, and also the factors leading to users persisting with it. It also examined differences between the two groups. Data for comparison of the two groups were collected using an online questionnaire.

Comparisons were made according to the following adoption factors: firstly, *Usefulness*, which indicates the extent to which the user found the new technology useful; secondly, *Usability*, which indicates the level of ease and the user-friendly aspects of the service; thirdly, *System Quality*, which covers the constancy and competence of the service from the user's perspective; fourthly, *Compatibility*, which indicates compliance between the user's background and services provided; fifthly, *Perceived Cost*, which includes the amount that the user has to pay and the time he/she requires while working with the service; sixth is *Ubiquitous Connectivity*, which refers to the special feature that MDS has (these services can be used anytime, at any place). As evidenced by the results, the important factors for discontinuers are usefulness and social pressure, whereas the important factor for continuers is

connectivity.

In 2011, Chong *et al*. investigated the factors that predicted consumer intention to adopt m-commerce in Malaysia and China. This work was an extension of the TAM and DOI models and compared consumers from Malaysia and China. The data were collected from 392 participants (222 Chinese and 172 Malaysian). The results showed that age, trust, cost, social influence and variety of services are able to predict Malaysian consumer decisions to adopt m-commerce. Trust, cost, and social influence can be used to predict Chinese consumer decisions to adopt m-commerce. This research confirms the need to extend the traditional TAM and DOI models when studying technology such as m-commerce.

Recently, UTAUT has gradually drawn the researcher's attention towards an understanding of user acceptance in mobile application technology. It has been used in a good amount of research work on information systems, but cannot be directly applied to m-commerce without some revision, because of some differences between e-commerce and m-commerce in terms of network infrastructure, business models, client devices, development and cost structure (Min, Ji and Qu, 2008) .

Carlsson *et al.* (2006) applied UTAUT to explore consumer behaviour intention in Finland, by randomly selecting a sample of 300 users and adding two more factors that may influence user intention behaviour. Their results found that effort expectancy and performance expectancy represented the

most significant factors in mobile usage in Finland. Park, Yang and Lehto (2007), based on data collected from 221 respondents, found that gender and education were significant moderating factors that affected the adoption of mobile technology by Chinese consumers, suggesting the importance of taking cultural background and disposition into consideration.

Also in China, Chong (2012) examined the predictors of m-commerce adoption, by extending the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The extended model incorporated additional constructs, such as perceived value, trust, perceived enjoyment and personal innovativeness. An online survey was used to collect data from 140 Chinese users. In this study 'trust', 'social influence' and 'facilitating conditions' had no significant effect on m-commerce usage.

Shin (2009) incorporated three constructs, namely self-efficacy, security and trust, into the UTAUT model, to understand consumer acceptance of the "mobile wallet", which is one mobile payment facility. The study used a questionnaire methodology, but, before distributing the final questionnaire, they sought comments by academic researchers as to their experiences in the mobile wallet area. The final survey was by online questionnaire. Among 296 applicants, over half of the participants (56%) were in the age range 21 to 30 years, followed by under 20 years (23.4%), while only .3% (n=1) of respondents were over 51 years old. The results show that all the hypotheses were significant, apart from social influence and self-efficacy, in which no significant effect was found on intention to use mobile wallet.

Zhou, Lu and Wang (2010) integrated the task technology fit model with UTAUT to understand why mobile banking is less utilized than other mobile services; their study adopted a questionnaire methodology, and data were gathered from 250 applicants. Among the sample, 63.2% were male, and just over half (55%) were between 18 and 24 years old. The study found that performance expectation, task technology fit, social influence, and facilitating conditions had an effect on user adoption.

As stated above, many studies have adopted UTAUT to investigate individual attitudes towards information system adoption in both the private and public sector contexts. A number of papers relating to m-commerce adoption are summarized in Table 2.2.

Table 2.2. Summary of m-commerce adoption studies

Title	Theories	Sampling and data collection method	Main findings	Author
Adopted intention of Mobile commerce from TAM Perspective: an empirical Study of Real Estate Industry	Extended TAM	251 surveys were collected	Tool experience was the extension in this study, and it was found to have a significant effect on PU. This revised model provided better fit than TAM.	(Shih *et al.*, 2010)
Exploring factors affecting the adoption of mobile commerce in Singapore.	Extended TAM	866 questionnaires collected from Singaporean students	The majority of positive relationships between PU, PEOU, AT, innovativeness, adoption behaviour, and demographics are supported by the empirical data.	(Yang, 2005)
Determinants of accepting wireless mobile data services in china	Extended TAM	Survey data were collected from 1,432 participants in China.	PE, PU, Mobile trust and Personal innovativeness mainly determine WMDS adoption intention in China.	(Lu *et al.*, 2008)
What drives Malays in m-commerce adoption? An empirical analysis	Extended TAM	222 survey data were collected in Malaysia.	PU, PE, Trust, Cost and Social Influence are significant in m-commerce adoption in Malaysia.	(Wei *et al.*, 2009)
Predicting consumer decision to	TAM and	Survey data were	Trust, cost, social influence and variety	(Chong,

adopt mobile commerce: Cross country empirical examination between China and Malaysia	DOI	collected from 172 Malaysian consumers and 222 Chinese consumers	of services are able to predict Malaysian and Chinese consumer decisions to adopt m-commerce. However, Age affected the Malaysian but not the Chinese decision to adopt m-commerce.	Chan and Ooi, 2011)
What drives mobile commerce? An empirical evaluation of the revised technology acceptance model (good question about actual usage)	TAM and IDT	337 survey data were collected in Taiwan.	Perceived risk, PU, Cost and Compatibility, represent the greatest effect on BI. However, PE did not have a significant effect on BI. BI significantly affected Actual usage.	(Wu and Wang, 2005a)
Exploring Critical Determinants Developing Mobile commerce Technology	Extended TAM	179 survey consumer data questionnaires were distributed, returned and studied.	Perceived trust, PU, PE, social and cultural values have significant association with intention on m-commerce, while economic issues were not significant.	(Yaseen, 2012)
Exploring Consumer adoption of Mobile Payment in China	IDT, TAM and UTAUT	431 survey data were collected from mobile phone users.	Compatibility, PU, interconnection, perceived security, PE and payment habits, were important determinants of consumer adoption of mobile payments in China.	(Zhong *et al.*, 2013)
Explaining the adoption of transactional B2C mobile	TAM and TPB	202 survey questionnaires were	PU and Self-efficacy affected BI, but Subject norms and PE did not have an	(Khalifa and Shen, 2008a)

commerce.		collected from mobile phone users.	effect on BI.	
An Extended TAM for Analyzing Adoption Behaviour of Mobile Commerce	TPB and extended TAM	228 survey questionnaires were distributed.	PU, PE, perceived behavioural control, perceived credibility, perceived self efficacy and perceived cost all had a significant effect on BI.	(Sun, Wang and Cao, 2009)
User acceptance of mobile commerce: an empirical study in Macau.	Extended UTAUT	219 subjects were surveyed	PE, EE, SI, privacy concern and FC had a significant effect on BI in m-commerce usage in Macau	(Lai and Lai, 2013)
Factors Effecting Individuals adopt mobile banking: Empirical Evidence form the UTAUT model	Extended UTAUT	441 survey questionnaires were collected	PE, Social influence, Perceived credibility and Perceived cost had a significant effect on BI. However, EE did not affect BI m-banking.	(Yu, 2012)
A comparative study of consumers' acceptance model in mobile-commerce	Extended UTAUT	140 questionnaires were used in this study in China.	PE, EE and social influence (SI) are the main factors encouraging Chinese students to adopt m-commerce. However, perceived credibility (PC) and perceived cost (PCS) were not significant	(Xiaolu Cheng and Luzhuang Wang, 2010)
Integrating TTF and UTAUT to explain mobile banking user	Task technolog	A total of 265 questionnaires were	Task technology, PE, SI and FC had an effect BI. However, EE did not	(Zhou, Lu and Wang, 2010)

adoption	y fit (TTF) and (UTAUT)	received from student mobile phone users in China.		
Exploring Mobile User Acceptance Based on UTAUT and Contextual Offering	Extended UTAUT	250 valid survey questionnaire were used	PU, facilitating conditions, SI and contextual offering significantly affected usage intention. EE indirectly affected BI through performance expectancy. BI determined actual usage.	(Tao Zhou, 2008)
The Impact of Use Context on Mobile Payment Acceptance: An Empirical Study in China	Extended UTAUT	111 survey questionnaire was distributed	PE and effort expectancy were key determinants in users adopting m-payment. User context, via its significant influence on PE and EE, had an indirect affect on BI. There was no significant relationship between perceived risk and BI, neither between SI and BI. Also there is no significant influence of FC on actual usage	(Wang and Yi, 2012)
An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust	Extended IDT	368 participants were surveyed	Perceived relative advantage, PE, compatibility, competence and integrity significantly influenced attitude, which in turn led to BI adopting m-banking.	(Lin, 2011)

Determining Critical Success Factors of Mobile Banking Adoption in Malaysia	Extended TAM	300 surveys were collected	PU, perceived credibility and awareness about mobile banking have significant effects on users' attitudes, thus influencing BI towards m-banking. However, PE and perceived risk did not have an effect	(Noor, 2011)
Investigating mobile wireless technology adoption: An extension of the technology acceptance model	Extended TAM	242 online surveys	PU, PE, Perceived Ubiquity, Perceived Reachability, and Job Relevance had an effect on BI to use mobile wireless.	(Kim and Garrison, 2009)
Towards an understanding of the consumer acceptance of mobile wallet	Extended UTAUT	303 online surveys were used in this study	While the model confirms the classical role of TAM (i.e., PU and PE are key antecedents to users' attitude), the results also show that users' attitudes and intentions are influenced by perceived security and trust. However, SI is not affected significantly	(Shin, 2009)
The adoption of mobile banking in Malaysia: The case of Bank Islam Malaysia Berhad (BIMB)	Extended TAM	158 survey were collected via convenience sampling	PE, PU, credibility, amount of information, and normative pressure strongly determine BI to use m-banking in Malaysia.	(Amin *et al.*, 2008)
Predicting Tourists Decisions to	Extended	288 valid survey	PU, PE, Cost and Mobility affect tourist	(Yang,

Adopt Mobile Travel Booking	TAM	questionnaires were collected	BI. Among them, PU had the most significant influence. Perceived enjoyment did not affect	Zhong and Zhang, 2013)
Factors affecting adoption of mobile banking in Pakistan: Empirical Evidence	Extended TAM	372 surveys were collected from the largest two cities in Pakistan (Karachi and Hyderabad)	SI, perceived risk, PU and PE significantly influenced m-banking. The most significant positive impact was of SI on BI to adopt m-banking services in Pakistan.	(Kazi and Mannan, 2013)
Exploring individual personality factors as drivers of M-shopping Acceptance.	Extended TAM	470 survey questionnaires from Spanish mobile telephone users selected on the basis of convenience	PU and, in a minor degree, PE of use, are over dimensioned if personality variables are omitted, making intention formation to be perceived as more rational than it really is. Personality variables (affinity to mobile telephones, compatibility and innovativeness) have a direct and positive influence on the intention to engage in m-shopping	(Aldás-Manzano, Ruiz-Mafe and Sanz-Blas, 2009)
Determinants of adoption of mobile games under mobile broadband wireless access environment	Extended TAM	1,011 usable online surveys	Perceived enjoyment was very important, but that usefulness did not influence an individual's attitude.	(Ha, Yoon and Choi, 2007)

M-banking in metropolitan Bangkok and a comparison with other countries	TAM and TPB	195 usable online surveys	The greatest effect factor on BI was subject norms, followed by PU and then self-efficacy.	(Sripalawat, Thongmak and Ngarmyarn, 2011)

2.5. Saudi Arabia

Figure 2.6 Saudi Arbia

The country of Saudi Arabia - its official name is the Kingdom of Saudi Arabia (KSA) - is located on the Arabian Peninsula and occupies 80% of it (MEP, 2014). It is in Asia's south-eastern region, contingent with the continents of Africa, Asia and Europe. It encompasses a large area, amounting to approximately 2,240,000 square kilometres (roughly 865,000 square miles). It is almost ten times the size of the UK, which spans just 243,610 square kilometres. Saudi Arabia is the first Gulf country reached when travelling from Europe or the USA. To the east, it borders Bahrain, Kuwait, Qatar and the United Arab Emirates, and to the west is the Red Sea, while to the north lies Iraq and Jordan, and to the south Oman and Yemen. Its first language is Arabic, although English is widely spoken across the country as a second language; it is learnt and used by educated individuals in urbanised

locations. It is regarded as having a high level of national income (ITU, 2011). Also, the Kingdom of Saudi Arabia has been categorized as one of the developing countries (Nielesn, 2011).

2.5.1 ICT in Saudi Arabia

It has been established through the Madar Research and development (MRD) report (2013), that the annual Arab ICT Use Index takes into consideration and analyses four key indicators for all 18 of the Middle East and North Africa (MENA) economies as a whole. These indicators are fixed-line subscribers, internet users, installed computers and mobile phone subscribers. The calculation of the index is achieved by adding the values of each of the four indicators for each country, and dividing the sum according to population. On the index, a larger score suggests a greater degree of ICT application. Another three indicators were examined, namely fixed broadband subscribers, the internet user–PC ratio, and mobile to fixed line subscribers (MRD, 2012).

On the 2011 index, KSA achieved top position, scoring 2.82, and was recognised as being amongst the top five overall, whilst holding top position in the ICT field. The position of the country was driven mainly by its mobile penetration figure, which was 53.7 million subscribers (189.24%), placing it in first position in MENA, as shown in Table 2.3, below. Moreover, Saudi Arabia achieved fifth place for internet penetration and installation of computers, and seventh place for fixed line telephone penetration.

Table 2.3: Arab ICT index-2011						
Country	Population*	Mobile phone subscriptions*	Fixed telecom subscriptions*	Internet users *	PC INSTALLED Base*	ICT index
KSA	28.38	53.70	4.63	13.60	8.10	2.82
Qatar	1.7	2.79	.31	.85	.8	2.78
UAE	8.49	11.73	1.82	4.57	3.86	2.59
Oman	2.86	4.81	.29	1.15	.55	2.38
Bahrain	1.32	1.69	.24	.72	.47	2.37
Kuwait	3.7	4.97	.52	1.85	1.31	2.34
Libya	6.00	10.00	1.01	1.36	.89	2.21
Jordan	6.25	7.48	.42	2.19	1.11	1.79
Morocco	32.42	36.55	3.57	12.73	3.05	1.72
Tunisia	10.73	12.39	1.22	3.43	1.27	1.71
Lebanon	4.22	3.39	.91	1.73	.91	1.64
Egypt	81.35	83.43	8.71	21.67	5.88	1.47
Algeria	37.10	35.71	3.15	7.77	3.76	1.36
Palestine	4.23	2.87	.39	1.28	.4	1.16
Syria	21.38	12.79	4.38	5.11	1.82	1.13
Iraq	33.56	24.41	1.95	5.51	2.55	1.03
Sudan	41.92	25.11	.48	6.96	2.07	.83
Yemen	24.31	12.53	1.08	3.33	.94	.74

*Number in millions

2.5.1.1 Internet services

According to the Communications and information technology commission (CITC report, 2013), KSA has provided 15.8 million individuals with internet access; this represents a significant rate of penetration, amounting to approximately 54.1% in contrast to just 5% in 2001. Field surveys and estimates by the CITC indicate that there are approximately three internet users for every fixed broadband subscription, including business users and residential. With regard to mobile broadband, there is more than one user for

each subscription, with a large number of users utilising both mobile and fixed schemes. The view is held that the requirement of internet services will experience a notable surge in the coming periods, owing to the fact that there will be greater accessibility to fibre optic (FTTx) networks, providing fast speed in larger, built-up areas, as well as the spread of handheld smart applications and devices and the growth of the internet as a whole.

2.5.1.2 The mobile market

At the end of 2012, there were approximately 53 million mobile subscriptions, signifying the penetration of the population at a rate amounting to 181.6% (Figure 2.5), with pre-paid substitutions seen to make up most of these subscriptions. Importantly, this figure showed a decline when compared with the figures for 2011, owing to the adoption of a new approach for subscriber data updates and modifications, with a significant number of unidentified SIM cards deactivated by service providers, thus impacting the penetration rate during the year as a result of the number of subscriptions being affected (CITC, 2013).

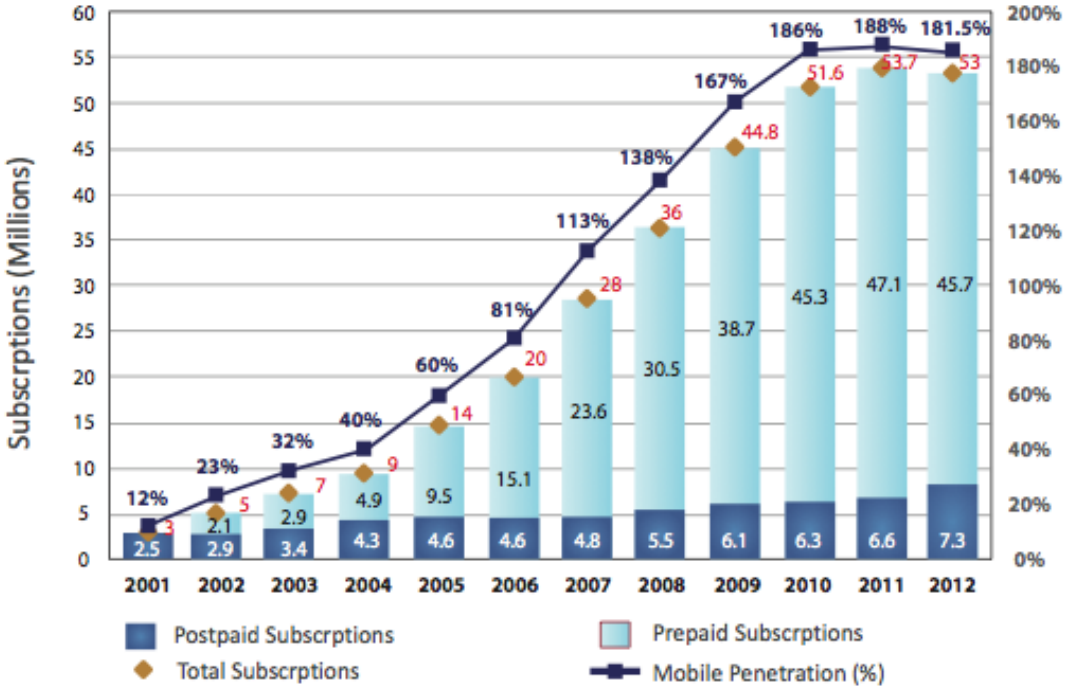


Figure 2.5: Mobile Services Market Growth (2001-2012)
Source: (CITC, 2013, p. 19)

In 2004, the Saudi telecoms sector was liberalised, with operators having to focus on market share capture. Importantly, Mobily and Zain, key players in the KSA market, were seen to command a great portion of the market share, taking a significant share from Saudi Telecom, which had been recognised as the leader over the previous five years. Despite losing some of its share, STC has nevertheless maintained almost half (45%) of its overall subscriber base in the domestic market, as shown when reviewing data for the financial year 2011 (see Figure 2.6). In point, Mobily is seen to have control of 38.3% of the market, whilst Zain holds 16.7% (Aljaziracapital, 2012). However, there has been a drop in market share, as illustrated in Figure 2.7, below.

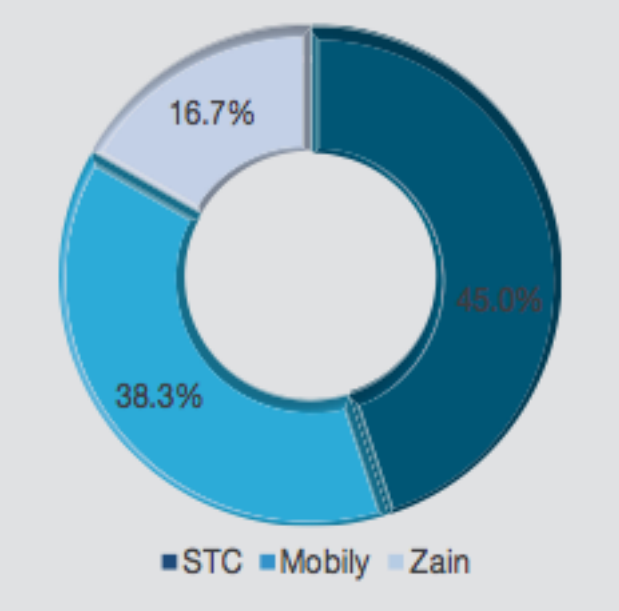


Figure 2.6: STC continues to lead the market

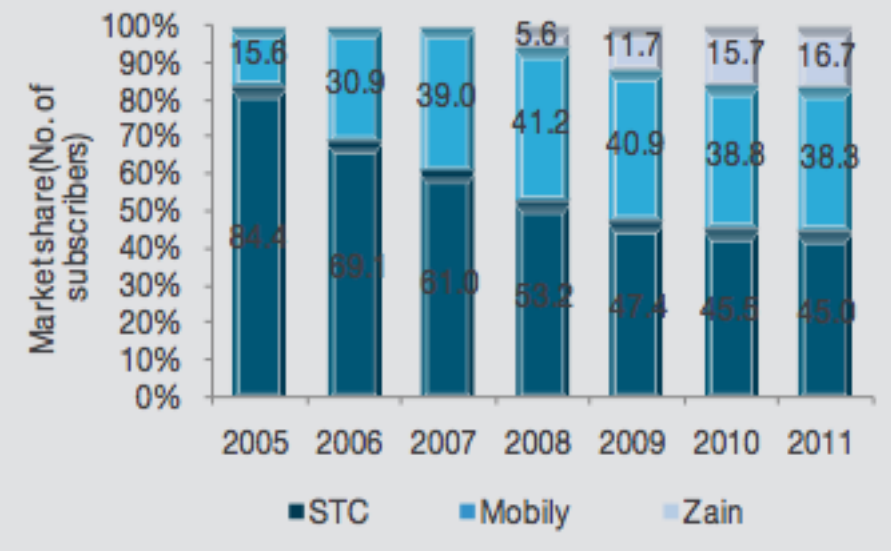


Figure 2.7: However, its market share is on the decline

2.5.1.3 ICT spending

Spending in the area of ICT refers to any expenditures made by businesses, consumers and the government in regard to IT. Such expenditure is not considered the same as that of investments made in ICT, although it does encompass this element (Waverman, Coyle and Souter, 2011). Accordingly, all consumer spending on the purchase of communication equipment in

telecom firms constitutes communication-related expenditure. Other costs are directed towards IT-related hardware and IT-related software.

It is predicted by CITC that ICT services-related spending was, in 2012, approximately SAR 94 billion; in 2002, it was around SAR 21 billion, thus demonstrating a per year growth of around 16% on average. IT-related spending was approximately one-third of the overall spend, with such expenditure centred on IT services and IT hardware, whilst a huge 70% was directed towards the telecommunications sector (CITC, 2013) (see Figure 2.8).

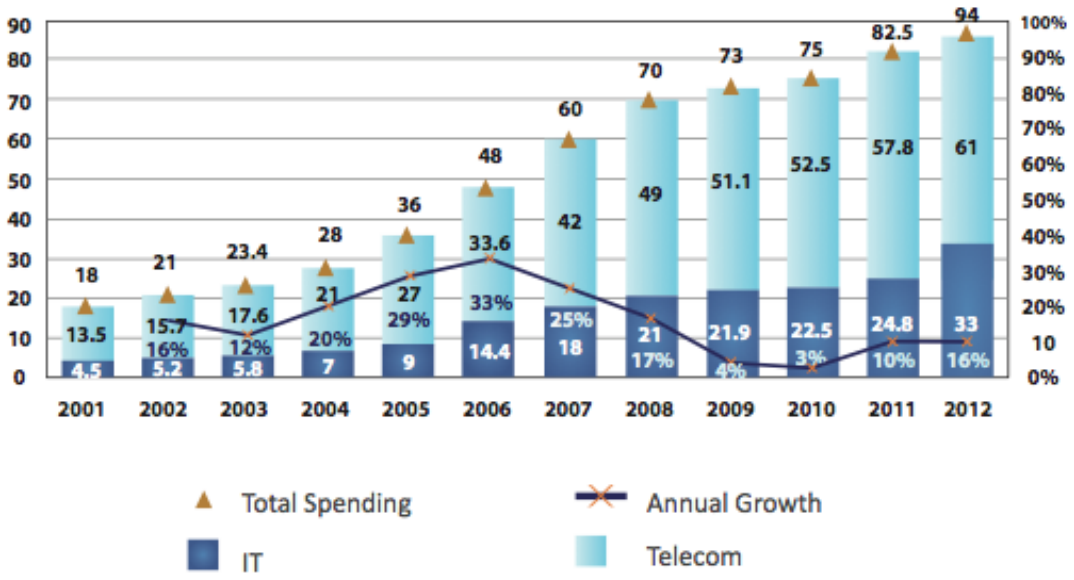


Figure 2.8: Spending on ICT Services

As can be seen in Table 2.4, as presented in CITC (2011), a significant and notable pattern may be observed: the spending directed towards ICT, in dollars per capita, is seen to be quite elevated, at approximately 50% of the

level in developed countries, such as Australia, for example, as well being much greater than those of Malaysia and India. In fact, when reviewing the spending per capita of Saudi Arabia on equipment and services in the communications field, levels are seen to be pretty much in line with those of the United Kingdom. Nevertheless, non-communications ICT spending is seen to be at lesser levels than in developed nations, with these figures seen to be much nearer the levels shown by developing countries.

Table2.4: Spending by the communications and non-communication sectors on a per-capita basis.

Country	ICT spending per capita ($)	Communications spending per capita ($)	Share of IT services and software spending per capita ($)
Australia	2464	1519	945
United kingdom	2721	1042	1680
United States	3418	1489	1680
Japan	2746	1714	1032
Saudi Arabia	1214	977	237
Malaysia	840	724	116
India	67	52	14
China	292	230	62

Source: CITC (2011); Waverman, Coyle and Souter (2011)

Such data are valuable, as they suggest that organisations within Saudi Arabia do not make significant investments in software and hardware. The predictions made imply that this would be the case in various countries, with a greater share of spending through business investment directed towards software and hardware in Canada, where the business sector is seen to represent three-quarters of overall ICT investment (Capeluck, 2012). Moreover, investment in communications equipment was seen to total $7.4

billion, computers $12.8 billion and software $22.4 billion in 2011; in Saudi Arabia, on the other hand, almost $16.2 billion was spent on communication, with a $8.8 billion share from IT (MRD, 2012; CITC, 2011). Accordingly, in line with the report of the ITU detailed in 2012, Saudi Arabia is regarded as being one of the top 20 countries, with specific regard to their telecommunications market, which generates significant revenue.

2.5.1.4 Network services

As highlighted in the CITC 2013 report, 3G and 4G service demand could be seen to act as a significant motivator for the data segment, owing to the belief that 3G subscribers' data consumption is nearly a half (45%) greater than that of subscribers to 2G. Moreover, 4G-enabled gadget owners are seen to utilise as much as 150% of the data utilised by 3G owners; therefore, 3G and 4G service demands are fundamental if growth is to be achieved and maintained in the data field. In consideration of this, an analysis is provided below in regard to the way in which the 3G and 4G market within KSA is expected to develop and progress during the following years.

In Saudi Arabia, the number of 3G subscribers is seen to have increased dramatically during recent years, mainly owing to the significant demand for devices such as tablets and smartphones, and high-speed internet. As has been highlighted by Aljazera Capital (2012), the 3G subscriber base has developed by as much as half (50%) throughout this time, accounting for an estimated 14% of all subscribers.

Although this would support the growing levels of consumption in data, the development and wide implementation of 4G services within the KSA is likely to further increase development and growth. As has been highlighted previously, key players in the field have invested many resources into 4G technology acquisition, with LTE (4G) tested with regard to their networks (CITC, 2013).

2.6 Chapter summary

This chapter of the thesis has presented background in terms of introduction, definition of key markets and certain popular application services in mobile commerce. It included the related literature to address a gap as discussed in the research. It highlights the significance of consumer acceptance of mobile services in making the mobile market successful in the world.

Major IT adoption was discussed in the chapter, with the assistance of many m-commerce adoption studies, mainly derived from developed countries. Further, this chapter discussed the high level of ICT in Saudi Arabia. An interesting aspect is that 70% of the spending is allocated to the telecommunication sector. The research and its conceptual model will be explained in the following chapter.

Chapter three

Research Model

3.1. Introduction

The purpose of this chapter is to construct a preliminary conceptual model regarding the adoption and execution of m-commerce. In this study, the proposed conceptual model (Figure 3.2) includes features that impact the implementation of m-commerce. It signifies a model structure that includes the different constructs and their impact on the adoption and usage of m-commerce by users in Saudi Arabia. For the empirical data collection and evaluation a suggested conceptual model will be employed as a road map; it will help in the development of a thorough overview of the acceptance and adoption of m-commerce in Saudi Arabia.

At the end of the chapter, the features that have been reviewed in it will be mapped onto a conceptual model, constructing a basis for the empirical research that will be carried out in the subsequent first and second studies.

3.2. Conceptual model and research hypotheses

Technology adaptation in the past has been mostly based on TAM (Chong, 2012; Wei *et al.*, 2009; Min, Ji and Qu, 2008). TAM theory (1989), as proposed by Davis, is one of many extensively reviewed and reported system theories (Chong,

2012). The theory argues that users' intent is determined by two key factors: perceived ease of use and perceived usefulness, and their effect on the information system, an argument that has been extensively accepted (Min, Ji and Qu, 2008; Hong *et al.*, 2008).

The revisited TAM, known as TAM2, also introduced subjective norms as determinants of the perceived usefulness factor (Venkatesh and Davis, 2000b). However, the theory is still seen to have certain limitations (Chong, 2012; Wei *et al.*, 2009; Min, Ji and Qu, 2008). In general, 40% of the system's use can be explained by TAM and TAM2 (Lu, Yao and Yu, 2005a). Different studies have found that TAM's integration with other models can be useful in developing stronger predictability (Chong, Chan and Ooi, 2011; Lu *et al.*, 2008; Wu and Wang, 2005a; Luarn and Lin, 2005; Yang, 2005).

It can therefore be surmised that every theory raises a certain number of issues, making it somewhat incompatible with every other conceptual framework. Thus, theory integration might be more effective. UTAUT was proposed by (Venkatesh *et al.*, 2003), after a number of authors had critically reviewed the eight important IT acceptance models, including TPB, TAM, TAM2 and the Innovation Diffusion theory. Tested with 70% of dependent variables, the UTAUT model offers empirical variance. Four important concepts, namely social influence, effort expectancy, performance expectancy and facilitation conditions, may add immense value to UTAUT.

It is argued on the basis of the UTAUT model that factors surrounding user effort expectancy, performance expectancy, social influence and facilitating conditions all markedly impact the acceptance of users concerning information technology (Marten and Herrero, 2012; Yu, 2012; Min *et al*., 2008; Zhou, 2008). Owing to the fact that the model considers eight different theories, these four factors are not considered new or dissimilar, but rather are adapted from external factors. More precisely, performance expectancy is acknowledged as being similar to the perceived usefulness of TAM and the relative advance of IDT. Moreover, it is known that there is similarity between effort expectancy, TAM's perceived ease of use and IDT's complexity.

Moreover, social influence derives from TPB and TRA's subject norm, whilst facilitating conditions are linked with TPB's perceived behavioural control. Moreover, the UTAUT model introduced a number of moderating factors, including age, experience, gender and voluntariness of use from social psychology's use. Such moderating factors are known to help deal with and manage those inconsistency and those weak-explanation and power-related problems that are associated with previous frameworks, and also help to further describe the groups of people's behavioural differences (Figure 3.1).

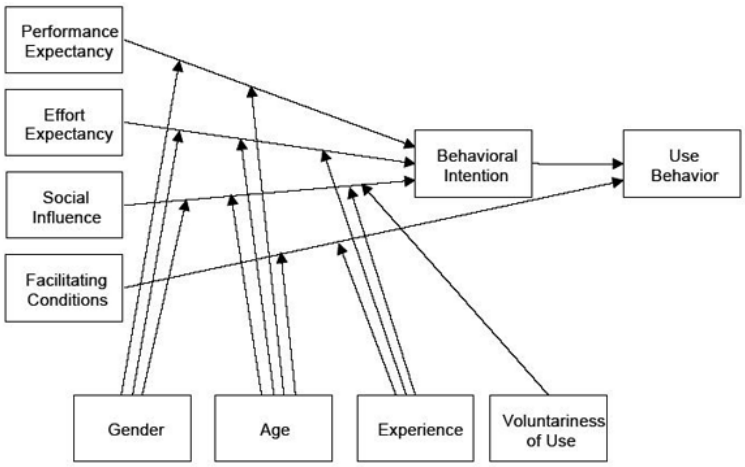


Figure 3.1: UTAUT Model
Source: Venkatesh *et al*. (2003)

In order to implement the UTAUT model in different IT application circumstances, such as m-commerce, a number of changes and reviews need to be carried out, as highlighted by Venkatesh *et al*. (2003). Moreover, as highlighted by Heijden (2004), various adoption behavioural moderators may result from different IS usages. Markedly, the moderator Voluntariness was eradicated as a moderator in this regard, owing to the fact that it is only considered pertinent when technology utilisation is essential (Dulle and Minishi-Majanja, 2011); notably, this is not the case in the context of the present research.

In this same vein, owing to the originality of the m-commerce concept, 'experience' is recognised as being less important and powerful in establishing m-commerce user acceptance. It is also recognised that removing 'experience' will also mean the model is much less complex (Min *et al*., 2008). In fact, such moderating factors *may* include independent variables. Furthermore, this study follows the proposition of Dwivedi and Weerakkody

(2007), who consider that age, education and gender may be regarded as independent social variables. Figure 3.2 illustrates the UTAUT model.

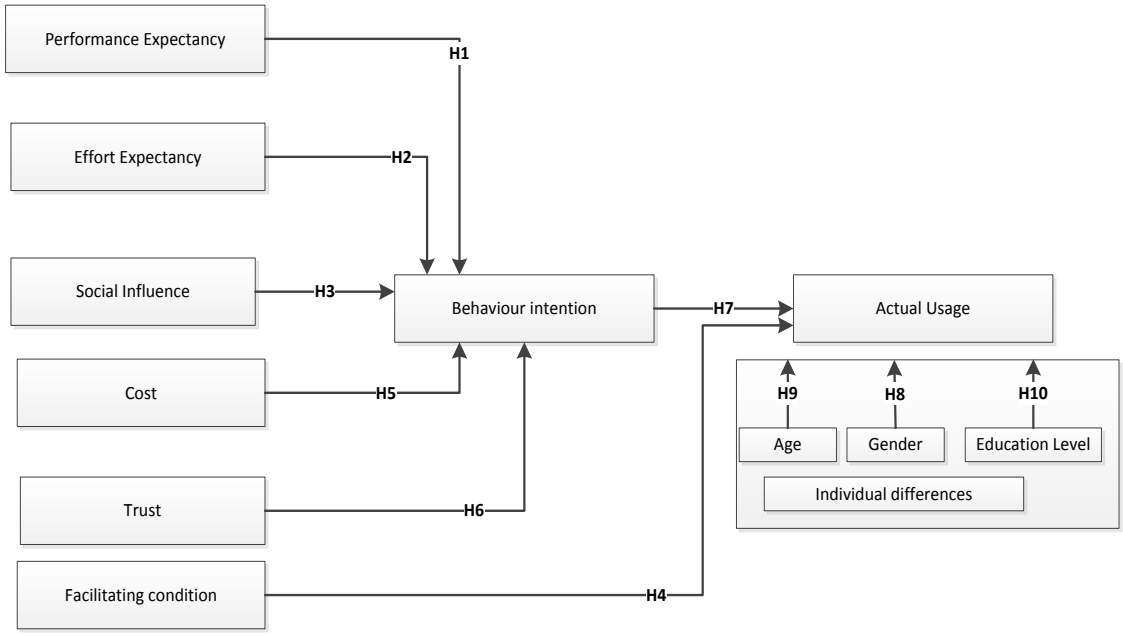


Figure 3.2-revised model

3.2.1 Performance Expectancy (PE)

Performance Expectancy (PE) is thought to show performance improvement when users implement new technology. Accordingly, in the view of Davis (1989), a system's overall perceived usefulness can be explained as the degree to which people hold the belief that new technology utilisation will improve the overall performance of a certain task. In this regard, there has been much research conducted in the Information Systems and m-commerce field that supports the importance of perceived usefulness on adoption or utilisation intention (Sandeep and Sagar, 2011; Kim, Choi and Han, 2009a; Kuo and Yen, 2009; Rhee and Kim, 2004; Venkatesh *et al.*, 2003; Davis, 1989a) .

In recent times, various empirical researchers have delivered support for the belief that performance expectancy is a key forecaster of m-commerce adoption, capturing the considered advantages linked with m-commerce service adoption (Zarmpou *et al.*, 2012; Yu, 2012; Yaseen, 2012; Kim, Choi and Han, 2009a; Wei *et al.*, 2009; Khalifa and Shen, 2008b). The following hypothesis is therefore proposed:

H1: *Performance Expectancy will have a significant positive impact on behaviour usage intention.*

3.2.2 Effort Expectancy (EE)

Effort Expectancy (EE) has been described by Venkatesh *et al*. (2003) as '... the degree of ease associated with the use of the system'. It is known that this is not dissimilar to the perceived ease of use included in TAM. In the view of Davis (1989), perceived ease of use in the context of a system is described as the extent to which it is maintained by an individual that the utilisation of a specific technology will be effort-free. In this regard, a number of empirical researchers have previously highlighted that perceived ease of use has a positive impact on the adoption of m-commerce (Chong,2012; Zarmpou *et al.*, 2012; Yu, 2012; Yaseen, 2012; Wang and Yi, 2012; Hanafizadeh *et al.*, 2012; Noor, 2011; Wei *et al.*, 2009; Kim and Garrison, 2009; Khalifa and Shen, 2008b; Bhatti, 2007; Li, Fu and Li, 2007). Accordingly, if it is considered that m-commerce technology is easy to use, it is stated that individuals holding this belief will have positive attitudes concerning m-commerce utilisation, owing to the fact that services on mobile devices may

be viewed as complicated and tedious, due to the various physical constraints associated with m-commerce (such as difficulties inputting information or the small screen display). As a result, m-commerce must comprise ease of learning. Accordingly, the following hypothesis is suggested:

H2*: Effort Expectancy will have a significant positive impact on behaviour usage intention.*

3.2.3 **Social Influence (SI)**

The Social Influence (SI) concept refers to '... the extent to which an individual perceives that important others believe he or she should use the new system', as highlighted by Venkatesh *et al*. (2003). In the view of Lu *et al*. (2003), SI is not dissimilar to the subject norm, and is described as the belief of an individual concerning whether other people maintain that an individual should become involved in the activity. Subject norm is taken into account in terms of both TPB and TRA as the fundamental aspect concerned with describing system adoption. It has been found that the social factors, sourced from TPB can, in the view of Chang (2004), improve the overall power and cogency associated with TAM in the context of intranet utilisation. Furthermore, taking into consideration DOI theory, Social Influence may also be broken down into two separate types, namely interpersonal influence and mass media (Rogers, 1995). With this in mind, it is stated that interpersonal influence commonly derives from social networks through friends, peers and superiors, etc.; mass media influence, on the other hand, comprises internet, newspapers, magazines, radio, television and other media. With this stated,

Fan *et al.* (2005) emphasise that a user is more inclined to propose and advocate a service to others if she or he is satisfied. Their conclusion also highlights the belief that social influence has a keener influence on the m-commerce acceptance of users than perceived ease of use and perceived usefulness. Moreover, SI is also believed to have a significant impact on consumers' intention to utilise m-commerce, as highlighted by Khalifa & Cheng (2002), Wei (2009), Zarmpou *et al*. (2012), Chong *et al*. (2011) and Lu *et al*. (2011). Accordingly, the hypothesis stated below has been devised:

H3*: Social Influence will significantly impact the intention of behaviour utilisation.*

3.2.4 Facilitating Conditions (FC)

Facilitating Conditions (FC) considers the extent to which it is held by an individual that a technical and an organisational framework is present which is able to support system utilisation (Venkatesh *et al*., 2003). Simplifying conditions have been put in place, with the aim of affecting actual utilisation of technology as opposed to behavioural intention (Schaper and Pervan, 2007; Garfield, 2005; Venkatesh *et al.*, 2003). In regard to UTAUT, facilitating conditions involve compatibility, facilitating conditions and perceived behavioural control from the TPB, MPCU and IDT models (Venkatesh *et al*., 2003). Importantly, a number of scholars in the area of technology research such as Chiemeke and Evwiekpaefe (2011), Al-Sobhi (2011), Al-Shafi and Weerakkody (2010a), Al-Gahtani, Hubona and Wang (2007) have noted that the facilitating conditions construct positively impacts actual use. In the case

of the present research, facilitating conditions have been gauged through the perception of being able to gain access to the necessary resources, in addition to garnering knowledge, information and the required support to utilise m-commerce services. They are also impacted by the perception of the technology incorporated within the user's lifestyle. In an attempt to describe those conditions relating to the actual use of m-commerce, the writer suggests the following hypothesis:

***H4**: Facilitating Conditions will significantly impact Actual Use.*

3.2.5 **Cost**

Perceived price is known to signify the internalisation or encoding of a product or service's objective selling price, as noted by Jacobby & Olsen (1977). Shifting to MC from wired EC suggests a number of additional costs, including access-, equipment- and transaction-related ones (Constantinides, 2002), all of which together mean that m-commerce in general is a more expensive solution than the wired option. Moreover, as noted by Mathieson, Peacock and Chin (2001), it has been acknowledged that financial and hardware / software resources are essential for users in regard to information systems.

Moreover, Perceived Cost is one of the fundamentals associated with establishing and delivering m-commerce. In contrast to other constructs, Perceived Cost is also regarded as an essential consideration for consumers in terms of deciding whether or not m-commerce will be utilised (Yu, 2012;

Islam *et al.*, 2011; Wei *et al.*, 2009; Dai and Palvia, 2008a; Hong *et al.*, 2008; Wu and Wang, 2005a; Luarn and Lin, 2005). In the same vein, Pagani, (2004) notes that cost is one of the key elements of 3G service implementation. It is also indicated by Anil *et al*. (2003) that cost is one of the factors impacting the adoption of m-commerce in the context of Singapore. In this regard, Sathye (1999) emphasised the significance of cost factors in terms of innovation implementation, further stating that cost is one of the main factors hindering individuals in Australia and Singapore from adopting internet banking.

Moreover, in their research, Luarn & Lin (2005) state that a number of different consumers confirmed, through the course of qualitative interviews, that financial factors would impact their intention to utilise mobile banking. Though many users found the costs of m-commerce to be affordable, the important issue is whether m-commerce services are perceived as valuable by users, since within m-commerce, cost is one of the influential factors found on the Malaysian user market (Wei *et al.*, 2009).

In comparing American and Chinese m-commerce users, Dai and Palvia (2008a) concluded that Chinese users were certainly affected by the cost factor, which, however, is not apparent among American users. A comparative study by Chong, Chan and Ooi (2011) on Malaysian and Chinese users found that users in both countries made m-commerce decisions based on the cost factor. Thus, it is significant to analyse the question as to whether the cost factor impacts Saudi Arabian mobile users. The following

hypothesis, therefore, is proposed:

H5*: Cost significantly influences behaviour usage intention.*

3.2.6 **Trust**

The Merriam-Webster Dictionary (2010) provides a definition of the term 'trust', stating that it is the: '... assured reliance on the character, ability, strength or truth of someone or something'. Although an apparently simplistic definition has been assigned to this term, trust is nevertheless considered as being one of the most problematic terms, the concept of which achieves little consensus amongst scholars operating within different academic disciplines (Hong and Cho, 2011). For instance, a number of disagreements have been rooted in various concept-related viewpoints (Hong and Cho, 2011). Notably, for a long period of time, trust has been described as one of the key factors known to impact the buyer–seller relationship. Trust has been similarly described as a key factor in the context of information systems (McKnight and Chervany, 2001), which has undergone much research from a number of different viewpoints and at various analysis levels.

Specifically as regards electronic commerce, trust and its importance owe much to the uncertainty and risk inherent as a critical aspect of online transactions, as noted by Pavlou (2003) and Yousafzai, Pallister and Foxall (2003). Trust is therefore regarded as a fundamental consideration, as consumers have to deal with the uncertainty associated with using online

services via an unfamiliar, essentially intangible, merchant (Hong and Cho, 2011).

Various research has been conducted in the area of electronic commerce, concluding that trust is a fundamental factor in comprehending interpersonal behaviours and economic exchange. In earlier research carried out on consumer trust, it was found through empirical presentation by Jarvenpaa, Tractinsky and Saarinen (1999) that a number of factors impact trust and subsequent purchasing intention. Moreover, it has been argued by Hoffman, Novak and Peralta (1999) that trust is a key factor in e-commerce. Academics (Kim *et al*., 2008) have further noted that trust and perceived risk notably influence internet consumers in their purchasing choices.

Trust is also a concern in the context of m-commerce, in addition to a number of other mobile-related factors (Siau and Shen, 2003). Thus, researchers have previously acknowledged trust as being a component able to enhance customer satisfaction, which notably assists in terms of improving consumer loyalty regarding mobile commerce (Lin, 2011; Kao, 2009; Min, Ji and Qu, 2008; Siau and Shen, 2003).

It is worth highlighting the fact that, owing to m-commerce being in its infancy, a number of payment systems, regulating policies, technical protocols and transaction standards need to be standardised; accordingly, with this in mind, it can be stated that trust represents a fundamental factor in regard to user acceptance. It is recognised that earning the trust of users is

essential in order to achieve success in the area of m-commerce. Accordingly, it is recognised that a trust component should be incorporated into the studies centred on m-commerce. Owing to the fact that trust considerations are key obstacles on the internet channel, it is acknowledged that consumers will not communicate their personal data without trust (Hoffman, Novak and Peralta, 1999). This research further emphasises that perceived trust impacts utilisation intention through directly affecting behavioural intentions.

***H6**: Trust positively and significantly affects behaviour usage intention.*

3.2.7 Behavioural intention

Jaccard and King (1977, cited in Liang *et al*., 2008) point out that behavioural intention is '... defined as a perceived notion between oneself and some action'. Moreover, behavioural intentions always refer to future behaviour, as observed by other scholars (Ajzen, 1991; Venkatesh & Brown, 2001; Venkatesh *et al*., 2003).

Importantly, in the view of Irani, Dwivedi and Williams (2008), most technology adoption studies have made use of behavioural intention with the aim of predicting associated adoption. Moreover, Ajzen (1991) highlights behavioural intention as feasibly being directly influential on adoption. The calculation of behavioural intention comprises the intention and estimated utilisation of m-commerce-related services.

In an attempt to describe behavioural intention towards m-commerce adoption behaviour, that scholar suggests the following hypothesis:

H7: *Behavioural intention concerning m-commerce services utilization will have a positive impact on the actual utilisation of m-commerce.*

3.2.8 Gender

Gender has been considered during the course of a number of studies with the aim of examining whether or not there are differences between men and women in regard to technology utilisation. Various academics have examined the role adopted by gender in the utilisation and implementation of technology (Al-Shafi and Weerakkody, 2010; Jackson *et al.*, 2001; Morris and Venkatesh, 2000). A number of researchers have emphasised that gender markedly has impacts when considering the use and implementation of technology in a business-related context. In this aspect, it is illustrated that males utilise computers more than women (Venkatesh and Davis, 2000b). In addition, the differences between genders have been highlighted with regard to internet utilisation (Jackson *et al.*, 2001).

Notably, Venkatesh *et al*. (2003) found that perceived usefulness in regard to behavioural intention is controlled by gender. As regards e-government usage, Alsahfi & Weerakkody (2010) note that 73.6% of e-government adopters are male. On the other hand, it was found that women and men do not exhibit

important differences in shopping behaviours as far as mobile technology is concerned (Bigne *et al*., 2005).

In the context of this study, the work of various scholars, including Dwivedi *et al.* (2006a) and Al-Shafi & Weerakkody (2010) will be followed, with gender taken into account as a social, independent variable. This will be done in an attempt to explain the differences between technology users, with the researcher proposing the following hypothesis.

H8*: Actual Use will differ between males and females.*

3.2.9 Education

It has been emphasised that those possessing educational qualifications are far more likely to obtain a higher occupational position (Dwivedi and Lal, 2007a). Accordingly, it is believed that such individuals are more likely to implement new technologies. Studies carried out previously in the area of technology utilisation suggest a strong link between usage and the level of education and technological ownership (Morris and Venkatesh, 2000).

The research findings of Morris and Venkatesh (2000) show that people with higher educational qualifications use computers more often than those with lesser qualifications. Thus education is seen as one of the most fundamental drivers in South Korea (Carveth & Kretchmer, 2004; Choudrie & Papazafeiropoulou, 2007). Specifically as regards internet access, it has been

suggested that those individuals with either secondary or tertiary education are more likely to have access to the internet (Choudrie and Dwivedi, 2005). Al-Shafi & Weerakkody (2010) state that, in regard to e-government usage, 75% of postgraduates use e-government services, while just 46.8% of those had high school or lower qualifications. With this in mind, the hypothesis is stated as follows:

H9*: Actual Use will be seen differently in terms of education.*

3.2.10 Age

Various IS studies have found that age has important, direct and moderating effects on the adoption and use of behaviours, in addition to behavioural intention (Al-Shafi and Weerakkody, 2010; Dwivedi and Lal, 2007; Bigne, Ruiz and Sanz, 2005; Venkatesh *et al.*, 2003; Venkatesh and Davis, 2000b; Morris and Venkatesh, 2000). Furthermore, it has been found that the 15–17 year age group was most likely to utilise computers in the USA, followed by the 26–35 age group. Similarly, in several West European countries (Carveth and Kretchmer, 2002), it was found that the older demographic groups are less inclined to use computers and the internet, compared with the younger population. In the United Kingdom, 85% of 16–24 year olds have internet access, but amongst older age groups, only 15% of 65–74 years and 7% of those 75 years and older have access (Carveth and Kretchmer, 2002).

In addition, Dwivedi *et al*. (2007) found that most broadband subscribers are aged between 25 and 54 years. In Saudi Arabia, Al-Ghaith, Sanzogni and

Sandhu (2010) showed that younger people in Saudi Arabia are more willing to use e-services. In the context of e-government, the results gathered by (Al-Sobhi, 2011) show that less than 10% of those using e-government services are above 45 years old. Accordingly, it can be predicted that, when considering m-commerce users, younger and middle-aged individuals are expected to exhibit differences, with this group expected to show more indifferent use, whereas older individuals will not use the technology as often as those who are younger. Accordingly, through this research, the following hypothesis is considered:

***H10**: There will be a difference between the users of various age groups.*

3.3 Chapter summary

This chapter ends by providing a conceptual model that maps the likely relationship between adoption of m-commerce and its use. This suggested model is new, since it is a combination of UTAUT with the two technology acceptance elements previously considered separately. According to research, there is no previous study that has tried to integrate the aspects that impact adoption and usage of m-commerce, or to form relations between these aspects. The key frame of reference and prospective lines of inquiry for the empirical research that will be conducted in this thesis is presented in this model. This empirical research will study the aspects that impact the adoption and implementation of m-commerce in Saudi Arabia. Businesses that wish to execute and adopt m-commerce applications could utilize this model as a

frame of reference. It could even act as a decision-making tool that would assist business firms and officials in their attempts to execute and spread m-commerce.

The evaluation and understanding of m-commerce acceptance and usage by scholars and researchers in the domain of m-commerce will be enabled through the use of this model. Chapter 4 is a review of the selected research approaches for the empirical study. The suggested conceptual model will be employed as the source for empirical investigation in the subsequent chapters (5 and 6).

Chapter Four

Research Methodology

4.1. Introduction

This chapter provides an overview of, and further develops, the study approach. The description relates to several study approaches that could have been adopted in the area of Information Systems, and is therefore the basis and justification for all of the work behind the study.

Primarily, there will be an analysis of interpretivism and positivism in Section 4.2, with a discussion providing an explanation for the choice of the quantitative approach for the study, and a justification regarding the selection of a survey study approach in Section 4.3. After that the sampling section (4.4) is followed by selection of the research strategy in Section 4.5. Section 4.6 deals with data collection, and data analysis is considered. The chapter summary is in Section 4.7.

4.2. Selecting a research philosophy

One of the key roles adopted by a researcher when carrying out such a study is the selection of the most suitable study approach. The selection of the most suitable study approach is a significant challenge facing all academics and investigators, irrespective of domain. Selecting the most suitable strategy in the area of

Information Systems (ISs) is problematic, as it is seen as a multi-disciplinary domain (Galliers, 1994). It is also impossible to cover IS from just one theoretical perspective (Straub, Boudreau and Gefen, 2004). Accordingly, the research question posed should provide the start point for the selection of the most suitable approach. Importantly, no individual strategy can be viewed as more suitable than others; however, the nature of the study can help to define the approach most suitable in the context of that particular research (Straub, Gefen and Boudreau, 2005). A number of researchers in the domain of Information Systems have suggested that a positivist approach is the most commonly utilised, whilst interpretivism is usually recognised as a secondary approach (Chen and Hirschheim, 2004; Orlikowski and Baroudi, 1990).

Positivistism is an epistemology that aims to test a theory. A generation of researchers have developed hypotheses in an attempt to gain insights into, and understanding of, the topic under examination. It is therefore suggested that there is a phenomenon beyond the human mind (Bryman and Bell, 2007; Orlikowski and Baroudi, 1990). In fact, the positivist epistemology commonly distinguishes between values and facts (Bryman and Bell, 2007; Chen and Hirschheim, 2004). This being the case, the beliefs of scholars are not taken into account as regards the study results, as the positivist epistemology clearly differentiates between reality and the investigator (Weber, 2004). From an ontological perspective, positivists do not consider the beliefs, intentions and values of the researcher (Weber, 2004). This approach begins by bringing together the data analysis and theory constructs in

order to create a conceptual model, the outcome of which facilitates the generation of data symmetry (Bryman and Bell, 2007).

Another line of approach is that of interpretivism, which describes models centred on interpreting the meaning of subjects, in an attempt to gain insights into the phenomena under examination (Orlikowski and Baroudi, 1990). Such an epistemology provides support for the notion that the beliefs and intentions of investigators cannot be entirely disregarded. Accordingly, interpretivism is recognised as knowledge that may be gathered through actual life experiences (Weber, 2004). This approach thus disregards objective and factual philosophy-centred assumptions from the positivist perspective, as highlighted by Orlikowski & Baroudi (1990). Interpretivism in action is more inclined to direct attention to the subjective meaning of social action in regard to future achievement (Bryman and Bell, 2007).

The interpretivist and positivist approaches are distinguished by Sandberg (cited in Weber, 2004), who outlines the differences, as detailed in the table below.

Table 4.1: Differences between positivism and interpretivism, according to Sandberg (in Weber 2004, p IV)

Meta-theoretical Assumptions	Positivism	Interpretivism
Ontology	Person (researcher) and reality are separate.	Person (researcher) and reality are inseparable (life-world).
Epistemology	Objective reality exists beyond the human mind.	Knowledge of the world is intentionally constituted through a person‘s lived experience.
Research Object	The research object has inherent qualities that exist independent of the researcher.	Research object is interpreted in the light of the meaning structure of the person‘s (researcher‘s) lived experience.
Methodology	Statistics, content analysis.	Hermeneutics, phenomenology, etc.
Theory of Truth	Correspondence theory of truth: one-to-one mapping between research statements and reality.	Truth as intentional fulfilment: the interpretations of the research object match the lived experience of the object.
Validity	Certainty: data truly measures reality.	Defensible knowledge claims.
Reliability	Reliability: research results can be reproduced.	Interpretive awareness: researchers recognise and address the implications of their subjectivity.

Accordingly, and in line with the review provided above, establishing the most suitable study technique can be complex, if one has to consider the various dimensions and their effects on the choice of research assumptions. In essence, this study is centred on the various elements of the philosophical assumptions, and positivism is recognised as being the most appropriate study approach to examine the factors that affect m-commerce service acceptance. This choice is further justified below.

- As per Chapter two, UTAUT (Unified Theory of Acceptance and Use of Technology) was applied in an attempt to gain a deeper understanding of m-commerce acceptance. Essentially, it is centred on conceptualizing UTAUT's new constructs. The main value of the positivist strategy lies in its capacity to generate hypotheses that can be tested through the gathering of data (Bryman and Bell, 2007).

- Another reason behind the selection of positivism is that the research seeks to use statistical methods to test the hypotheses.

The above table details the rationale behind choosing the positivist approach as the most suitable. The research does not suggest that it would not benefit from the application of other epistemologies; however, it can be argued, when considering the insight into the philosophical assumption above and the approach adopted in this study, that positivism is the most appropriate approach for this research. An overview is given below of the qualitative and quantitative approach methodologies in more detail, in a section which further justifies this choice of research approach.

4.3. The qualitative and quantitative approaches

Discussion as to the respective merits of qualitative over quantitative approaches has been discussed in terms of various factors, all of which may be mainly attributed to their underlying methodological and philosophical assumptions (Gelo,

Braakmann and Benetka, 2008). There is some degree of consensus regarding the main meanings and associated practical implications. Essentially, the quantitative approach is regarded as being most applicable when studies seek to provide observations with figures or numbers, or to otherwise establish a universal statement (Bryman and Bell, 2007). On the other hand, as Myers (1997) stresses, the qualitative approach in the context of Information Systems may be more valuable owing to its utilisation of qualitative data, namely documents, interviews and observations, which help to establish understanding of, and insight into, the social phenomena under investigation.

With this in mind, Denzin and Lincoln (2005) advocate qualitative studies, owing to the fact that the investigator must examine situations in their normal environment, seeking to gain understanding of phenomena in regard to their meaning as interpreted by the subjects. On the other hand, quantitative approaches provide an empirical investigation of social phenomena through the use of statistical and mathematical data approaches. Moreover, the qualitative strategy is linked with various types of collocation, techniques and approaches, namely interviews and observations; quantitative approaches, on the other hand, make use of questionnaires and surveys (Bryman and Bell, 2007). Harling (2002) provides an overview of the differences between quantitative and qualitative research from three main perspectives: firstly, the application of quantitative studies is common when describing a phenomenon, whilst qualitative studies are adopted in order to understand a phenomenon; secondly, in both regards, the impersonal and personal

role of the investigator is different; and thirdly, the objective of quantitative studies is to discover knowledge, whereas qualitative studies are concerned with the construction of knowledge.

As can be seen from the above, there is a need for the present researcher to justify the use of the quantitative approach, as stated below:

1. The study is to examine social phenomena, through statistical data approaches;
2. It utilises a survey tool for data collection, as there is a need to consider a large sample through all three stages of the research.
3. Time and cost considerations are fundamental. The study comprises three sub-studies, each of which depends on the previous one.

The section below discusses the sample selection in greater detail.

4.4. Sampling

In the data collection phase, the key start point of any research is to make contact with respondents who are representative of the study population (Teddlie and Tashakkori, 2009; Tashakkori and Teddlie, 1998). The required data for analysis and evaluation of the proposed model and hypothesis were collected using a quantitative approach.

Researchers follow a certain sampling frame, which can be stated as the

procedure of selecting an appropriate number of participants who are representative of the entire targeted population. This is because it is unlikely for a researcher to reach all the people who represent the targeted population, be it quantitative or qualitative research (Cohen, Manion and Morrison, 2013; Mkansi and Acheampong, 2012; Collis and Hussey, 2009; Teddlie and Tashakkori, 2009).

Researchers usually conduct random or non-random sampling of the subjects, since it is not feasible to reach the entire research population (Mills, Airasian and Gay, 2012; Teddlie and Tashakkori, 2009; Collis and Hussey, 2009; Teddlie and Yu, 2007). There are many limitations when attempting to study entire populations (financial issues, access, the necessary huge impact on subjects and time constraints). So the findings of the research will be more generalisable, the greater the size of the population. Consequently, researchers have to adopt an approach that reduces the population into manageable units, so as to fulfil the objectives of the research. Sampling is this procedure by which the number of participants is reduced as much as possible. This is a critical phase, and the researcher has to work carefully in order to successfully generalize the findings (Collis and Hussey, 2009; Teddlie and Yu, 2007).

Probability sampling and non-probability sampling methods are two kinds of sampling and selection approaches. As previously indicated, there is no common consensus among the main authors on several main terms in the methodology, its classifications and definitions. This also applies to sampling approaches (Collis

and Hussey, 2009; Teddlie and Yu, 2007; Tashakkori and Teddlie, 1998).

Sampling and selection procedures are classified into four categories (Teddlie and Yu, 2007), namely Purposive, Probability, Mixed methods and Convenience sampling, whereas sampling methods are categorized into two categories by Tashakkori and Teddlie (1998): probability and non-probability.

All these research types have different approaches. Different methods come under probability sampling: stratified random, systemic random and simple random. Non-probability comprises sequential sampling, snowball sampling and so forth (Tashakkori and Teddile, 1998).

In any research, sample size is a significant aspect since it has considerable influence on the analysis and generalization of findings. Campbell (2006) states that the sample size required is dependent on the statistical analysis to be used. In SPSS software, the Kaiser-Mayer-Olkin (KMO) measure is used to determine sample adequacy. KMO values of greater than 0.5 are acceptable and indicate an adequate sample size (although larger values are better) (Field, 2005; Kaiser, 1974).

The sample for this research included in its target population any Saudi Arab citizen who possessed a mobile phone. These citizens were included since they had much more chance of accepting and using m-commerce facilities in

comparison to those who did not (Wei *et al.*, 2009). The author's guide to his distribution approach is presented in Wei *et al*. (2009). The areas in Saudi Arabia where the survey instrument was distributed in different public places in each study included shops in various shopping malls from different cities across Saudi Arabia. Every fourth individual that went into the shop was asked to participate in the research (simple random) to make sure there was no bias in the data collection; those who were unwilling to take part in the survey at the shop were emailed the survey after requesting their email address. In each study, the partesepants are unlikely to be the same people as thtere are almost five months between each study the sample size was above 300 participants and there , and the KMO was greater than 0.5.

4.5. Research Strategies

Studies begin with a complete review of the literature with the objective of understanding already acquired knowledge, as well as to become familiar with research methods and theories. Inconsistencies in results, as well as significant controversies, are also taken into account. Moreover, the research questions that went unanswered in the domain under examination would also be focused on (Bryman and Bell, 2007). This phase led to the utilisation of secondary data, which is that data acquired by other scholars and made available in the form of books, journal articles and reports and the like (Collis and Hussey, 2003). The literature review is an important phase associated with the satisfactory achievement of study aims and objectives. This thesis provided a literature review

in order to establish any gaps in the study domain, as well as to emphasize the main area to be studied.

One further data source is primary data, which can be linked with the study area. As has been stated by Collis and Hussey (2003), primary data is the data gathered by the study investigators in an attempt to satisfy the study questions, in other words, to fulfil the aims and objectives of the study. This type of data may be gathered through the application of various approaches, such as action research, archival research, case studies, cross-sectional studies, field experiments, grounded theory, laboratory experiments, longitudinal studies and surveys (Lewis, Saunders and Thornhill, 2009; Bryman and Bell, 2007; Orlikowski and Baroudi, 1990). The choice between different strategies rests on the questions emphasised by the scholar (Avison and Pries-Heje, 2005). Such data may be gathered through various instruments, including interviews, both semi-structured and structured, observation and questionnaires (Lewis, Saunders and Thornhill, 2009; Bryman and Bell, 2007).

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Due to the fact that this research has adopted the UTAUT framework as an accepted model, a theoretically based questionnaire survey approach was recognised as being the most suitable in the context. A number of different studies in the Information Systems area generally, as well as that of m-commerce specifically, have utilised this framework, usually by using a survey approach as

the data collection approach (Zhou, Lu and Wang, 2010; Kim, Choi and Han, 2009a; Wei *et al.*, 2009; Kim, Chan and Gupta, 2007; Wu and Wang, 2005a).

Accordingly, this study adopts the survey method for data collection. Moreover, the research is a student research project with a limited budget, and limited access and resources; thus, the questionnaire survey is regarded as the most appropriate, when compared with other approaches, such as interviews.

The study approach adopted in this research was designed with the aim of analysing elements affecting m-commerce application acceptance in the context of Saudi Arabia. Accordingly, the first research phase, which centred on m-commerce services, made use of the initial conceptual model; the second research phase adopted the same conceptual model, but specifically as regards m-commerce applications, namely that of mobile social network services; in the third phase of research, the insignificant constructs, as established in the first and second phases, were removed, with an additional construct subsequently incorporated. This proved valuable in the creation of the research hypotheses, as well as the choice of survey research approach.

4.6. Data Collection

4.6.1 The use of the questionnaire method

The questionnaire **s**urvey study is a fundamental technique of measurement adopted in social studies (House, 2004; Pinsonneault and Kraemer, 1993). It is highlighted by various researchers that the main objective of a questionnaire survey is to produce quantitative statistics relating to various elements. Moreover, a questionnaire survey is a systematic approach centred on gathering data from a sample with the aim of creating quantitative attributes. House (2004) further suggests that the survey methodology has the aim of identifying the principles surrounding the analysis, collection, design and processing of surveys in regard to cost, quality and speed. The survey methodology is implemented not only in scientific domains but also in professional management fields.

Questionnaires are specifically created for a particular study domain, and are likely to collect different types of information, including behavioural patterns or opinions. In regard to the mobile commerce area, there are various studies that have made use of the questionnaire tool to gather data, including those by Zhou, Lu and Wang (2010), Kim, Choi and Han (2009b), Wei *et al.* (2009), Kim, Chan and Gupta (2007), Wu and Wang (2005b) and Chong (2012). There are various principles that a researcher should consider during the process of questionnaire design, including seeking to achieve the minimum of data necessary for the study purpose, owing to the fact that respondents' time is precious, and

also owing to the fact that the time invested in answering questions may impact mood, thus affecting answers. Essentially, a questionnaire should not pose questions that may be viewed as unnecessary, or when the data derived from such can be gathered through other means. In addition, there is a need to ensure that all questions can be answered. Moreover, all questions should be answered honestly; therefore, it is important to highlight that those questions that are difficult to answer may not produce honest answers. Lastly, all questions need to be answered, meaning that none are rejected. In regard to this final point, it is recognised that questions centred on sensitive issues may not be answered (Coolican, 2009).

Attitudes, beliefs and opinions were measured on a Likert scale, in an attempt to assess their satisfaction with products. Coolican (2004) state that there are various benefits associated with the use of the Likert approach, such as ease of completion, keeping respondents directly involved and demonstrating a keen degree of reliability and validity. A scale ranging from 1 to 5 was used for this study, as follows: Strongly Disagree; Disagree; Neither; Agree; Strongly Agree (respectively) as already stated (Yu,2012; Wei at al, 2008). Moreover, it is important to ensure scales are labelled consistently, as this provides agreement direction and a greater degree of reliability. In this research, one key benefit associated with the adoption of UTAUT in the analysis part was that UTAUT is recognised as offering a good validation measurement inventory.

Measurements for trust, cost, performance expectancy (PE), effort expectancy (EE), social influence (SE), Facilitating conditions (FC) and behaviour usage intention (BI) were devised based on the work of previous researchers, namely Kim, Choi and Han (2009b), Wei *et al.* (2009), Lu *et al.* (2008), Kim, Chan and Gupta (2007), Park, Yang and Lehto (2007), Wu and Wang (2005a) and Cheong and Park (2005), although changes were made to fit the specific context of mobile commerce.

Brief, clear and detailed instructions were incorporated within the questionnaire, with a mind to ensuring ease of response. The participants were advised of the nature and objectives of the survey through a cover letter. The questionnaire utilised a five-point Likert scale, as already stated (Wei *et al*., 2008), and was selected as the key tool for the questionnaire. The questionnaire consisted of numerous parts, one of which was to gather data from the perspective of peoples demographic background (Al-maghrabi and Dennis, 2011) .

27 items were included in the first draft of the questionnaire (five-point Likert scale). Furthermore, five multiple-choice questions and one checkbox section were incorporated. In the view of Brinkman (2009), with regard to content validity, many professionals hold the view that all aspects of the construct are to be captured. Accordingly, in the context of this research, four experts in the field of information technology application were involved. The questionnaire was subsequently finalised, and included a total of 27 statements.

Wei *et al*. (2008) served as the model guide for the distribution method. Shops located in different shopping malls in Saudi Arabia were the sites where the

survey instrument was distributed. Every fourth individual entering a shop was included in the research. Those unwilling to respond to the survey *in situ* were emailed the survey after their email address had been requested.

4.6.2 Questionnaire Translation

Owing to the fact that the questionnaire was designed in English, and considering that the targeted study context was that of Saudi Arabia, the first language of which is Arabic, there was a need to have the questionnaire translated into Arabic, with the translation subsequently validated through the use of four academic staff in the target country. Emphasis was placed on accuracy and fluency, and made use of the back-translation approach, as highlighted by Saunders, Lewis and Thornhill (2002). According to Brislin (1970), this strategy can garner a more in-depth understanding, and the version encompassing the target language can be improved.

4.6.2 Pilot Study

A pilot study was carried out for each of the studies for different people. The key aim of the pilot studies was to improve the questionnaire prior to its distribution

across the study sample. Pilot study participants were needed in order to highlight any problems the study population might experience when completing the questionnaire survey. In addition, the pilot study was recognised as being able to assist in establishing whether or not the survey instructions were clear enough. Following, the pilot, the study was disseminated amongst the study sample in Saudi Arabia.

4.6.3 The reliability and validity of the questionnaire

In order to have a reliable survey instrument, and thus confidence in the findings, instrument validation processes were applied to each study. This study involved primary component factor analysis with Varimax Rotation to test for convergent validity, the Keiser–Meyer–Olkin (KMO) measure for sample adequacy, and Cornbach's alpha as a test for reliability. Factor analysis was used to reduce the number of question items into a smaller set of unique measurement scales (Field, 2006, p. 619).

As noted by Straub, Boudreau and Gefen (2004), construct validity is recognised as one of the various validity subtypes that focus on the degree to which a particular instrument or test has the ability to efficiently measure a theoretical approach; content validity refers to the extent to which an instrument is able to adequately reflect the content universe to which the instrument will be generalised, where, overall, such validity is established through expert judges or

plans, and literature reviews; lastly, reliability refers to the approaches delivering a true construct score (Straub, Boudreau and Gefen, 2004). With this taken into consideration, instrument validation should be applicable across various periods, both prior to and following the collection of data. Reliability analysis was used to test the accuracy and consistency of the question items within each subscale. Reliability also relates to the consistent replication of measurements using the survey instrument within different samples.

4.7 Summary

In this chapter, differences between the study approaches and data-gathering methods were highlighted. Through this overview, the application of the positivist approach was justified. It was not suggested that the interpretivist approach could not be adopted; rather, the claim was made that the positivistic approach was more suited to this particular study.

A data collection approach was selected for the study and presented, with the various principles needing to be taken into account by the researcher when designing the questionnaire (notably translation and tool validation). Lastly, the way in which the pilot study was to be carried out for each phase of research was described.

Chapter Five

Empirical analysis of drivers of mobile commerce adoption

5.1 Introduction

The concept of m-commerce has aroused significant interest over recent years in Saudi Arabia, and it has benefitted from considerable development. According to De Vere (2012), in Saudi Arabia, 60% of mobile users own smart phones, while, in the US, the market penetration of smart phones was recorded as 44%, according to De Vere's study. Moreover, in Saudi Arabia, 85% of smart phone users have access to the internet (Crum, 2012). In addition, the total number of mobile subscriptions had increased to approximately 53.7 million by the end of 2011, up from only 2.5 million in 2001 (CITC, 2011).

In contrast to more conventional electronic commerce (e-commerce), the key benefit associated with m-commerce is that, through the use of mobile terminals and networks, users may participate in omnipresent communications without the restrictions of wired solutions. Accordingly, it can be seen that m-commerce significantly enhances user efficiency. Through that initiative, mobile users are able to gain access to information in real time, and can communicate and purchase anywhere, at any time. With these advantages, m-commerce offers key innovation, and induces a number of opportunities, particularly for organisations. Furthermore, it is considered that user satisfaction may be enhanced significantly through m-commerce, thus providing the potential for the enhancement of user behaviours.

Currently, there exist a number of obstacles and issues in regard to the development of m-commerce, namely the restrictions associated with mobile terminals, i.e. inconvenient input method, limited power, low resolution, small screen, etc., as well as the high costs associated with mobile services, and the complicated utilisation of various functions (Tao Zhou, 2008). Such issues will impact the acceptance of m-commerce amongst potential users of the technology.

In a number of industrialised, technology-savvy countries, namely China, the USA and those within Europe, various theoretical frameworks have been devised in an attempt to understand the factors affecting the adoption of information and communication technologies (Chong, Chan and Ooi, 2011;Benou and Bitos, 2009b; Lu *et al.*, 2008; Carlsson *et al.*, 2006; Davis, 1989b). Accordingly, the overall aim of this study is to examine the revised model constructed in Chapter three, with specific focus on Saudi Arabia.

5.2 Research Method

A quantitative approach is implemented, with the aim of gathering those data relating to the study topic. The design supports the gathering of information through validated collection tools. The information has been analysed objectively, with the utilisation of the statistical procedures available in SPSS software.

5.2.2. Survey instrument development

A quantitative approach is adopted for the work report in this study. The questions were taken from a number of relevant studies with the necessary validation and wording modification (Kim, Choi and Han, 2009b; Wei *et al.*, 2009; Lu *et al.*, 2008; Kim, Chan and Gupta, 2007; Park, Yang and Lehto, 2007; Wu and Wang, 2005a; Cheong and Park, 2005). For this work, a Likert scale ranging from 1 to 5 is used, as follows: Strongly Disagree; Disagree; Neither; Agree; Strongly Agree

(Appendix 1).

5.2.3. Pilot Study

There are various reasons why a pilot study should be conducted, one of the main being that it can help to establish identification of where project protocol may not be followed, and where the study may subsequently fail to fulfil its objectives.

In the context of this study, the first stage was to create a survey that was based on the literature review; secondly, it was distributed to five experts. After gaining their feedback and insights, the first draft of the ultimate questionnaire was then created.

The next stage involved distributing the survey to 50 volunteers aged between 18 and 45 years, all of whom were resident in Saudi Arabia. This facilitated the use of Cronbach's α (*alpha*), which helps to calculate and test reliability in SPSS. Markedly, the *alpha* needs to be 0.7 or more before it can be accepted. The results are presented in Table 5.1, below.

Table 5.1: Summary of the results from Cronbach's a*lpha* analysis

Question	N item	Cronbach's a*lpha*
PE	5	0.881
EE	4	0.764
SI	3	0.802
BI	4	0.735
Trust	4	0.848
Cost	3	0.794
FC	4	0.731

A result of 0.7 or more for the questions detailed in the question above was obtained, which markedly reflects an acceptable degree of dependability.

5.2.4. Data Collection

Data were collected through a survey method, by randomly selecting respondents from different public places and cities across Saudi Arabia. A pilot study was initially carried out to understand the different dynamics of the items for further review. Individuals with personal mobile devices were the target population for the main study. The consideration to include these individuals in the study was made on the basis that they were more likely to adopt m-commerce compared to those without a mobile phone.

Wei *et al* (2009) served as the model (guide) for the distribution method. Within 60 days, out of a total of 1,700 surveys distributed, a total of 820 respondents returned them, of which 574 were usable.

5.3. Results

The data were analysed using SPSS software (Ver. 18), and statistical significance was set at $p<.05$ as the deciding criterion.

5.3.1 Demographic profile of the participants

Table 5.2 below presents the participants' profile according to their gender, age and education. This helped to pinpoint the demographic differences in m-commerce acceptance variables.

Table 5.2
Demographic characteristics of the participants (n=574)

Demographic	***Category***	***Frequencies (n)***	***%***
Gender	Male	249	43
	Female	325	57
Age	15-18 years	65	11
	19-25 years	260	45
	26-35 years	198	34
	36-45 years	39	7
	45+ years	12	2
Education	Less than high school	31	5
	High school	121	21
	Diploma	43	7
	Bachelor	303	53
	Postgraduate	76	13

Of the 574 respondents, a slight majority were female (57%, n=325), while 43% (n=249) were male. The majority were in the young age group (18-25 years) (45%, n=260), followed by 26-35 years (34%, n=198), 15-18 years (11%, n=65), 36-45 years (7%, n=39), while only 2% (n=12) were aged 45 years and over. As for education, the majority (53%, n=303) held undergraduate level degrees, 13% (n=76) held postgraduate degrees, 21% held high school certificates, 7% (n=43) held a diploma, while 5% (n=31) had less than high school qualifications.

5.3.2. Reliability and validity of the instruments

The author used primary component factor analysis (PCA) with Varimax Rotation to measure convergent validity. Tabachnick and Fidell (2001, p. 588) recommend at least 300 cases / participants for factor analysis. Other texts suggest a 10 to 1

ratio, that is, 10 cases for each item / variable to be factor analysed (Tabachnick and Fidell, 2012; Hair *et al.*, 1998). This analysis involved 26 items and 574 participants, and would appear to be a sufficient sample size. SPSS also generated the Keiser–Meyer–Olkin (KMO) measure. This represents the ratio of the squared correlation between variables to the squared partial correlation between variables. An eigenvalue approaching 1 indicates that the patterns of correlations are closely grouped, and are likely to yield factors that are distinct (and vice versa) (Campbell, 2006, p. 47). KMO values of greater than 0.5 are acceptable and indicate an adequate sample size (although larger values are better) (Field, 2005; Kaiser, 1960). The KMO measure of sampling adequacy was 0.85, which is well above the threshold value of 0.5, indicating that the sample size is adequate (Field, 2005). Thus, we can be confident that the data support the use of factor analysis.

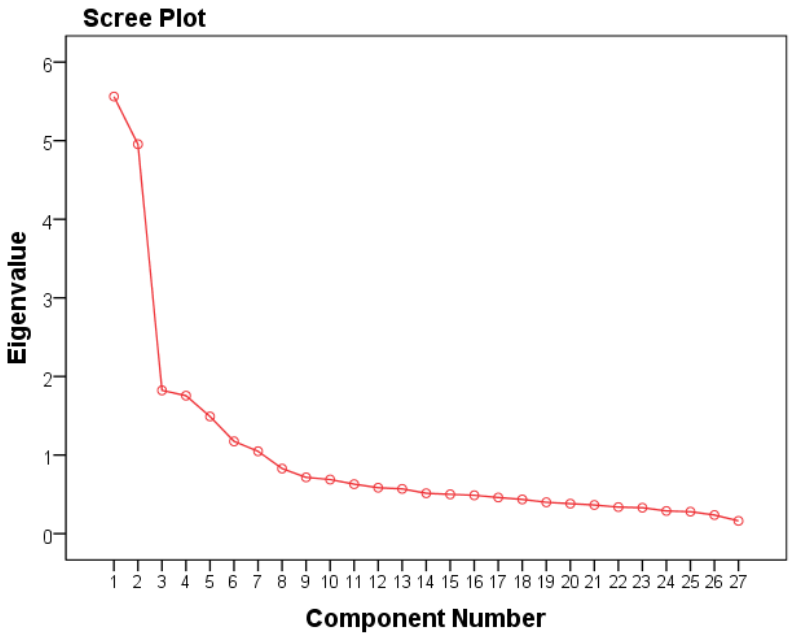

Figure 5.1

Factor Loading Results

The scree test (Cattell, 1966) uses eigenvalues greater than one as the cut-off for

identifying unique components (Eder, 1989). Following Field (2009a), factor analysis was considered suitable for the data involved, given the importance of Barlett's test of *sphericity*. Seven factors were extracted with values greater than 1.0 (see Fig. 5.1). These seven unique components emerged naturally (Fig 5.1). The components / factors are arranged in decreasing order of importance in the rotated component matrix (Table 5.3), and show that Performance Expectancy was the most important component. Most coefficients loaded highly above 0.6 (Hu and Bentler, 1999; Hair *et al.,* 1998). An item loading of 0.4 is the minimum recommended value in IS research (Dwivedi *et al.*, 2006b; Straub, Boudreau and Gefen, 2004).

Table 5.3 shows that the factor loadings also had 'simple structure,' meaning that each item loaded strongly on only one component, and each component comprised a number of strongly loading variables (Pallant, 2005; Thurstone, 1947). Together, the seven components accounted for (explained) 66% of the total variance. The first (rotated) component (Perceived Performance Expectancy) is associated with the largest eigenvalue, and this component explained 20.60% of the variance, being the most influential factor by a considerable margin.

Factor 1 contained five items corresponding to the Perceived Performance Expectancy scale, which loaded with high coefficients (above .7). Factor 2 explained 18.35% of the variance, and comprised four items pertaining to the Trust scale, which loaded with high coefficients (above .7). The next five factors each explained a further 3.88 to 6.75% of the variance. Factor 3 included the four Perceived Effort Expectancy items, which loaded above .6. Factor 4 comprised the three Cost items, which loaded above .5. Factor 5 contained three Social Influence items, which loaded highly above .7. Factor 6 contained the four Facilitating Conditions items, which loaded above .5. Finally, Factor 7 included the four Behavioural Intention items, which loaded above .6.

Table 5.3
Rotated Components Matrix[a]

	Factor Components & Loadings						
	Factor 1 Performance Expectancy	Factor2 Trust	Factor 3 Effort Expectancy	Factor4 Costs	Factor 5 Social Influence	Factor 6 Facilitating Conditions	Factor 7 Behavioural Intention
PE3	.827						
PE4	.801						
PE2	.797						
PE1	.793						
PE5	.755						
TRUST4		.824					
TRUST3		.818					
TRUST1		.772					
TRUST2		.733					
EE2			.779				
EE1			.773				
EE3			.685				
EE4			.660				
COST2				.870			
COST1				.866			
COST3				.575			
SOCIAL2					.878		
SOCIAL1					.831		
SOCIAL3					.747		
FACILIT3						.785	
FACILIT4						.753	
FACILIT1						.622	
FACILIT2						.535	
BN4							.685
BN1							.681
BN3							.646
BN2							.636
Eigenvalues	5.56	4.96	1.82	1.76	1.49	1.17	1.05
% of variance	20.60	18.35	6.75	6.50	5.52	4.35	3.88
KMO = .85, p<.001							

This research analysed reliability by applying Cronbach's *alpha*. According to (Gliem and Gliem, 2003), when using Likert-type scales, it is imperative to calculate and report Cronbach's *alpha* coefficient for internal consistency

reliability for any scales or subscales one may be using. The analysis of the data then must use these composite scales or subscales. The closer Cronbach's *alpha* coefficient is to 1.0, the greater the internal consistency of the items in the scale. The lowest threshold for adequate reliability is α = .7 (Gliem and Gliem, 2003); however, to some extent, a level of .6 is acceptable. Markedly, various scholars (Hinton and Brownlow, 2004; Sekaran, 2000; Robinson, Wrightsman and Andrews, 1991) suggest four levels of reliability: excellent (0.90 and above), high (0.70–0.90), high-moderate (0.50–0.70) and low (0.50 and below).

Table 5.4 illustrates the reliability for each construct, along with its interpretation. A high Cronbach value for all seven constructs indicates that they are internally consistent and measure the same content of the construct (Al-Shafi and Weerakkody, 2010). All items appear to be worthy of retention.

Table 5.4: Reliability of measurements

Construct	**N**	**Number Of Items**	**Cronbach's Alpha(α)**	**Type**
Behaviour Intention	574	4	0.73	High Reliability
Performance Expectancy	574	5	0.88	High Reliability
Trust	574	4	0.85	High Reliability
Effort Expectancy	574	4	0.76	High Reliability
Cost	574	3	0.79	High Reliability
Social Influence	574	3	0.80	High Reliability
Facilitating Conditions	574	4	0.73	High Reliability

n=sample size

5.3.3. Demographic Differences

Gender Differences in Frequency of Actual Use

A *chi*-square test of independence was performed to examine the relation between gender and frequency of actual use. The relation between these variables was not significant. The findings in Table 5.5 show that the largest percentage (91%) of actual use was 'daily use' for males, followed by females (85%). Slightly more females (9%) than males (5%) used m-commerce 'more than once per week.' Also, prevalence of 'weekly' use was low for both males (2%) and females (3%). Furthermore, a small minority of males (2%) and females (4%) use m-commerce 'monthly'. Table 5.5 represents Pearson's *chi*-square test, which confirms that there was no significant difference between males and females in their frequency of actual use ($X2$ (3, n=574) = 5.60, p = .133).

Table 5.5

Crosstab Analysis: Gender by Actual Use of m-commerce

			Gender		Total
			Male	Female	
ACTUAL USE	Monthly	Count	6	12	18
		% within gender	2%	4%	3%
	Weekly	Count	4	10	14
		% within gender	2%	3%	2%
	More than Once per Week	Count	12	28	40
		% within gender	5%	9%	7%
	Daily	Count	227	275	502
		% within gender	**91%**	**85%**	88%
Total		Count	249	325	574
		% within gender	100%	100%	100%

Note: Pearson *chi*-Square = 5.60 $p < .05$; n=574. No cells have an expected count of less than 5.

Testing Frequency of Actual Use by age difference

A *chi*-square test of independence was performed to examine the relation between age group and frequency of m-commerce actual use. The relation between these variables was significant.

Table 5.6 shows the cross-tabulation between actual use for the five age groups, and shows that age groups consistently reported 'daily use,' with the largest percentage of 'daily use' in the 15-18 age group (94%), followed by the 26-35 age group (89%), then the 18-25 age group (87%). Most older participants reported lower 'daily use', including the 36-45 age group (74%), and the 45+ age group (67%). These results support the idea that actual use differs for the age subgroups. Table 5.6 shows that Pearson's *chi*-square test was significant, indicating a difference among age groups in terms of frequency of actual use ($X2$ (12, n=574) = 22.44, $p < .05$).

Table 5.6

Crosstab Analysis: Age Group by Actual Use

			Age Group					
			15-18	18-25	26-35	36-45	45+	Total
ACTUAL USE	Monthly	count	1	6	6	3	2	18
		% within age	2%	2%	3%	8%	17%	3%
	Weekly	count	0	7	4	3	0	14
		% within age	0%	3%	2%	8%	0%	2%
	More than once per week	count	3	20	11	4	2	40
		% within age	5%	8%	6%	10%	17%	7%
	Daily	count	61	227	177	29	8	502
		% within age	**94%**	**87%**	**89%**	**74%**	**67%**	88%
Total		count	65	260	198	39	12	574
		% within age	100%	100%	100%	100%	100%	100%

Note: Pearson *chi*-Square = 22.44, $p < .05$; Cramer's V = .144, $p < .05$; n=574.

Testing Education Differences in Frequency of Actual Use

A chi-square test of independence was performed to examine the relation between education and frequency of actual use. The relation between these variables was not significant ($X2$ (12, n=574) = 11.97, Cramer's V = .083, p = .448).

Table 5.7 shows actual use across the five education groups, with all education groups consistently reporting highest 'daily use'. 100% of 'daily use' was reported by those educated below high school, followed by those with a high school diploma (90%), diploma group (88%), bachelor degree (86%) and finally postgraduate degree (83%). The results suggest that those with lower education tend to report higher actual use, but this difference is not statistically significant.

Table 5.7
Crosstab Analysis: Education by Actual Use

			Education					
			Less than high school	High school	Diploma	Bachelor	Postgraduate	Total
ACTUAL USE	Monthly	Count	0	5	2	8	3	18
		% within education	0%	4%	5%	3%	4%	3%
	Weekly	count	0	1	1	8	4	14
		% within education	0%	1%	2%	3%	5%	2%
	More than once per week	count	0	6	2	26	6	40
		% within education	0%	5%	5%	**9%**	**8%**	7%
	Daily	Count	31	109	38	261	63	502
		% within Education	**100%**	**90%**	**88%**	**86%**	**83%**	88%
Total		Count	31	121	43	303	76	574
		% within Education	100%	100%	100%	100%	100%	100%

Note: Pearson *chi*-Square = 11.97, $p < .05$; Cramer's V = .083, $p = .448$; n=574.
a. 10 cells (50.0%) have an expected count of less than 5. The minimum expected count is .76.

5.3.4. Regression

First, the impact of five predictors on usage intention was investigated using standard multiple regression. As a group, the five predictors explained 39.4% of the variation in usage intention; hence this is a reasonably good model, though 60.3% of the variation in usage intention scores is still unexplained, i.e., there are other unknown factors that may influence usage intention that are not accounted

for in this model (Field, 2009b).

The full model was significant (f = 73.781, MSE= .352, p<.001). Three of the predictors had a significant and positive impact on usage intention scores at the 0.001 level. The largest impact was for Performance Expectancy (β = .509, t=14.446, p<.001), as this factor had the largest standardised *Beta* (β) and t-values. This was followed by Costs (β = .185, t=5.180, p<.001), which was the second largest predictor of usage intention. Effort Expectancy had the lowest explanatory power (β = .151, t=4.085, p<.001).

Finally, neither Trust nor Social Influence were significant predictors of usage intention. The results suggest that for every one standard deviation increase in Performance Expectancy scores, usage intention increased on average by .509 points (based on the standardised *Beta* coefficient values). For every one standard deviation increase in Cost scores, usage intention increased on average by .185 points. Finally, for every one standard deviation increase in Effort Expectancy scores, usage intention increased on average by .151 points.

Table 5.8 displays the standardised regression coefficients (β) and intercept (constant), the t-values, R^2, adjusted R^2 for the impact of the five predictors on usage intention.

Table 5.8: M-commerce Acceptance Predictors → Behaviour Usage Intention

Predictors	**Usage Intention**
Trust	0.016
Cost	0.185***
Performance Expectancy	0.509***
Effort Expectancy	0.151***
Social Influence	0.055
R^2	.394
Adj. -R^2	.388
F-ratio	73.781***

*** significant at the 0.001 level of significance

Next, a standard multiple regression was determined to test the impact of usage intention and Facilitating Conditions on actual use (see Table 5.9 below). The R square value (0.091) is low, indicating that usage intention and facilitating conditions explained only 9.1% of the variation in actual use. The model was highly significant (F = 28.491, MSE = .370, p<.001). Usage intention significantly predicted actual use (β = .304, t=7.545, p<.001), with a one standard deviation increase in behaviour usage Intention scores, increasing actual use by .304 points (based on the standardised *Beta* coefficient value). However, Facilitating Conditions had no significant impact on actual use (β = .026, t=.659, p = .510).

Table 5.9: m-commerce Predictors → Actual usage

Predictors	**Usage Intention**
FC	0.26
BI	0.302***
R^2	.091
Adj. -R^2	.88
F-ratio	28.491***

*** significant at the 0.001 level of significance

Table 5.10: Summary of research hypotheses

HN	Research hypotheses	Result
H1	*Performance Expectancy will have a significant positive impact on behaviour usage intention*	Supported
H2	*Effort Expectancy will have a significant positive impact on behaviour usage intention*	Supported
H3	*Social Influence will significantly impact on behaviour usage intention*	Not Supported
H4	*Facilitating Conditions will significantly impact Actual Use*	Not Supported
H5	*Cost significantly influences behaviour usage intention.*	Supported
H6	*Trust positively and significantly affects behaviour usage intention*	Not supported
H7	*Behavioural intention concerning m-commerce service utilization will have a positive impact on the actual use of m-commerce*	Supported
H8	*Actual Use will be different between males than females*	Not supported
H9	*Actual Use will be different in terms of education*	Not supported
H10	*There will be a difference between users of various age groups*	Supported

In figure 5.2, the results of the multiple analyses found that trust, cost and performance expectancy significantly predicted usage intention. Performance expectancy had the strongest impact on usage intention, followed by cost, and then effort expectancy. Usage intention also predicted actual use, though the magnitude of the effect was moderate. Finally, facilitating conditions had no significant influence on actual use.

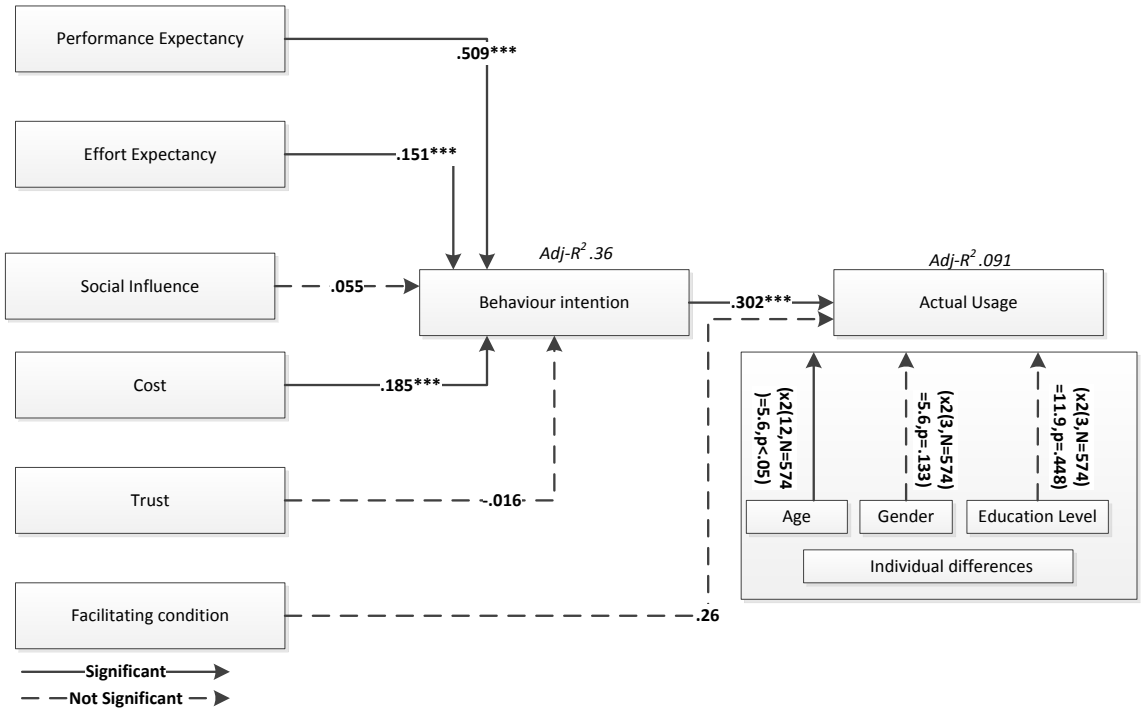

Fig. 5.2 Revised model

5.4. Discussion and Conclusions

This study presents the findings obtained from the data analysis of the survey that was conducted to examine m-commerce intention and usage. The findings are shown in several sections. The first step was a discussion of the validation and findings obtained on the adoption of m-commerce. The section presented findings that illustrated that the reliability of the test was confirmed, and that the

measures were internally consistent, as all of the constructs had Cronbach's *alpha* above 0.70.

Construct validity was established utilising PCA. Significant probability tests resulted. The components consistent with the number of independent factors in the conceptual model resulted in eigenvalues above 1, and factor validity was loaded and resulted in all items having a score of at least 0.40 (Dwivedi *et al.*, 2006b; Straub, Boudreau and Gefen, 2004). In addition, the results reveal that there was no cross-loading above 0.40, which confirms that both types of construct validity existed in the survey instrument. This concludes that the respondents showed strong agreement with factors included in the study in regard to examining the adoption of m-commerce.

A Pearson *chi*-square test was applied for analysis of the first part of the questionnaire; this study analysed demographic differences in social variables using the Pearson *chi*-square test. As stated earlier, various scholars have cited gender as being relevant in the use of technology (Al-Shafi and Weerakkody, 2010; Dwivedi and Lal, 2007b; Dwivedi *et al.*, 2006a). However, the present study established no significant statistical differences in terms of gender and the utilisation of m-commerce. It is believed that this result is due to the number of m-commerce applications that were offered, which covered both genders' needs.

As regards education level, it is emphasised that education is largely recognised as being one of the most fundamental drivers (Al-Shafi and Weerakkody, 2010; Choudrie and Papazafeiropoulou, 2006; Choudrie and Dwivedi, 2005; Choudrie and Lee, 2004). However, education has been found to make no statistical difference on the utilisation of m-commerce, meaning that education and/or qualifications are not recognised as relevant in the adoption of m-commerce. This finding gives an indication that m-commerce services all levels.

Finally from the age perspective, this study supports the statistical difference

between age groups in m-commerce frequency use, as reported in previous research (Al-Shafi and Weerakkody, 2010; Al-Gahtani, Hubona and Wang, 2007; Carveth and Kretchmer, 2002). In more detail, the research established that the greatest percentage of actual use was 'daily use', which was the case across all age groups considered in the study, although those in the 18–35 year bracket cited this most often, with those aged 36–45+ years stating this the least often. This means that older individuals are less likely to make use of m-commerce, which could be rationalised when considering a potentially lower level of awareness concerning the advantages of m-commerce, as well as a shortage of the necessary skills for utilisation.

As regards regression, the results of multiple regression analyses reveal that Performance expectancy has the strongest impact on usage intention, as stated in previous studies (Wei *et al.*, 2009; Venkatesh *et al.*, 2003). The performance expectancy factor is viewed as having an essential influence on behavioural intention in terms of adopting new technology. This provides a clear indication of the fact that attempts are needed from m-commerce professionals, implementers and officials to develop and enhance system content to ensure greater usefulness and value for people. Moreover, it can also be seen that Saudi people consider usefulness as being an essential component when adopting technology.

Owing to the fact that performance expectancy is one of the obvious factors impacting adoption, service providers need to develop the applications and content held by users as valuable, ensuring the capacity of the instrument to keep up with and improve users' fast-paced lifestyles. The design of content and services should be fundamentally concerned with the valuable and individual characteristics of m-commerce. In line with other authors' findings, this research acknowledges that m-commerce costs are quite costly, a view agreed upon by most Saudis, although m-commerce usage behaviour is not negatively impacted

as a result. This is considered to be an unexpected result, when taking into account the fact that this study has identified a positive relationship between usage behaviour and cost, while other studies have identified contrasting links (Chong, Chan and Ooi, 2011; Wei *et al.*, 2009; Luarn and Lin, 2005).

In terms of Effort expectancy, the literature review shows that, if the effort expectancy factor toward m-commerce adoption of behaviour factor is positive, then members of the public are more likely to carry out activities online (Wei *et al.*, 2009; Khalifa and Shen, 2008d; Bhatti, 2007; Venkatesh *et al.*, 2003). This supposition, though theoretical, has been supported through the findings of a survey conducted in this study, thereby suggesting that the effort expectancy factor has a strong, positive effect on m-commerce behavioural intention. Although the literature describes this factor as the extent to which the system is easy to use (Venkatesh *et al.*, 2003; Agarwal and Karahanna, 2000), the study findings provide evidence concerning the effort expectancy factor in the sense that there is a positive link with behavioural intention to use m-commerce.

It is believed that messages from a number of sources (friends, family, colleagues, advertisements, television programmes, newspapers and magazines, etc.) impact significantly on the way in which users implement technology (Chong, 2013; Khalifa and Shen, 2008c; Rao and Troshani, 2007; Fan *et al.*, 2005; Lu *et al.*, 2003; Khalifa and Cheng, 2002). However, when considering the results of this study, it has been found that social influence does not have a positive impact on the behavioural intentions of users to adopt m-commerce. With this in mind, we can make a link between this and performance expectancy which, means that Saudi people will now use services if they find them useful, as recognised in previous research (Min, Ji and Qu, 2008; Siau and Shen, 2003).

Trust was not found to have a positive effect on behavioural intention to utilise m-commerce, which is not an expected result, but supports Yaseen's (2012) finding. The findings of the current research clearly illustrate that trust in the construct is insignificant, therefore providing a rationale behind behavioural intention to use m-commerce, while Yaseen found no significant relation between trust and behavioural intention to use m-commerce.

This study has established that usage behaviour intention and facilitating conditions are important when establishing predictors of actual use. The research findings support the belief that there is a strong, positive link between m-commerce usage behaviour and behavioural intention. In this regard, it is noted by Venkatesh *et al*. (2003) that behavioural intention impacts the utilisation and implementation of technology, both positively and significantly.

Finally, facilitating conditions are not important predictors of actual usage. This may be owing to a lack of accessibility and/or availability in terms of government regulations, of service provider support or of other accessibility channels; thus, firms, organisations and the government should make keener consideration of end user services, as opposed to merely focusing on business-related services (see Figure 2).

5.5. Chapter Summary

This chapter has provided the first empirical study in this research. Considering the problem examined and its nature, it was found that a quantitative analysis would be most appropriate, and so the research was carried out using a questionnaire. In order to ensure data collection was successful, it was decided that a pilot study should be conducted. Furthermore, SPSS software was utilised,

with the aim of establishing reliability and validity.

The study established that there are strong, significant links between usage intention, and cost, effort expectancy and performance expectancy. Nevertheless, social influence and trust were not found to be important predictors in the context of m-commerce adoption behaviours. Furthermore, facilitating conditions were regarded as being insignificant in terms of actual utilisation. However, usage intention was established as being a key predictor. In addition, when considering age, educational level and gender, it was found that age has an impact on usage, while educational level and gender did not. The next study focuses on one m-commerce application, namely mobile social network services.

Chapter six

Predicting consumer decisions to adopt mobile social network services: an empirical examination

6.1 Introduction

The first study presented in this research examined the factors that affect consumer acceptance of m-commerce. The study established that there are strong, significant links between usage intention, and cost, effort expectancy and performance expectancy. Nevertheless, social influence and trust were not found to be important predictors of m-commerce adoption behaviours. Furthermore, facilitating conditions and the social variables gender and education were also regarded as being insignificant in terms of actual use. However, age was found to affect actual use. The main aim throughout this study is to use a conceptual model in regard to mobile social network services (MSNSs) in order to examine how such factors impact their adoption, which represents a subset of m-commerce.

Section 6.2 provides a brief review of social networks; then the chapter turns to mobile social network services (Section 6.3). Section 6.4 describes and develops the research methodology. Section 6.5 presents the findings obtained. Section 6.6, provides discussion of, and justification for, the data findings and the last section presents the conclusions. The chapter summary is in Section 6.7.

6.2 Social Network Services

According to conventional social network theory, a social network is a group of individuals, social entities or organisations linked by a number of social relationships, namely co-working, friendship or information exchange (Garton, Haythornthwaite and Wellman, 1997). The modern-day form of social network services directs emphasis to various types of relationship, including face-to-face

and friends; however, social network services have recently attracted much attention to the online community, as well as a technical mechanism, namely communication (Kwon and Wen, 2010). The first online social network site was introduced to users in 1997; since this time, several hundred have been created and adopted across the world, thus providing users with a number of interests, practices and support (Steinfield, Ellison and Lampe, 2008).

During recent times, social network services, otherwise known as SNSs, have achieved a significant degree of popularity amongst users of technology. Sites based on SNS have reached 82% of the world's online population, representing 1.2 billion users across the globe (ComScoRE, 2011). Accordingly, SNS has attracted much attention from research scholars, such as Ghazizadeh (2012), Boyd and Ellison (2010), Kwon and Wen (2010) and Steinfield, Ellison and Lampe (2008).

Social networks are constructed and validated by SNS for communities and individuals that share activities and interests with each other, or who hold an interest in examining the activities and interests of others (Kwon and Wen, 2010). Some SNSs facilitate individuals in establishing their own social network and facilitating communication with other people and entities; other SNSs attract people like Ghazizadeh (2012) through other factors, such as nationality or political views. In the view of Boyd and Ellison (2010), social network services facilitate the creation of profiles that may be public, semi-public or private and the establishment of lists of individuals with whom they might have common interests.

Individuals are able to utilise the system to search and establish a connection. Importantly, a number of SNSs require the user to create a personal profile, perform searches for others and add them as 'friends'. Many SNSs implement a

criterion whereby the friendship must be two-way, thus meaning that a friendship can only be established if it is accepted by both parties (Ghazizadeh, 2012).

When considering that social network services have become more and more universal, it can then be seen that such services are quickly becoming a fundamental part of users' lives. As stated above, 82% of the world's online population make use of SNSs. For example, *Facebook* is recognised as being the world's most widely-used SNS. Since its introduction in 2007, the amount of users has increased significantly on a daily basis. In December 2011, active users numbered 845 million (McCarra, 2012). In October 2021, *Facebook* users totalled 1.01 billion, as highlighted by the BBC (23/10/2012). During recent times, SNSs through mobile devices have increased significantly, mainly owing to the way in which social network information is facilitated (Guo *et al.*, 2011).

6.3 Why mobile social network services?

As the personal media market has become more prominent in today's top-level business, mobile social network services (MSNSs) have also come to play a central part. MSNS, which is a cellular business application service, is offered by virtual online social network services. According to Lu *et al.* (2011), online social network services are individual webpages that facilitate online human relationships, and can be regarded as such, as they build relations by putting together useful information, making it easy for sharing amongst different members.

As stated by Mohan, Agarwal and Dutta (2012), the average time spent on a mobile device in the United States is 2.7 hours a day. Similarly, around the world, in October 2011, social networking sites were visited by 1.2 billion people (82% of the online global population) (ComScoRE, 2011).

Time spent today on social networking sites is estimated to be one in every five minutes, where the most popular activity is building social relations (Aquino, 2012). Social networking websites were accessed by 45% of active Smartphone holders within the EU5 (the UK, Spain, Italy, Germany and France) in one month (comscoredatamine, 2013). In Germany, monthly mobile-based access to social networking websites increased enormously, by 27% in 2013, as user numbers surged to 19 million from 14 million previously.

What is more intriguing for advertisers and brands is that almost half of users, about 49.3%, pay serious attention to brand / organisation-initiated posts on social networks (Comscoredatamine, 2013).This is seen as a lucrative sign of business growth. The BBC (2012) reported that Facebook Mobile earnings had reached $152.6m; in 2013, 53% of Facebook revenue came from mobile advertising (Edwards, 2014). In addition, it is expected that Twitter will derive over 60% of its revenues from mobile ads (Emarketer, 2013a). However, one of the key issues confronting telecommunication companies is how to turn this huge potential related to MSNS into concrete revenue. Thus, MSNS's success is fundamentally dependent on understanding consumer acceptance trends. As well as established social networking on the internet, MSNS users have begun to make use of mobile information systems (ISs) and relevant platforms. We strong believe in their unique niche. This study therefore focuses on bringing out the important and influential features of user acceptance of MSNSs; our conceptual model for Saudi Arabia is reliant on that user acceptance.

6.4 Research Method

A quantitative approach is implemented, with the aim of gathering those data relating to the study topic. The design supports the gathering of information through validated collection tools. The information is analysed objectively, using the statistical tools available in SPSS software.

6.4.2 Survey instrument development

In order to establish the overall acceptance of a generalisation, this study implemented a survey in order to garner insights into consumer viewpoints. Importantly, the questionnaire was devised after consideration of a literature that put specific emphasis on m-commerce, information technology and SNSs. UTAUT was adopted for the analysis of mobile social network services. One key benefit of that is that it is that it is associated with, and recognised as, offering a good validation measurement inventory.

Measurements for trust, cost, performance expectancy (PE), effort expectancy (EE), social influence (SE), Facilitating Conditions (FC) and behaviour usage intention (BI) were derived from previous research work of relevance (Kim, Choi and Han, 2009b; Wei *et al.*, 2009; Lu *et al.*, 2008; Kim, Chan and Gupta, 2007; Park, Yang and Lehto, 2007; Wu and Wang, 2005a; Cheong and Park, 2005), though adaptations were made to fit the specific context of mobile social networking services.

Brief, clear and detailed instructions were incorporated within the questionnaire, which was devised bearing ease of response in mind. The participants were advised of the nature and objectives of the survey through a cover letter. The questionnaire utilised a five-point Likert scale, which was selected as the key tool. The questionnaire was formulated as numerous parts, in an attempt to gather data from the perspective of demographic background.

27 items were included in the first draft, with a five-point Likert scale adopted.

Furthermore, five multiple-choice questions and one checkbox were incorporated. In the view of Brinkman (2009), as regards obtaining content validity, many professionals hold the view that all aspects of the construct are to be captured. Accordingly, in the context of this research, four experts in the field of information technology application were involved. The questionnaire was then finalised, and included a total of 27 statements (Appendix 2).

6.4.3 Pilot Study

Following the design of the questionnaire, 50 volunteers completed it for the purpose of the pilot study. Two key objectives were born in mind: firstly, to test for clarity and comprehension by the respondents; secondly, to enhance the questions in any way possible (Saunders *et al.*, 2003; Miles & Huberman, 1994).

The subsequent phase was the distribution of the survey. A total of 50 individuals, all of whom lived in Saudi Arabia, were contacted. This figure enabled the implementation of Cronbach's α (Alpha*)*, which aids in calculating and analysing SPSS reliability. Importantly, it is known that a score of 0.7 or more for the alpha needs to be established, otherwise it will not be accepted. The results can be found in Table.1.

Table 6.1: Summary of the results of Cronbach's Alpha analysis

Construct	Items	Cronbach's Alpha
PE	5	.922
EE	4	.709
SI	3	.739
BI	4	.726
Trust	4	.842
Cost	3	.736
FC	4	.703

The questions detailed above obtained a result of 0.7 or more, which markedly reflects an acceptable degree of dependability.

6.4.4 Data Collection

It was decided that a positivist approach should be adopted through the use of a survey, as this was recognised as the most appropriate approach. Prior research had been carried out in the field; Kwon and Wen (2010) and Abedniya and Mahmouei (2010) were researchers that had used this data-collection approach.

Individuals with personal mobile devices were the target population for the main study. The decision to include these individuals in the study was made on the basis that they were the more likely to adopt the m-social network way, compared to those without a mobile phone.

Wei *et al.* (2009) served as our model / guide for the distribution method. As previously indicated, shops located in different shopping malls were the distribution sites for the survey instrument. Questionnaires were distributed to approximately 980 shoppers; out of that number, 420 were returned (42.86% response rate) and 363 of those were usable. The other 57 responses were eliminated because they were incomplete or the response pattern indicated a careless response.

6.3 Results

The analysis of the survey was conducted using SPSS version 18, with all tests set at the significance level of 0.05, allowing for acceptance or rejection of the null hypotheses. A result of 0.05 was significant, and a result of 0.001 highly significant.

6.3.1 Demographic profile of the participants

Table 6.2 describes the profile of the participants, based on gender, age, and education in Saudi Arabia.

Table 6.2
Demographic characteristics of the participants (n=363)

Demographic	***Category***	***Frequencies (n)***	***%***
Gender	Male	133	37
	Female	230	63
Age	15-18 years	52	14
	18-25 years	181	50
	26-35 years	99	27
	36-45 years	24	7
	45+ years	7	2
Education	Less than high school	20	6
	High school	99	25
	Diploma	17	5
	Bachelor	192	53
	Postgraduate	44	12

Of the 363 respondents, a majority were female (63%, n=230), while 37% (n=133) were male. Half of them were young, in the age group 18-25 years (50%, n=181), followed by 26-35 years (27%, n=99), 15-18 years (14%, n=52), 36-45 years (7%, n=24), while only 2% (n=7) were aged 45 years and over. As for education, exactly half (50%, n=181) held undergraduate degrees, a quarter (25%) held high school certificates, nearly half of those (12%) held postgraduate degrees, and nearly half of those again (6%) (n=20) had less than high school qualifications, while 5% had a diploma.

6.3.2 Reliability and validity of the instruments

Primary component factor analysis was used, with Varimax Rotation to test for convergent validity. '0.811' was the Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy. According to Field (2009a), factor analysis is considered suitable for the data, given the importance of the Barlett's test of *sphericity*. Seven factors with values greater than 1.0 were extracted. The total percentage of variance was 60.65% - as explained by all factors. If the factor percentage was above 0.6, as a rule, the item was noted to be high; however, if it was lower than 0.4, the item was considered unsuitable (Dwivedi and Lal, 2007b; Straub, Boudreau and Gefen, 2004). As illustrated in Table 6.3, the outcomes of factor analysis indicated that all the items' load time was highly favourable on relevant factors, and also showed no cross-loading. Therefore, there was good validity convergence in the data.

Factor Loading Results

Factor 1 contained five items corresponding to the Perceived Performance Expectancy scale, which loaded with high coefficients above .7, and it is associated with the largest eigenvalue. Factor 2 explained 17.28% of the variance, and comprised the four items pertaining to the Trust scale, which loaded with high coefficients above .7. The next five factors each explained a further 4.08 to 7.34% of the variance. Factor 3 comprised the three Cost items, which loaded above .5. Factor 4 included the four Perceived Effort Expectancy items, which loaded above .6. Factor 5 contained three Social Influence items, which loaded highly (above .7). Factor 7 included the four Usage Intention items, which loaded above .5. Finally, Factor 6 contained the four Facilitating Conditions items, which loaded above .4.

Table 6.3
Rotated Components Matrix[a]

	Factor Components & Loadings						
	Factor 1 PE	Factor2 Trust	Factor3 Costs	Factor4 EE	Factor5 SI	Factor6 BI	Factor 7 FC
PE3	.828						
PE1	.803						
PE4	.796						
PE5	.788						
PE2	.783						
TRUST4		.824					
TRUST3		.816					
TRUST1		.750					
TRUST2		.735					
COST1			.866				
COST2			.826				
COST3			.523				
EE1				.756			
EE2				.746			
EE3				.680			
EE4				.674			
SOCIAL2					.885		
SOCIAL1					.795		
SOCIAL3					.770		
BI4						.731	
BI1						.726	
BI3						.689	
BI2						.585	
FC3							.807
FC4							.795
FC1							.534
FC2							.410
Eigenvalues	5.37	4.67	1.98	1.73	1.57	1.29	1.10
% of variance	19.91	17.28	7.34	6.42	5.83	4.79	4.08
KMO = .811, p<.001							

This research analysed reliability by applying Cronbach's *alpha*, which, as illustrated in Table 6.4, ranged for all the constructs from 0.71 to 0.89 – all showing a greater value from the minimum cut-off value of .7 (Gliem and Gliem, 2003). Thus, reliability was adequate, as indicated by the statistics. Thus, with acceptable reliability and convergent validity, we proceeded to test the revised model.

Table 6.4: Reliability of Measurements

Constructs	N	Number of Items	Cronbach's Alpha (α)	Type
BI	363	4	0.75	High Reliability
PE	363	5	0.89	High Reliability
Trust	363	4	0.84	High Reliability
EE	363	4	0.74	High Reliability
Costs	363	3	0.75	High Reliability
SI	363	3	0.79	High Reliability
FC	363	4	0.71	High Reliability

n=Sample

6.3.3 Demographic differences

Gender Differences in Frequency of Actual Use

A *chi*-square test of independence was carried out to examine the relation between gender and frequency of actual use. The relation between these variables was not significant. The findings in Table 6.5 show that the largest percentage (93%) of actual use was 'daily use' for males, followed by females (85%). Females (10%) more than males (4%) used mobile social network services 'more than once per week'. The prevalence of use 'More than once' was low for both males (1%) and females (4%). Furthermore, a small minority of males (2%) and females (2%) used mobile social network services as 'non-adopters'. Pearson's *chi*-square test showed that there was no significant difference between males and females in frequency of actual use. Table 6.6 below confirms and illustrates that point ($X2$ (3, n=363) = 7.08, p = .07).

Table 6.5

Cross-table analysis: Gender by Actual Use of Mobile Social Network Services

			Gender		Total
			Male	Female	
ACTUAL USE	Non-Adopters	Count	3	4	7
		% within gender	2%	2%	2%
	More than once	count	1	8	9
		% within gender	1%	4%	3%
	More than once per week	count	5	22	27
		% within gender	4%	10%	7%
	Daily	count	124	196	320
		% within gender	**93%**	**85%**	88%
Total		Count	133	230	363
		% within gender	100%	100%	100%

Testing Age Differences with Frequency of Actual Use

A *chi*-square test of independence was performed to examine the relation between age group and frequency of actual mobile social network use. The relation between these variables was not significant. Table 6.6 shows the cross-tabulation between actual use for the five age groups, and shows that age groups consistently reported 'daily use,' with the largest percentage of 'daily use' in the 15-18 age group (94%), followed by the 26-35 age group (90%), then the 18-25 age group (87%). Most older participants reported lower 'daily use', including the 36-45 age group (83%), and the 45+ age group (71%). These results support the idea that actual use differs for age sub-groups. Table 6.6 shows that the Pearson's *chi*-square test was not significant, indicating a difference in age groups and frequency of actual use ($X2$ (12, n=363) = 12.36, p = .417).

Table 6.6

Crosstab Analysis: Age by Actual Use of mobile social network services

			Actual Use				
			Non-adopter	More than once	More than once per week	Daily	Total
AGE	15-18 yr	Count	1	0	2	49	52
		% within AGE	2%	.0%	4%	**94%**	100.0%
	18-25 yr	Count	2	5	17	157	181
		% within AGE	1%	3%	9%	**87%**	100.0%
	26-35 yr	Count	2	3	5	89	99
		% within AGE	2%	3%	5%	**90%**	100.0%
	36-45 yr	Count	1	1	2	20	24
		% within AGE	4%	4%	8%	**83%**	100.0%
	45+ yr	Count	1	0	1	5	7
		% within AGE	14%	.0%	14%	**71%**	100.0%
Total		Count	7	9	27	320	363
		% within AGE	2%	3%	7%	**88%**	100.0%

Testing Education Differences against Frequency of Actual Use

A *chi*-square test of independence was performed to examine the relation between education and frequency of actual use. The relation between these variables was not significant (*X2* (12, *n*=363) = 9.59, *p* = .652). Table 6.7 shows actual use across the five education groups, with all education groups consistently reporting highest 'daily use'. 92% of 'daily use' was reported by those with high school education, followed by those with bachelor and postgraduate degrees (86%) and diplomas (82%), and less with high school qualifications (75%). The results suggest that this difference is not statistically significant.

Table 6.7

Crosstab Analysis: Education by Actual Use of mobile social network services

			Actual Use				
			Non-adopter	More than once	More than once per week	Daily	Total
Education	Less than high school	Count	0	0	5	15	20
		% within ED*	0%	0%	25%	**75%**	100.0%
	High school	Count	2	1	4	83	90
		% within ED*	2%	1%	4%	**92%**	100.0%
	Diploma	Count	1	1	1	14	17
		% within ED*	6%	6%	6%	**82%**	100.0%
	Bachelor	Count	3	5	19	165	195
		% within ED*	2%	3%	10%	**86%**	100.0%
	Postgraduate	Count	1	2	3	38	44
		% within ED*	2%	5%	7%	**86%**	100.0%
Total		Count	7	9	32	315	363
		% within ED*	2%	2%	9%	**87%**	100.0%

*Education

6.3.4 Regression

First, the impact of five predictors on usage intention was investigated using standard multiple regression (Enter method). As a group, the five predictors explained 36.9% of the variation in usage intention, hence this is a reasonably good model, though 64.1% of the variation in usage intention scores is still unexplained, i.e., there are other unknown factors that may influence usage intention that are not accounted for in this model (Field, 2009).

The full model was significant (f= 34.9, MSE= .384, p<.001). Three of the predictors had a significant and positive impact on usage intention scores, two at the 0.001 level and one at .05 level. The largest impact was for Performance Expectancy (β = .529, t=11.806, p<.001), as this factor had the largest standardised Beta (β) and t-values. This was followed by Cost (β = .159, t=2.409,

p<.05) , which was the second largest predictor of usage intention. Finally, Effort Expectancy had the lowest explanatory power (β = .23, t=4.25, p<.001). Neither Trust nor Social Influence were significant predictors of usage intention.

The results suggest that for every one standard deviation increase in Performance Expectancy scores, usage intention increased on average by .529 points (based on the standardised Beta coefficient values). For every one standard deviation increase in Effort Expectancy scores, usage intention increased on average by .23 points. Finally, for every one standard deviation increase in Cost scores, usage intention increased on average by .159 points. Table 6.8 displays the standardised regression coefficients (β) and intercept (constant), the t-values, R^2 and adjusted R^2 for the impact of the five predictors on usage intention.

Table 6.8: Mobile social network acceptance predictors → Behaviour Usage Intention

Predictors	Usage Intention
Trust	0.05
Costs	0.159*
PE	0.529***
EE	0.23***
SI	0.12
R^2	.36
Adj. -R^2	.35
F-ratio	34.89***

*** significant at the 0.001 level of significance
*significant at the 0.05 level of significance

Next, a standard multiple regression was used to test the impact of usage intention and Facilitating Conditions on actual use (see Table 6.9 below). The R squared value (0.075) is low, indicating that usage intention explained facilitating

conditions at only 7.5% of the variation in actual use. The model was highly significant (F = 14.655, MSE = .293, p<.001). Usage intention significantly predicted actual use (β = .274, t=5.395, p<.001), with a one standard deviation increase in Usage Intention scores increasing actual use by .275 points (based on the standardised Beta coefficient value). However, Facilitating conditions had no significant impact on actual use (β = -.031, t=-.266, p = .775).

Table 6.9: Mobile social network acceptance predictors → Actual usage

Predictors	**Usage Intention**
FC	-0.014
BI	0.274***
R^2	.075
Adj. -R^2	.70
F-ratio	14.655***

*** significant at the 0.001 level of significance

Table 6.10 represents Summary of the research hypotheses.

Table 6.10: Summary of the research hypotheses

HN	Research hypotheses	Result Second study	Result Frist study
H1	*Performance Expectancy will have a significant positive impact on behaviour usage intention*	Supported	Supported
H2	*Effort Expectancy will have a significant positive impact on behaviour usage intention*	Supported	Not Supported
H3	*Social Influence will significantly impact on behaviour usage intention*	Not Supported	Not Supported
H4	*Facilitating Conditions will significantly impact Actual Use*	Not Supported	Supported
H5	*Cost significantly influences behaviour usage intention.*	Supported	Not supported
H6	*Trust has positively significant effects on behaviour usage intention*	Not supported	Supported
H7	*Behavioural intention concerning MSNS utilization will have a positive impact on the actual use of MSNSs*	Supported	Not supported
H8	*Actual Use will be different between males than females*	Not supported	Not supported
H9	*Actual Use will be different in terms of education*	Not supported	Not Supported
H10	*There will be a difference between users of various age groups*	Not supported	Supported

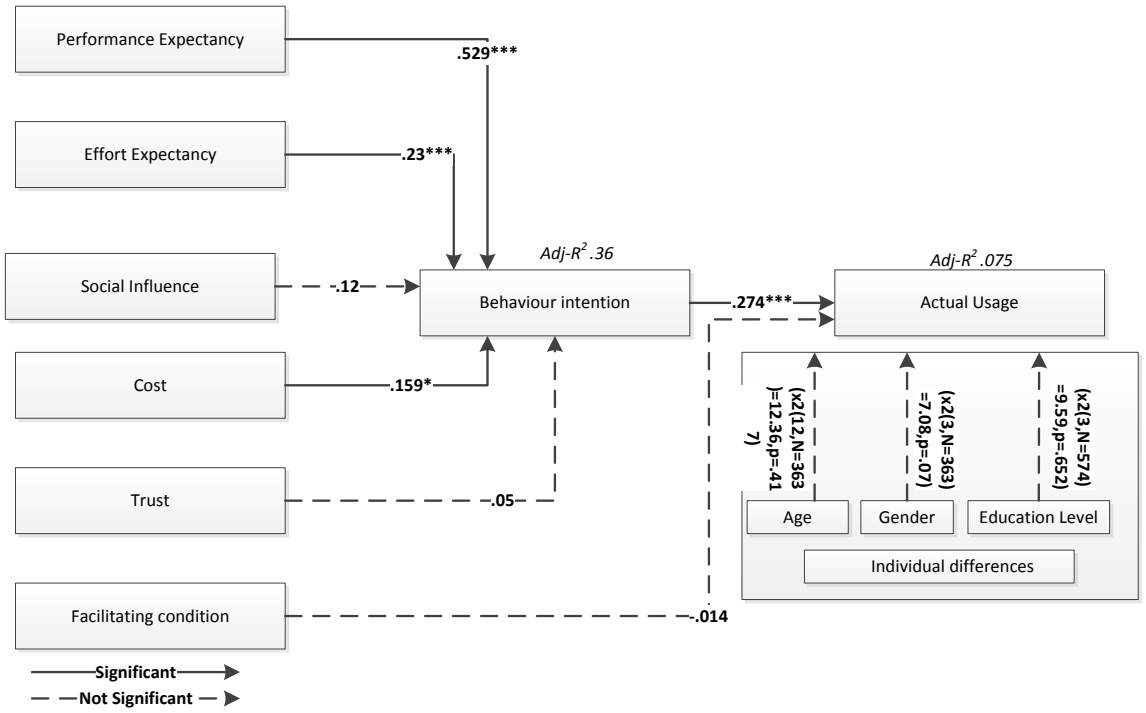

Figure 6.2: Revised model

In the Figure 6.2, the results of the multiple regression analyses found that performance expectancy, effort expectancy, and cost significantly predict usage intention. Performance expectancy had the strongest impact on usage intention, followed by cost, and then effort expectancy. Finally, behaviour usage intention had a significant effect on behaviour usage intention; however, facilitating conditions had no significant influence on actual use

6.4 Discussion and conclusions

This study had the key aim of examining factors impacting behaviour intention and utilisation in regard to mobile social networks. The main objectives were to validate empirically the conceptual model in the context of the mobile social network within Saudi Arabia.

The quantitative approach led to key research findings resulting from the

questionnaire. As shown in the research methodology section, a number of different tests were to be carried out in an attempt to analyse the study data: factor analyses, reliability analyses and regression tests.

The questionnaire survey achieved a response rate of 42.86%, with Fowler (2008) recognising such a level as being acceptable, if it falls between 5% at the lower end and 95% at the higher end. As such, in mind of the above statement, the response rate to the questionnaire in this research was acceptable.

In terms of this section's results, the first stage involved discussing the reliability of the results garnered in regard to the application of the MSNSs. The section provided results that highlighted the confirmed reliability test; and the measures were internally consistent, as show by Cronbach's *alpha* being above 0.7 for the entire construct.

Construct validity was identified as unitising the PCA. This was the result of a significant probability test. The factors aligned with the number of independent factors in the conceptual model, resulting in eigenvalues being above 1; factor validities were loaded and resulted in all items having a score at least .40 (Dwivedi *et al.*, 2006b; Straub, Boudreau and Gefen, 2004). Furthermore, the findings did not show any cross-loading amounting to more than 0.40, which further validated both of the construct types found in the survey instrument.

This study analysed demographic differences as social variables through the employment of the Pearson *chi*-square test. In our results, there was no significant difference in MSNS actual use when considering gender, in support of the first study's findings. Nevertheless, the work of Morris & Venkatesh (2000), Venkatesh *et al*. (2000, 2003) and Jackson *et al*. (2001) established differences between the genders in regard to adoption of ICT; however, the present research did not provide such support.

Prior research has implied that older individuals are usually regarded as non-users of technology (Al-Shafi and Weerakkody, 2010b; Al-Ghaith, Sanzogni and Sandhu, 2010; Al-Gahtani, Hubona and Wang, 2007), and the first study supported that; however, this study did not further support this view. Although no statistical differences were found between age differences and MSNS adoption, it can nevertheless be seen that the same differences were still apparent (for example, 90% of the youngest group used these services daily, while the figure was just 67% for the oldest group).

On reviewing the first research, a significant difference between age group in m-commerce usage was identified, which may suggest that the members within those groups did not have spare time; the other suggestion is that they did not find it very useful.

As noted in the literature, education level is believed to have a keen effect on technology adoption and utilization (Al-Shafi and Weerakkody, 2010; Dwivedi and Weerakkody, 2007; Choudrie and Papazafeiropoulou, 2006). This research found education level to be insignificant when identifying MSNS usage. This result implies that government officials need to take into account various education and training initiatives that may be able to aid individuals in the adoption of ICT, particularly when such people seek to communicate using social mobile networks. This finding is markedly in line with that of the first study.

As regards regression, a strong relation in regard to performance expectancy and behavioural intention has been recognised in many studies (Yaseen, 2012; Wei *et*

al., 2009; Lu *et al.*, 2008; Tao Zhou, 2008; Wu and Wang, 2005b; Luarn and Lin, 2005; Cheong and Park, 2005). The statistical results in this research suggest a key link between performance expectancy and behavioural intention (β = .529, p<.001) towards the adoption of MSNSs. This implies that the results of this factor provide support for the previous research, which held that performance expectancy goes some way to describing behavioural intention as regards technologies. Accordingly, these research findings support the first study. In addition, it has been determined that the Saudi Arabian people are willing to implement MSNSs, with the aim of saving both money and time. Accordingly, it is suggested that, through the provision of additional advantages, there will be a greater level of adoption in the field of MSNS.

With regard to effort expectancy, prior research has stated the value of effort expectancy in regard to describing behavioural intention in systems utilization (Yaseen, 2012; Kim, Mirusmonov and Lee, 2010; Kim and Garrison, 2009; Lu *et al.*, 2008). The present research has established a key link between effort expectancy and behavioural intention towards MSNS adoption (β = .23, p<.001), thus implying that, in the MSNS model, this construct has significant implications in regard to impacting behaviour intention towards the use of MSNS services in the context of individual Saudi users. Moreover, this research provides further support for other studies in SNS on Korean people; a good relationship between effort expectancy and MSNS usage intention has been recognised (Kwon and Wen, 2010).

When considering social influence, a strong link has been detailed in the acceptance literature (Chong, Chan and Ooi, 2011; Tao Zhou, 2008; Fan *et al.*, 2005; Venkatesh *et al.*, 2003). Social influence, as represented by friends and family, is also acknowledged as being a very important factor in terms of impacting users' intention behaviour towards the application of new m-commerce services (Chong,2012). This research also establishes that social influence does

not have any bearing on MSNS behavioural intention (β=.21, p =.096). This finding highlights a lack of support for the hypothesis, thus implying that friends and families do not significantly affect each other in terms of the use of MSNSs, which is an unexpected result, specifically in Saudi Arabia.

As considered throughout the literature review, a strong link can be seen between facilitating conditions and actual usage or behaviour intention towards technologies (Chong, Chan and Ooi, 2011; Lu *et al.*, 2008; Tao Zhou, 2008; Al-Gahtani, Hubona and Wang, 2007; Chang *et al.*, 2007; Park, Yang and Lehto, 2007; Venkatesh *et al.*, 2003). As noted by Tao (2008), Park *et al*. (2007) and Lu *et al*. (2008), facilitating conditions are commonly gauged through the potential to gain access to necessary resources, as well as to collecting information and knowledge and achieving the required support in terms of adoption of m-internet services. This research has identified no link between the facilitating conditions construct and the usage of MSNSs (β=-.14, p =.66). This suggests that the same obstacles will need to be eradicated or circumvented; thus, there is a need for the government to enhance facilities.

In terms of cost, when reviewing previous research, much data has been identified on the link between the application of m-commerce and expenditure, in the view of Wei *et al*. (2009), Chong (2012), Yu (2012) and Anil *et al.* (2003). For example, there is a key link between MSNC adoption behaviour and cost, with much support shown for the hypothesis outlined in this research (β=.159, p<.05). The resulting implication is that having this construct plays a fundamental role in establishing the adoption of MSNS, thus meaning that information technology commission and communication within the country requires a new price schema. Moreover, this research provides support for the belief that the Saudi parliament should request a reduction in the country's telecommunication charges. In relation

to price, it was found that Saudis are generally dissatisfied with the price, but they still use it; in Malaysia, people choose not to use the service owing to the price.

Research carried out previously notes the value of behavioural intention in terms of describing behaviour technology usage (Venkatesh *et al*., 2003). This research provides support that there is a significant impact from behaviour intent to use MSNS and actual use.

The research was carried out in order to establish the effect of trust in relation to behavioural intention towards the application of MSNSs. As recognised through previous research (Min, Ji and Qu, 2008; Siau and Shen, 2003), trust was found to have a positive effect on behavioural intention to utilise m-commerce. The current research details the hypothesis of the importance of trust to bring intention to MSNS adoption. The findings of the research clearly illustrate that trust in the construct (β= .05, p>.05) is insignificant, therefore providing a rationale behind the behavioural intention to use MSNSs. This is supported by Yaseen (2012), who found no significant relation between trust and behaviour intention to use m-commerce.

6.5 Chapter Summary

Chapter six has described the second study, which examined mobile social network service intention and usage. In regard to this chapter, the revised model was examined, which was devised in the first study in order to establish how such factors impact the behaviour usage of MSNSs.

Considering the nature of the problem under examination, it was found that a quantitative analysis would be most appropriate. This was achieved through the adoption of a questionnaire survey. To ensure that the data collection was

successful, a pilot study was first conducted. SPSS software was also utilised, with the aim of ascertaining the validity and reliability of the questionnaire.

The study has established that there are strong, significant links between usage intention, and cost, effort expectancy and performance expectancy. Nevertheless, social influence and trust were not found to be important predictors in the context of MSNS adoption behaviours. Furthermore, facilitating conditions were also regarded as being insignificant in terms of actual use. However, usage intention was established as being a key predictor, but age, educational level and gender did not have a significant impact on actual MSNS usage. Almost the same result was found in this study as in the first study. However, in terms of individual differences in results, age did not affect actual use.

The next study narrows its focus down to examine one specific mobile social network service, namely Twitter. Twitter was selected because it represents a broadly-used social network application in Saudi Arabia.

Chapter seven

Factors influencing the adoption of M-Twitter: an empirical study

7.1 Introduction

The first study examined the revised UTAUT model, by adding cost and trust as key constructs, constructs that I believe to be important to the study. A number of social individual factors, namely age, education level and gender, were also included, all of which were examined in terms of their impact on actual usage. The first study established that there are strong, significant inter-relations among usage intention, cost, effort expectancy and performance expectancy. However, social influence and trust were not found to be important predictors in the context of m-commerce usage intention in Saudi Arabia. Furthermore, facilitating conditions were also regarded as being insignificant in terms of actual use, but usage intention was established as being a key predictor. In addition, when considering age, education level and gender, it was found that age had an impact on usage. However, education level and gender did not. The first study led to the examination of the same model for an m-commerce application to confirm the findings.

The second study examined the same conceptual model on mobile social network service applications. In regard to this study, the revised model was examined, which was devised in the first study in order to establish how such factors impact on the acceptance of mobile social network services. In this study we found the result almost same as the first study. However, there are some differences in terms of significance level. In addition, it was found that there was no significant individual difference in mobile social network usage.

In the subsequent research, the scope is narrowed down to focus on one social network application, Twitter, one of the most used applications in Saudi Arabia. In Saudi Arabia the number of Twitter users has increased 3,000% (Al-Khalifa and Garcia, 2013). In consideration of the statistics, according to an e-marketer forecast, it is estimated that Twitter will earn $582.8 million in global advertisement revenue, a little more than half (53%) coming from mobile advertising, as opposed to virtually no mobile advertising in 2011 (Emarketer, 2013b). In this study, consideration is directed towards the Twitter mobile application as a commercial mobile application, and how users make use of services through accessing Twitter.

The conceptual model is simplified through removing various elements, namely facilitating conditions, trust and social influence, all of which were seen to be insignificant during the course of the first and second studies. On the other hand, another construct, that of personal innovativeness, is added as a fundamental element impacting usage behaviour intention. The incorporation of this aspect was dependent on the findings of other studies. For example, a higher degree of innovativeness was found to be linked with weaker social influence, in regard to the decision to accept new technologies or behaviours, as highlighted by Martin and Herreo (2012). Moreover, the work of Aldas-Manzano *et al*. (2009) established a link between an individual's higher acceptance of trust with greater innovativeness. Thus, the view in terms of the present facilitating conditions is less fundamental in regard to the implementation decision, when individuals show a greater degree of innovativeness.

7.2 Why Twitter?

Following its launch in 2006, there has been a huge surge in the popularity of Twitter, which has come to attract half a billion active users on a global scale, as recognised during early 2012 (Holt, 2013). The success of the website is believed to come down to the fact that it has complemented the significant pace at which the internet has grown worldwide. The unique approach adopted by Twitter is to enable short messages to be shared amongst countless subscribers utilising internet-enabled devices. Furthermore, owing to the fact that Twitter is a social networking tool, both average users and famous people and entities can make use of the resources, with Twitter subsequently becoming recognised as a powerful instrument in various fields, including activism, business, governance and media, amongst others.

The preliminary application of Twitter, especially in the Middle East, which has placed much emphasis on celebrities and superstars, was quite slow, with its current users recognised as only a minor segment of the majority of Arab peoples, led mainly by the younger generations. The driving force for such systematic use and wide growth of Twitter is that of the Arab Spring, which swept away a number of Arab countries run by totalitarian regimes, including Egypt, Libya, Tunisia and Yemen, with the tool utilised mainly for the organisation of protest events and the communication of fundamental data and timely news.

At the present time, there are dozens of activists, business and religious leaders, entertainment celebrities, a number of political leaders, including heads of state, who regularly tweet, each using the website on a regular basis and having several thousands of followers. Accordingly, despite the present minor volume of users, Twitter is nevertheless expected to experience significant growth, particularly amongst the younger populations, demonstrating innovative use in the Arab domain.

As has been highlighted by the Dubai School of Government, towards mid-2012, spanning the 18 Arab countries discussed in that report, there were almost 2.17 million Twitter users who actively used the website. Kuwait and Saudi Arabia are recognised as being the leading countries in the Arab world, together accounting for in excess of 55% of all Twitter user populations in the Arab world. By a significant degree, Saudi Arabia signifies the largest number of Twitter users, accounting for 38.3% of all Arab users, numbering approximately 830,000, despite being recognised as only the sixth largest of the 18 Arab countries (MRD, 2012; Dubai, 2012). As recognised by the MRD report, the six GCC member states make up approximately 75% of all Twitter users in the Arab world, representing a staggering 1.6 million users. From the above, it is obvious how Twitter has become the leading, well-known social network service used in Saudi Arabia, and an application worthy of study.

The following sections present how personal innovativeness can affect intention to use mobile services.

7.3. Personal innovativeness (PI)

In past studies, innovativeness was assigned much emphasis in the context of consumer behaviours, for example Agarwal and Prasad (1998) and Rogers (1995b), especially in regard to its significance as an element of new products and/or services (Blake, Neuendorf and Valdiserri, 2003; Im, Bayus and Mason, 2003). A number of different lines of theory have been suggested in the literature, in an attempt to assess the precise workings in terms of the variable 'innovativeness'. Rogers and Shoemaker (1971) define the concept of innovativeness as '... the degree to which an individual is relatively earlier in adopting an innovation than other members of his system' (p. 27). In addition, personal innovativeness is believed to point to the extent to which new ideas are

accepted and innovative decisions are made by individuals, irrespective of the experience held by others. Overall, innovativeness is regarded as an inherent element possessed by all individuals, at both lower and higher levels, but which is subject to a number of influential social elements (Rogers, 1995b).

Despite the fact that various innovativeness-related typologies have been considered, the majority of studies only differentiate between domain-centred and general innovativeness. From a cognitive standpoint, general innovativeness may be seen to comprise the attitudinal, intellectual and perceptual characteristics of an individual (Joseph and Vyas, 1984). Goldsmith & Hofacker (1991) state that innovativeness may be viewed within a particular field of interest, with domain-centred innovativeness regarded as the inclination of an individual to try to incorporate innovations within processes, products or services in that particular field of interest. It has been stated that domain-centred innovativeness is more effective in terms of estimating the procurement of new items, when compared alongside overall innovativeness (Goldsmith and Hofacker, 1991).

Although it is clear that domain-specific innovativeness can be linked with a general tendency towards innovation, it is more prognostic of certain behaviour than a general idea. A number of scholars agree with this statement, emphasising the significance of domain-centred innovativeness as a factor in the application of a new behaviour or product (San Martín and Herrero, 2012; Lu *et al.*, 2011; Lu, Yao and Yu, 2005b). Various researchers have analysed domain-centred innovativeness and its impact on the adoption of new service models or shopping approaches. With this taken into account, Citrin *et al.* (2000) suggest that domain-centred innovativeness has a direct impact on the application of online shopping amongst consumers. In addition, it is also shown by Aldás-Manzano *et al.* (2009) that domain-centred innovativeness positively affects internet banking utilisation, with information system researchers highlighting the value of innovativeness in

the field of new technology (Agarwal and Prasad, 1998). With this noted, innovativeness in the context of new technology has been confirmed by Herrero Crespo and Rodríguez del Bosque (2008) as impacting the inclination to utilise business-to-consumer (B2C) e-commerce, with Lu *et al*. (2011) establishing a strong link between innovativeness in new technology and online services. Moreover, during 2012, Martor and Herrero recognised a strong impact induced on intention to make online purchases, as a result of innovativeness in new technology. On the other hand, Lu, Yao & Yu (2005) emphasise that innovativeness in new technology does not impact the inclination to utilise new technologies.

Regardless of the opposing findings detailed by Lu *et al*. (2005), most research shows a direct influence between domain-centred innovativeness on the inclination to implement new information technology. Undoubtedly, the mobile Twitter application can be viewed as a fundamental mobile application technology. Accordingly, the following hypothesis is devised:

- **H1:** Personal innovativeness positively affects the intention to access Twitter from mobile devices.

Table 7.1 below provides details related to the constructs and hypotheses of this study.

Construct	**Definition**	**Hypotheses**
Personal Innovativeness	Innovativeness: inherent elements encompassed by individuals at lower or higher levels, but subject to a number of influential social aspects	H1: Personal innovativeness positively affects the intention to access Twitter from mobile devices
Cost	Financial elements affect the	H2: Behaviour usage intention

	inclination to adopt mobile access to Twitter	is affected by cost
Performance expectancy	The extent to which people maintain the potential of m-Twitter to improve job performance and daily activities	H3: Behaviour usage intention will be impacted by performance expectancy
Effort Expectancy	The extent of ease linked with system utilisation	H4: Behaviour usage intention will be impacted by effort expectancy
Behaviour intention	The extent to which people are inclined to access Twitter through mobile devices	H5: Actual Twitter access through a mobile device will be conversely impacted by behavioural intention to access Twitter through a mobile device
Individual differences	The inclusion of individual differences so as to enable analysis of IT usage, and whether these differences have an effect on implementation	H6: Actual Twitter access through mobile devices will be greater amongst men than women
		H7: Differences in actual Twitter access through a mobile device will be seen in relation to education
		H8: There will be differences in actual Twitter access through a mobile device according to age group

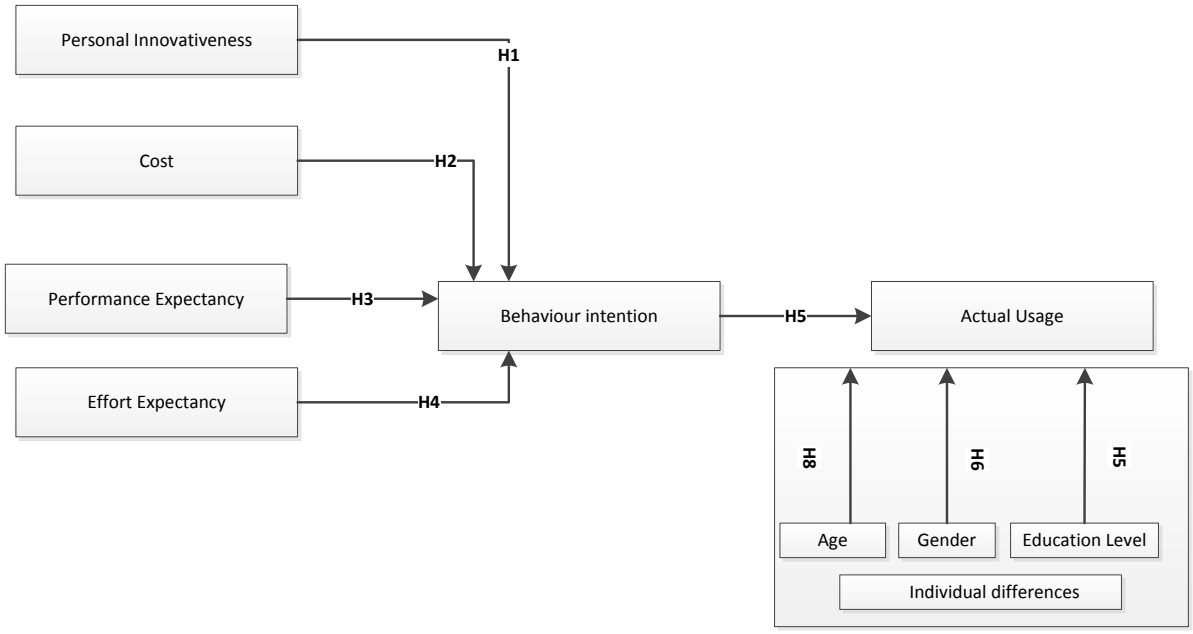

Figure 7.1: Conceptual model

7.4 Research method

To ensure the appropriate collection of data, a positivist methodology was adoptied using a survey, which is recognised as the most appropriate strategy. Prior research studies carried out in this area, namely those by Luarn and Lin (2005), Park *et al*. (2007) and Min *et al*. (2008), have made use of this method.

7.4.1. Survey Instrument development

Altogether, 24 questions were devised, 3 of which were demographic questions, 1 centred on actual utilisation and the other 18 utilised a Likert scale.

The questions centred on gathering demographic data; insights into actual utilisation are believed to be helpful in terms of explaining participants' profiles in accordance to age, education and gender. This helps to provide insights into

suggestions that Twitter access through mobile devices differs according to education- and person-related variables (i.e. age and gender, for example).

The 18 Likert-type questions were broken down into different categories, comprising 3 cost items, 4 behaviour intention (BI), 4 performance expectancy (PE) items, 3 effort expectancy (EE) items and 4 personal innovativeness (PI) items.

Measurements for cost, performance expectancy (PE), effort expectancy (EE), and behaviour usage intention (BI) were developed from the previous studies in the thesis, and almost the same questions were applied. Moreover, personal innovativeness is included in this research following on from various studies carried out previously, including those by Martin and Herrero (2012), Crespo & Bosque (2008), Lu *et al*. (2011) and Lu *et al*. (2005). Despite the fact that amendments were made in view of the specific field of mobile Twitter, the questionnaire also included brief, clear and detailed instructions so as to ensure ease of response. The participants involved were given information regarding the nature and objectives of the survey through a covering letter. The questionnaire adopted a five-point Likert scale, which was chosen as the best and most appropriate instrument for this research (See Appendix 3).

23 items were included in the questionnaire, five of which were multiple-choice questions and one checkbox item. After the involvement of four experts in the field of information technology implementation, the questionnaire was distributed amongst participations in the KSA, with the request to assign a score, through the use of a Likert scale, to signify their level of agreement with several statements.

7.4.2.Pilot Study

A small-scale pilot study, involving approximately 50 participants, was conducted before the third part of the research was ready for implementation. Sanders and Pinhey (1974, p. 381) describe a pilot study as one '... that is performed to sensitise concepts and work out any bugs in the instruments and procedures'.

This pilot study was carried out in order to ensure smooth understanding and the completeness of the questionnaire, as well as to highlight any problems that may be encountered in terms of its completion (Moore and Benbasat, 1991). Upon review of the information gathered through the pilot study, no changes were made. The consistent *alpha* values indicated that the survey instrument was highly reliable in measuring the five constructs, as presented in Table 7.2.

Table 7.2: Reliability of Measurements

Constructs	Number of Items	Cronbach's Alpha (α)	Type
BI	4	0.83	High Reliability
PE	4	0.81	High Reliability
EE	4	0.79	High Reliability
Costs	3	0.86	High Reliability
PI	3	0.91	Excellent

7.4.3. Data Collection

To ensure the appropriate collection of data, a positivist methodology was applied through the use of a survey, which is recognised as being the most appropriate strategy. Prior research carried out in this area, namely that by Luarn and Lin (2005), Park *et al*. (2007) and Min *et al*. (2008), made use of this method.

Individuals with personal mobile devices were the target population for the main study. The consideration to include these individuals in the study was made on the basis that they were more likely to adopt mobile twitter compared to those without a mobile phone.

Wei *et al.* (2009) provided the model guide for our distribution method. Shops located in different shopping malls were the sites where our survey instrument was distributed in Saudi Arabia. Every fourth individual entering the shop was included in the research. Those unwilling to respond to the survey at the shop were sent the survey after their email address had been requested. Questionnaires were distributed to approximately 2,200 phone users in Saudi Arabia. Of that number, 1,341 were returned (60.9% response rate) and 1,252 were usable. The other 89 responses were eliminated because they indicated a careless response.

7.5 Results

The primary goal of this part is to present the results from the Twitter mobile application survey. The survey data were analyzed using SPSS software (version 18), with $p<.05$ set as the criterion for statistical significance.

7.5.1. Demographic profile of participants

Table 7.3 presents the profile of the participants, based on gender, age and education. This part helped to inform the propositions that Accessing Twitter from mobile device usage differs by the person's age, gender and education level.

Table 7.3

Demographic characteristics of the participants (n=1252)

Demographic	Category	Frequency	%
Gender	Male	723	42.3
	Female	529	57.7
Age	15-18 years	85	6.8
	19-25 years	346	27.6
	26-35 years	529	42.3
	36-45 years	202	16.1
	45 years +	90	7.2
Education	Less than high school	48	3.8
	High school	214	17.1
	Diploma	131	10.5
	Bachelor	650	51.9
	Postgraduate	209	16.7

Of the 1,252 respondents, 723 were men (57.7%) and 529 (42.3%) women. The age range of 26 to 35 years had the highest frequency (42.3%, *n*=529), followed by the age range 19 to 25 years (27.6%, *n*=346), while only 6.8% of the respondents were age between 15-18 years. As far as education is concerned, a very small majority were educated to Bachelor degree (51.9%, *n*=650), 17.1% (*n*=214) held high school certificates, 16.7 % (*n*=209) held postgraduate degrees, 10.5% (*n*=131) held a diploma, while 3.8% (*n*=48) had less than high school qualifications.

7.5.2 Reliability and validity of the instruments

Factor analysis using principle components with the Varimax rotation method was

used to evaluate construct validity of the Accessing Twitter from mobile devices Acceptance Scale. The KMO measure sampled adequacy. After that, the results of the reliability tests confirmed the internal consistency of the measures (Cronbach's *alpha*).

Factor loading result

Principal component analysis generated five components (see Table 7.4). Small coefficients less than .4 were suppressed, as Basilevsky (1994) recommends, to eliminate variables that correlated below $r = 0.40$, and to produce a clearer picture of the dominant variables in the rotated component matrix. This improved the interpretability of the components (Campbell, 2006; Comrey and Lee, 1992). The factor loadings ranged between 0.53 and 0.88, and the five components together accounted for 71.21% of the variance in the 18-item questionnaire. Item BI 2 cross-loaded onto two components (2 and 4), suggesting that it did not accurately measure its intended construct. Hence, this item was removed from the dataset before further analysis. All 17 remaining items loaded highly onto their respective theorized components, indicating a simple structure. The sample size was adequate for factor analysis (n=1,252); Tabachinick and Fidell (2001) suggest a minimum of 300 participants / cases for good factor analysis. The Kaiser-Meyer Olkin (KMO) measure of sampling adequacy was above .6 (KMO=.847), indicating that the sampling was factorable (Tabachinick and Fidell, 2001). Bartlett's test of *sphericity* was significant (p<.001), indicating that factor analysis was appropriate, with all items correlating with each other (Pallant, 2005, *p*. 174).

The first factor contains the four Personal Innovativeness items, which loaded highly (above .8), and explained the largest 28% of the variance. This was by far the dominant component (as shown in Figure 7.2). The second factor contains the four Intention to Use items which loaded highly (.5 to .8), and explained 14% of the variance. The third factor contains the four Performance Expectancy items, which loaded highly (above .7), and explained 12% of the variance. The fourth

factor contains the three Cost items, which loaded highly (above .7), and explained 10% of the variance. Finally, the fifth factor contains the three Effort Expectancy items, which loaded highly (above .7), and explained 6% of the variance (see Table 7.4).

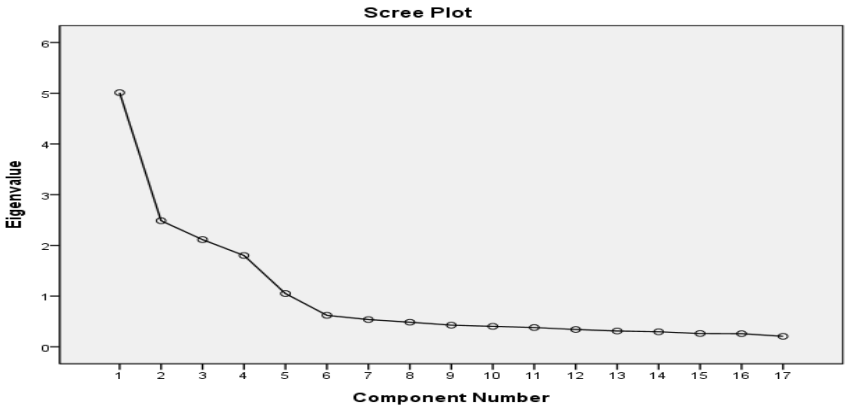

Table 7.4: *Rotated Components Matrix*

	Factor Components & Loadings				
	Factor 1 Personal Innovativeness	Factor2 Intention to Use	Factor 3 Performance Expectancy	Factor 4 Costs	Factor 5 Effort Expectancy
PN2	.883				
PN3	.867				
PN4	.827				
PN1	.808				
BI3		.824			
BI4		.814			
BI1		.797			
BI2		.538		.439	
PE4			.822		
PE1			.765		
PE3			.755		
PE2			.731		
CO2				.891	
CO1				.862	
CO3				.741	
EE2					.860
EE1					.857
EE3					.711
Eigenvalues	5.19	2.50	2.20	1.83	1.11
% of variance	28.83%	13.88%	12.20%	10.15%	6.15%

KMO = .85, $p<.001$

Table 7.5 (below) presents reliability (Cronbach's *alpha*) for the constructs in this study. Higher scores reflect higher performance expectancy, effort expectancy, cost, behaviour intention to use mobile application, and personal innovativeness.

Table 7.5: Reliability of Measurements

Constructs	N	Number of Items	Cronbach's Alpha (α)	Type[1]
BI	1252	3	0.88	High Reliability
PE	1252	4	0.80	High Reliability
PI	1252	4	0.88	High Reliability
EE	1252	3	0.81	High Reliability
Costs	1252	3	0.80	High Reliability

N=Sample Size

inton (2004).

6.5.3 Demographic differences

Gender Differences in Frequency of Actual Use

The Pearson *chi*-Square ($\chi 2$) analysis found that frequency of Twitter use from a mobile device varied significantly by gender ($\chi 2(4) = 9.63$, $p<.05$). Table 7.6 shows that males were more likely to use Twitter more than once a day from a mobile device (73.7%) than were females (67.1%). By contrast, females were more likely to use Twitter from a mobile device once a day (21.7%), compared with males (18.8%). Moreover, a greater proportion of females had never used Twitter from a mobile device (5.3%), as compared with 2.8% of males who had never used Twitter from a mobile device.

Table 7.6 : Crosstabulation of Gender by how often they used Twitter from mobile device

			How often do you use Twitter from mobile device?					
			Never	Once	Weekly	Once a day	More than once a day	Total
Gender	Female	Count	28	5	26	115	355	529
		% within Gender	5.3%	.9%	4.9%	21.7%	67.1%	100.0%
	Male	Count	20	8	26	136	533	723
		% within Gender	2.8%	1.1%	3.6%	18.8%	73.7%	100.0%
Total		Count	48	13	52	251	888	1252
		% within Gender	3.8%	1.0%	4.2%	20.0%	70.9%	100.0%

Pearson *chi*-square $\chi 2(4) = 9.63$, $p<.05$. n=1,252.

Testing Age Differences against the Frequency of Actual Use

A Pearson *chi*-Square ($\chi 2$) analysis found that frequency of Twitter use from a mobile device varied significantly by age group ($\chi 2(16) = 98.90$, $p<.001$). Table 7.7 shows that the youngest age group of 15-18 years were more likely to use Twitter from a mobile device only once per day (56.5%), while all other age groups

were more likely to use Twitter from a mobile device more than once per day (range: 64.4% to 75.6%). Table7.8 also shows the age group 45+ years were the most frequent users of Twitter mobile (75.6%).

Table 7.7: *Cross tabulation of Age by how often they use Twitter from mobile devices*

			How often do you use Twitter from mobile device?					
			Never	Once	Weekly	Once a day	More than once a day	Total
Age	Beteween 26-35	Count	19	5	18	84	403	529
		% within Age	3.6%	.9%	3.4%	15.9%	**76.2%**	100.0%
	Beteween1 15-18	Count	3	0	1	48	33	85
		% within Age	3.5%	.0%	1.2%	**56.5%**	38.8%	100.0%
	Beteween1 19-25	Count	7	4	18	63	254	346
		% within Age	2.0%	1.2%	5.2%	18.2%	**73.4%**	100.0%
	Beteween3 36-45	Count	11	3	12	46	130	202
		% within Age	5.4%	1.5%	5.9%	22.8%	**64.4%**	100.0%
	More than 45 years	Count	8	1	3	10	68	90
		% within Age	8.9%	1.1%	3.3%	11.1%	**75.6%**	100.0%
Total		Count	48	13	52	251	888	1252
		% within Age	3.8%	1.0%	4.2%	20.0%	70.9%	100.0%

Testing Education Differences in Frequency of Actual Use

A Pearson *chi*-square ($\chi 2$) analysis found that the frequency of Twitter use from a mobile device varied significantly by education level ($\chi 2(16) = 779.75$, $p<.001$, Cramer's V =.395). Table 7.8 shows that respondents with high school education were more likely to use Twitter from a mobile device once per day (86.4%), while all other education levels were more likely to use Twitter from a mobile device more once per day (range: 78.5% to 87.8%), although the frequency of more than one daily use was slightly lower among postgraduate students (78.5%), possibly due to higher study demands, or affording less mobile credit.

Table 7.8: *Crosstabulation of Education by how often they use Twitter from a mobile device*

			How often do you use Twitter from your mobile device?					
			Never	Once	Weekly	Once a day	More than once a day	Total
Education Level	Bachelor	Count	15	6	25	40	564	650
		% within ED	2.3%	.9%	3.8%	6.2%	86.8%	100.0%
	Diploma	Count	2	2	2	10	115	131
		% within ED	1.5%	1.5%	1.5%	7.6%	87.8%	100.0%
	High School	Count	17	0	9	185	3	214
		% within ED	7.9%	.0%	4.2%	86.4%	1.4%	100.0%
	Less than High School	Count	3	0	0	3	42	48
		% within ED	6.3%	.0%	.0%	6.3%	87.5%	100.0%
	Post-graduate	Count	11	5	16	13	164	209
		% within ED	5.3%	2.4%	7.7%	6.2%	78.5%	100.0%
Total		Count	48	13	52	251	888	1252
		% within ED	3.8%	1.0%	4.2%	20.0%	70.9%	100.0%

Pearson *chi*-square $\chi 2(16) = 779.75$, $p<.001$, Cramer's V =.395. n=1,252.

7.5.4 Regression

Standard multiple regression analysis (Enter method) was performed to examine the unique contribution of Personal Innovativeness, Cost, Performance Expectancy and Effort Expectancy on the outcome of Intention to Use Twitter on Mobile Internet. The regression results in Table 7.9 fully support the conceptual model. The sample size of n=1,252 was sufficiently large for multiple regression with four independent variables; Field (2009, p. 222) recommends 15 participants per independent variable for standard multiple regression. The multiple regression results are shown in Table 7.9, including the R^2 value, the F-value, and the *beta* values, and the statistical significance of these values.

In the figure 7.2, The R^2 value of .386 indicates how well the fitted model predicts Intention to Use Twitter for Mobile Internet. The four predictors explained 38.6% of the variation in intention to use scores (based on R^2). Therefore, 61.4% of the variation in *intention to use* scores cannot be explained by these variables alone. This means that other unknown variables also influence intention to use, that are not in this model (Field, 2009, p. 207). The regression model was significant, with F (4, 1,247) = 196.07, p<.001. Effort expectancy was the greatest predictor of intention to use (β = .451, p<.001), followed by performance expectancy (β = .246, p<. 001), then personal innovativeness (β = .167, p<.001), while cost was significant, but had the least explanatory power (β = .062, p<.01). Based on the β standardized coefficient, for every one-unit increase in Effort expectancy scores, intention to use increased by 0.451 points. For every one-unit increase in performance expectancy scores, intention to use increased by 0.246 points. For every one-unit increase in personal innovativeness scores, intention to use increased by 0.167 points. Finally, for every one-unit increase in cost scores, intention to use increased by 0.062 points.

Table 7.9: Mobile twitter application Predictors → Behaviour Usage Intention

Predictors	**Usage Intention**
Personal innovativeness	.167***
Cost	.062**
Performance expectancy	.246***
Effort expectancy	.451*
R^2	.386
F-ratio	196.07***

Regression coefficient is significant predictor at p <.01, * significance predictor at p < .001

In the figure (7.2), The R^2 value of .122 indicates that 12.2% of the variance in ideal actual Twitter usage is explained by intention to use. Hence, intention to use can account only for 12.2% of intention to use in the sample. This means that

87.8% of this variance is unexplained in the linear regression model. The model was highly significant ($F(1,1250) = 174.29$, $p<.001$). Intention to use was a highly significant predictor of actual Twitter usage ($\beta=.350$, $t=13.20$, $p<.001$). The linear regression results are shown in Table 7.10, including the R^2 value, the F-value, model parameters (*beta* value, t-value), and the statistical significance of these values. See Figure 7.2.

Table 7.10: Linear regression analysis predicting intention to use Twitter for mobile internet by intention to use Twitter for mobile internet (n=1,252).

	BI to use mobile twitter
Intention to Use [β]	.350
p-value	.001
R^2	.122
F-ratio	174.29***

The figures in square brackets are standardized regression weights (β), the **Regression coefficient is a significant predictor at $p < .001$.

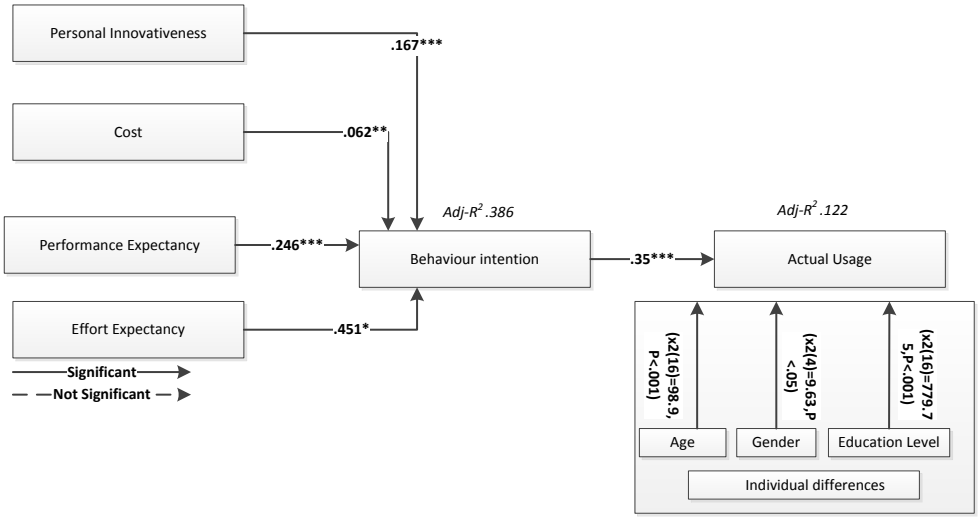

Figure 7.2: Revised model

7.6. Discussion and conclusion

This study goes into greater depth to understand the factors that affect m-commerce applications (Accessing Twitter from mobile devices). M-twitter is one of the most popular applications used from mobile devices. In this study, the conceptual model was simplified through removing various elements, namely facilitating conditions, trust and social influence, all of which were seen to be insignificant during the course of the first and second parts of the research. On the other hand, personal innovativeness was added as a fundamental element impacting usage behaviour intention.

The key finding from this research can be seen through the quantitative approach resulting from the questionnaire. As shown in the methodology in this study, a number of different tests were carried out in an attempt to analyse the study data.

The questionnaire survey achieved a response rate of 60.9%, with Fowler (2008) recognising such a level as being acceptable if it falls between 5% at the lower end and 95% at the higher end. As such, in mind of the above statement, the response rate to the questionnaire within this study is acceptable.

The first step in the data analysis stage involved discussing the reliability of the results garnered in regard to the usage of Twitter via a mobile device. That section provided results that confirmed the reliability test, and that the measures were consistent internally, owing to the Cronbach's *alpha* being above 0.8 for the entire construct.

The analysis of the differences in terms of demographics (i.e. age, education and

gender) as social variables was carried out through the application of the Pearson *chi*-square test, with the findings emphasising that Twitter usage within Saudi Arabia *does* display significant differences in regard to the aforementioned. This study supports all three hypotheses, which investigated whether demographic factors have a significant statistical impact on the perception of those factors for Twitter usage via mobile in the Kingdom of Saudi Arabia.

As noted earlier, scholars such as Al-Shafi and Weerakkody (2010a, Dwivedi and Lal (2007b and Dwivedi *et al.* (2006b) have stated gender as being relevant in the use of technology. This study confirms that the use of Twitter differs between men and women. The study showed that men are more interested in using twitter than women.

From the age perspective, this study supported the first study and a number of prior researchers, who found that age affected significantly information technology usage (Al-Shafi and Weerakkody, 2010a; Al-Gahtani, Hubona and Wang, 2007a). One of the interesting points here is that the younger age group access twitter once a day; however, the highest percentage is in the oldest age group, who access twitter more than once a day. It is believed that the Arab Spring news may be one of the main reasons influencing the older to view the news through Twitter.

Also, in regard to the hypotheses, differences in actual Twitter access through a mobile device are seen in relation to education. The hypothesis is supported in this study, which confirms the results of previous researchers' findings (Al-Shafi and Weerakkody, 2010a; Dwivedi and Lal, 2007b; Choudrie and Dwivedi, 2005; Choudrie and Lee, 2004). In this study education was found to have a significant influence on Twitter usage, meaning that education and/or qualifications are recognized as relevant in the use of Twitter in Saudi Arabia.

In terms of regression results, the five main individual hypotheses were tested

throughout this study, with the aim of analysing the link between the dependent and independent factors. It was found that personal innovativeness, cost, effort expectancy and performance expectancy all have a notable significant impact on the intention to use Twitter from a mobile device. Moreover, actual use is also determined by usage intention.

The positive finding on Personal innovativeness has a positive impact on the behaviour intention of using Twitter using mobile devices (β = .167, p<.001), strongly supporting the findings of Lu *et al*. (2011) and Martor and Herrero, (2012), who established a strong link between innovativeness in new technology and intention to use. From the sample chosen, Personal innovativeness was less important than performance expectancy and effort expectancy, which supports Lu *et al*. (2005), who found that perceived usefulness and perceived ease of use had a greater impact on intention to use. Martor and Herrero (2012) found that personal innovativeness is more important than effort expectancy, which is not supported in this study. However, this study supports Martor and Herrero (2012), who found that performance expectancy had a greater impact on intention to use. This finding is one of the main contributions of this study.

The finding is that Cost significantly influences behaviour intention to use Twitter on mobile devices (β = .062, p<.01), which means that the communications and information technology commission need to have a clear strategy to improve the price competition between market operators (STC, Mobiliy and Zain). In both studies, the cost construct had a greater impact on intention to use than effort expectancy, while effort expectancy had more impact than the cost construct.

This study confirmed Martor and Herrero's (2012) result, that performance expectancy has a more important impact on intention to use than personal innovativeness. This result supports Yaseen (2012), Wei *et al.* (2009), Lu *et al.* (2008), Tao Zhou (2008), Wu and Wang (2005b), Luarn and Lin (2005) and

Cheong and Park (2005). The construct in the first and second study was a significant predictor affecting intention to use; thus, users selected Twitter, because they found it a good and useful application.

One of the interesting findings in this study related to effort expectancy. It found that effort expectancy was the greatest predictor of intention to use (β = .451, p<.001), while both in the first and second study, performance expectancy was the highest predictor. The result shows that effort expectancy is more powerful than personal innovativeness, which is strongly supported by Lu et al. (2008). This, however, does not support Martor and Herrero (2012), who found that personal innovativeness is higher than effort expectancy as a predictor of intention to use. From that interesting view, the Arabic language is the fastest growing language on Twitter. From this standpoint, good support for Arabic language in Twitter would make it easier for Arabic users.

Both the first and second studies noted the value of behavioural intention in terms of describing behaviour technology usage. This research provides support that there is a significant impact from behaviour intention to use twitter. The regression model was significant, with β=.350 and p<.001. We can see the power of the projector is slightly greater than in the first and second study.

7.7. Chapter summary

This chapter narrowed down the focus on using Twitter via mobile devices. It provided background to the study and details of the motivation for conducting it., It also presented the methodology applied in the study in more detail, in order to meet the research aims and objectives.

In this study, all the hypotheses were supported: personal innovativeness, cost,

effort expectancy and performance expectancy all have a notable significant impact on the intention to use twitter from a mobile device. Moreover, actual use is also determined by usage intention. Furthermore, so as to establish the differences between demographic variables in regard to accessing Twitter, there was the development of three hypotheses.

The findings in this study support the first and second studies, confirming that cost, effort expectancy and performance expectancy are important constructs affecting intention, and also behaviour intention on actual use. The main contribution in this study was the addition of the innovativeness construct. Moreover, one of the main interesting findings is that effort expectancy was the greatest predictor affecting m-twitter behaviour intention.

The following chapter is a summary of the findings of the research work in this thesis. The next chapter presents the research contributions of the thesis, its limitations and suggestions for future work.

Chapter eight

Overall discussion and conclusions

8.1. Introduction

It was the aim of this thesis to determine how matters associated with user acceptance of m-commerce could be described and understood, through a review of the unified theory of acceptance and use of technology (UTAUT) with respect to Saudi Arabia. To accomplish the specified objective of this thesis, three studies were conducted. The decision-making procedures with regard to m-commerce were improved through this model.

Respondent rates are presented in the first part of this chapter (Section 8.2). Section 8.3 discusses instrument validation and reliability, while Section 8.4 provides a short synopsis of the three studies this research has undertaken. Section 8.5 constitutes a review of the main findings, with general implications in Section 8.6. Section 8.7 discusses the research limitations, while section 8.8 suggests possible future research directions. The last part (Section 8.9) is the chapter summary.

8.2. Response Rates

As found in Chapters 5, 6 and 7, the overall response rates were rich (more than 52%). The first empirical study gave 48.28%, the second 42.86% and the third 61%, which are considered as good. According to Fowler (2002), the response rates need to be between 5% - 95% to be acceptable. Therefore, according to the above suggestions, the response rates in this study are very acceptable and satisfactory.

8.3. Instrument Validation and Reliability

Instrument validation is necessary before and after data collection, so that the findings of the study can be validated (Straub, Boudreau and Gefen 2004). Thus, in each study, the research included a number of instrument validations. Pilot procedures were used in each study, so that pre-tests could be conducted. This led to greater confidence in the findings and post-data collection construct reliability and validity. The methods of validity in information system research are regarded as standard (Straub, Boudreau and Gefen, 2004). To analyse the internal consistency of the measure, Cronbach's coefficient alpha values were selected in each study (Hinton, Brownlow 2004).

8.4. Summary of the three studies:

The three studies were carried out as presented below:

First Study: An empirical analysis of the drivers of mobile commerce

The first study aimed to empirically examine some of the factors affecting the acceptance of m-commerce within the context of Saudi Arabia. Based on the revised UTAUT model, the revised model included two particular constructs: cost and trust, to enhance our understanding of m-commerce acceptance in Saudi Arabia. This study followed the suggestion of (Dwivedi and Lal (2007a), who considered gender, age and education level as independent social variables.

A quantitative approach was adopted. The data was objectively analyzed, using the statistical procedures provided in SPSS software. The questions were taken from a number of relevant studies, with necessary validation and wording change

(Lu *et al*., 2008, Wu and Wang, 2005a, Wei *et al*., 2009, Kim, Chan and Gupta 2007, Kim, Choi and Han 2009b, Park, Yang and Lehto 2007, Cheong and Park 2005). Before distributing the survey, the first stage was to make a review of the literature; secondly, the survey was distributed amongst five experts. After gaining their feedback and insights, the first draft of the ultimate questionnaire was then created. The next stage involved distributing the survey to a group of 50 volunteers, aged between 18 and 45 years, all of whom were Saudi residents. The survey facilitated the use of Cronbach's α (Alpha), which helps to calculate and examine the reliability of SPSS. Markedly, the *alpha* needs to be 0.7 or more before it can be accepted. The questions garnered a result of 0.7 or more, which markedly reflects an acceptable degree of dependability.

In the main study, the survey was distributed to 1,700 participants, who were selected randomly from public places in several cities across Saudi Arabia. Of that number, 820 were returned (48.24% response rate) and 574 were usable. A high Cronbach's value was obtained for all constructs (between .73 and .88). The KMO measure of sampling adequacy was 0.85, which is well above the threshold value of 0.5, indicating that the sample size was adequate (Field, 2005). In terms of Regression Analysis, the results emphasise that the five predictors Trust, Social Influence, Cost, Performance Expectancy and Effort Expectancy explained 39.4% of the variation in usage intention; hence this is a reasonably good model, although 60.3% of the variation in usage intention scores is still unexplained, i.e., there are other unknown factors that may influence usage intention that are not accounted for in this model (Field, 2009).

The full model was significant (F = 73.781, MSE= .352, p<.001). Three of the predictors had a significant and positive impact on usage intention (scores at the 0.001 level). The largest impact was for Performance Expectancy (β = .509, p<. 001) as this factor had the largest standardized Beta (β). This was followed by Cost (β = .185, p<.001), which was the second largest predictor of usage intention. Effort Expectancy had the lowest explanatory power (β = .151, p<.001).

Finally, neither Trust nor Social Influence were significant predictors of usage intention. In terms of constructs related to actual usage (facilitating conditions and behavioural intention) that were related to adoption of m-commerce, facilitating conditions had no significant impact on actual use (β = .010, p = .818). However, Usage intention significantly predicted actual use (β = .300, p<.001). In addition, when considering age, educational level and gender, it was found that age had an impact on usage. However, educational level and gender did not.

Second Study: Predicting consumer decisions to adopt mobile social network services: an empirical examination

The first study presented in this thesis examined the factors that affect consumer acceptance of m-commerce. The main conceptual model was examined in the second study, regarding how such factors impact adoption in mobile social network services.

It was decided that a positivist approach would be adopted through the use of a survey; the questionnaire was same as for the first study questions, with modifications to the wording. The survey was then sent to four experts in the field of information technology, before finalization of the first draft of the questionnaire. 50 volunteers completed the questionnaire for the purpose of the pilot study. The questions garnered a result of 0.7 or more, which markedly reflects an acceptable degree. Surveys were collected from 363 participants. In the factor loading, all items loaded strongly on only one component, which means that all of those factors were above 0.4, the minimum recommended value in IS research (Straub, Boudreau and Gefen 2004, Dwivedi and Lal, 2007b). Also, The KMO measure of sampling adequacy was 0.811, and Cronbach's *alpha* varied between (0.71) to (0.89).

In this study on mobile social network services, the five predictors as a group, explained 36.9% of the variation in usage intention; hence this is a reasonably good model, though 64.1% of the variation in usage intention scores is still

unexplained. The full model was significant (F = 34.9, MSE= .384, p<.001). Three of the predictors had a significant and positive impact on usage intention. The largest impact was for Performance Expectancy (β = .529, p<.001), as this factor had the largest standardised Beta (β). This was followed by Cost with β = .112, p<.05) , which was the second largest predictor of usage intention. Finally, Effort Expectancy had the lowest explanatory power (β = .23, p<.001). Neither Trust nor Social Influence were significant predictors of usage intention. In terms of constructs related to actual usage (facilitating conditions and usage intention) that were related to the adoption of mobile social network services, facilitating conditions had no significant impact on actual use (β = - .023, p = .666). However, uage intention significantly predicted actual use (β = .274, p<.001). Furthermore, so as to establish the differences between demographic variables in regard to the application of MSNSs, there was the development of three hypotheses. This research established that none of the hypotheses were supported by age, education level or gender data.

In this study we found that the result is almost the same as in the first study. However, there are some differences in terms of significance level. In addition, it was found that there were no significant the individual differences in mobile social network usage.

Third study: Factors influencing the adoption of M-Twitter: an empirical study

The scope was narrowed down to focus on one social network in the third study, which found that Twitter is one of the most popular mobile applications in Saudi Arabia. Also, the first conceptual model was simplified by removing various elements, namely facilitating conditions, trust and social influence, all of which were seen to be insignificant during the course of the first and second studies. Also, we added personal innovativeness as a fundamental element impacting usage behaviour. The incorporation of this construct was dependent on the

findings of other studies such as Blake, Neuendorf and Valdiserri (2003) and Im, Bayus and Mason (2003).

A positivist methodology was applied through the use of a survey. Measurements for cost, performance expectancy (PE), effort expectancy (EE), and usage intention (UI) were developed as a result of the prior studies. Moreover, personal innovativeness was included in this study, following various previous studies carried out by Martin and Herrero (2012), Crespo and Bosque (2008), Lu *et al*., (2011) and Lu *et al*. (2005). A small-scale pilot study was given to four experts in information systems and to 50 subjects living in the KSA, before the third part of the research properly got under way. Cronbach's *alpha* was between .79 to .91, which is acceptable.

In the main study, 1,340 surveys were returned, of which 1,252 were usable. The other 88 responses were eliminated because they indicated a careless response. In factor loading, Item BI2 (from the Intention to Use construct) cross-loaded onto two components (2 and 4), suggesting that it did not accurately measure its intended construct. Hence, this item was removed from the dataset before further analysis; all other remaining items loaded highly onto their respective theorized components, indicating simple structure. The KMO measure of sampling adequacy was .847, indicating that the sampling is factorable, in a reliability Cronbach's *alpha* range between .8 to .88, which is acceptable.

Four predictors explained 38.6% of the variation in intention to use scores in this study (based on R^2). Therefore, 61.4% of the variation in intention to use scores cannot be explained by these variables alone. This means that other unknown variables also influence intention to use, which are not in this model (Field, 2009, p. 207). The regression model was significant, with F (4, 1,247) = 196.07, p<.001. Effort expectancy was the greatest predictor of intention to use (β = .451, p<.001), followed by performance expectancy (β = .246, p<. 001), then personal innovativeness (β = .167, p<.001); cost was significant, but it had the least

explanatory power (β = .062, p<.01). In terms of constructs related to actual usage, Intention to use was a highly significant predictor of actual Twitter usage (β=.350, p<.001). Furthermore, so as to establish the differences between demographic variables in regard to Mobile Twitter usage, three hypotheses were developed. This study established that all of the hypotheses were supported by age, education level and gender data.

8.5. Discussion of the main findings

This thesis has come to recognise that the cost of m-commerce usage is relatively expensive in the view of Saudi people, although there is no negative impact inflicted on m-commerce usage behaviour. This is a surprising finding, considering that the research established a positive link between cost and usage intention behaviour, when various other researchers have established the opposite, i.e. a negative link (Chong, Chan & Ooi, 2011; Wei *et al*., 2009; Luarn and Lin, 2005; Dai and Palvia, 2008). This may be explained when considering that the income in Saudi Arabia is greater than in other countries, such as China and Malaysia, or otherwise Saudi people may enjoy and utilise technology on a greater scale. Another suggestion is that m-commerce services are affordable for the majority of the Saudi consumers, but they are not happy with the price schema.

As has been established, performance expectancy was found to have had the greatest impact on user behaviour intention in the first and second studies, with a number of other IT-centred research studies carried out in the country also recognising this construct as being significant in terms of usage behaviour intention (Wei *et al*., 2009; Lu *et al*., 2008; Tao Zhou, 2008; Luarn and Lin, 2005; Cheong and Park, 2005; Wu and Wang, 2005b; Yaseen, 2012). In relation to effort expectancy, this element is also seen to significantly impact intention to adopt m-commerce, with this finding also supported by other works that related to m-commerce and information technology (Yaseen 2012; Lu *et al*., 2008; Kim,

Mirusmonov and Lee, 2010; Kim and Garrison 2009). This factor presents the largest impact on the intention factor in the third study. This point indicates that the construct helps to increase the implementation of user intention.

The findings show that trust is not recognized as a construct that signifies impact on user behavioural intention towards m-commerce services. Importantly, this result stands in stark contrast with other research, which highlights the significant positive relationship between trust and behavioural intention to use technology (Lin 2011; Siau and Shen 2003; Chong, 2012; Min, Ji and Qu 2008; Al-Sobhi, Weerakkody and El-Haddadeh, 2011; Al-Gahtani, Hubona and Wang, 2007). One sound rationale for this is that the users targeted do not utilise this particular type of technology for financial purposes. Aldas-Manzano *et al*. (2009) established a link between an individual's higher acceptance intention of risk with greater personal innovativeness. Based on this finding, personal innovativeness has been added to the third study and we found that it has a significant effect on behaviour intent.

From the social influence perspective, our finding from the first and second studies confirmed that this construct does not play a significant influence in m-commerce intention to use, which supports Shin (2009). Most other technology adoption models have credited the influence of the social influence factor on behavioural intention (Venkatesh *et al*., 2003; Al-Shafi and Weerakkody 2010; Chong, Chan & Ooi 2011; Al-Sobhi, Weerakkody and El-Haddadeh, 2011). The possible answer is that m-commerce is becoming common. Another possibility was highlighted by Martin and Herreo (2012): a higher degree of innovativeness was found to be linked with weaker social influence in regard to the decision to accept new technologies, which is supported in the third study.

Finally, facilitating conditions had no significant influence on actual use in the first and second studies, which indicated that Saudis are not concerned about this factor. The possible answer is from the finding in the third study, which shows

that Saudis have high personal innovativeness.

Furthermore, it should be taken into account that individual factors have an effect (age, gender and education level) on actual use. In the first and third studies we noted different usage interest in terms of age; however, no different usage interest was found in terms of gender and education level in the first and second studies. Importantly, we believe that this result is due to the number of m-commerce and MSNS service advantages. This point may be associated with males and females having different levels of education, which affects their decision to use this service. In contrast, the author additionally found different twitter usage on twitter applications between males and females, also according to education level.

8.6 Main contributions of the research

First of all, this is one of the very rare studies conducted in the field of m-commerce applications in a rapidly developing country. In addition, the focus of this research is on a developing country, where mobile devices and infrastructure are both advanced. As opposed to more industrialised nations like USA, Japan, UK, and Korea, developing nations are considered to be of the same classification as the Kingdom of Saudi Arabia.

Secondly, in comparison to other competing and information adoption modes, the UTAUT model has proven to be superior (Yu 2012; Venkatesh *et al*., 2003; Park, Yang and Lehto 2007; Venkatesh and Zhang, 2010). However, there is very few UTAUT-based research, especially when compared to the vast body of TAM/TPB-based research (Yu 2012). For this reason, Venkatesh and Zhang (2010) state that there is a need for studies and improvement of generalisability and validity of UTAUT in different technology contexts. As per the respondent feedback in Saudi Arabia, it is seen through the empirical outcomes of this study that the differences in consumer intention and behaviour can be resolved by extending the UTAUT model. This aspect was the key contribution to this

research, namely the establishment of a theoretical model through which consumers' usage of m-commerce could be determined and described, specifically in Saudi Arabia. Moreover, this study develops new valid standards to ascertain and describe consumer approval of the evolving technology.

Thirdly, it was empirically concluded in this study that behaviour intention to utilize m-commerce is not significantly influenced through social influence and trust. A likely reason for this is personal innovativeness. It could also be that there has been quick development of mobile technology and the merging of such technology and good services has progressed with time. Therefore, consumers have had much experience of the benefits of m-commerce, which basically diminishes the impact of social influence and trust.

Fourthly, the role of social variables like age, gender and educational level, is proven in the revised conceptual model, when the actual implementation of m-commerce is explained.

8.7. General implications for practice

Aspects that have the possibility to influence m-commerce adoption within the context of Saudi Arabia have been investigated in this thesis. There is a need to recognize that the initiation of m-commerce alone is not sufficient to attract a higher number of users and motivate them to implement m-commerce applications in the country. Instead, there could be a need for service providers and government policies to direct focus and stress on construct enhancement, so as to influence behaviour intention and use by customers.

This thesis leads to many inferences. The first point is that firms functioning within the telecommunications and m-commerce fields have been able to develop and execute strategies that are properly targeted towards customers from the Gulf or developing nations through the findings obtained from the thesis. This would

be due to the similar income, culture and infrastructure between Saudi Arabia and the Gulf or developing countries.

The second point is that service providers should consider the applications and content available to users as valuable, due to the fact that performance expectancy is one of the most evident elements that influence adoption. It would ensure the capacity of the instrument to sustain and enhance the quick-paced lifestyle of users. The overall design of content and services should essentially cater for the useful and individual aspects of m-commerce. Moreover, the design should be easy to use. It has been observed that effort expectancy is one of the key factors influencing the intention of a consumer to use a certain technology. Therefore, development of application usefulness, ease of use and cost reduction should be focused on by management. The findings also indicate that price is not a very big factor for Saudi consumers when implementing m-commerce, since their mobile services already include high personal innovativeness. They even know about the benefits of using this service. All in all, implementation has to be enabled via government efforts and the telecommunications sector by improving legal production for m-commerce users.

The next point is that the outcomes indicate through overall demographic profiles that users are not good defenders of m-commerce implementation. Even though older Saudis were seen to be users of mobile Twitter applications, age was seen to be insignificant in the first study, which is the opposite of Wei *et al*.'s (2009) idea that it is not just young consumers that need to be the focus. Instead of focusing on particular target groups, application providers should concentrate on the general population, since m-commerce consumers are not different with regard to gender and educational level.

It can be concluded from this study that Saudis *do* prefer the use of technology. The service provider will have to comprehend the needs of Saudis, about ease of use of services and lifestyle, so as to effectively extend m-commerce services in

the country. Consequently, they should use this knowledge to develop m-commerce applications.

8.8 Research Limitations

Similar to any research on technology, there are certain gaps and shortcomings, leaving room for exploration in further research.

- Time has been one constraint for this research. The research for this PhD had to be accomplished within a reasonable time period (3-4 years), but some more time could have led to greater detail of information, specifically from the interviews. This would have contributed further to the study.
- In the model for this research, only seven variables were included out of the numerous significant adoption elements that impact intention to use and actual usage. This particular selection of variables was available through a methodical review of the literature; they were not randomly selected.
- The study in this research does not have the required information to explain those findings that are insignificant, meaning all constructs should have been examined in detail.
- The fact that all three studies were based on quantitative techniques was another limitation. Also, the research includes the usual restraint linked with this type of method. In addition, it is believed that each study could have benefited if a qualitative approach had also been used in combination.
- This research is in the context of Saudi Arabia, but, as previously mentioned, the results of this study could be extended to other nations that have similar cultural, social, and economical circumstances.

8.9 Areas for Future Research

Similar to this study, there can always be further study and research. In this research, some aspects have to be further examined and analysed. For the purpose of comparative analysis, it would be beneficial if this study could be repeated in different nations or service contexts (such as other categories).

Moreover, several alternative directions have been suggested through which additional study on this topic could be carried out. These include:

Recommendation 1: As per the existing literature, there are numerous m-commerce applications. The author suggests that these applications could be studied in detail, which could result in determining more issues that hinder the adoption of m-commerce.

Recommendation 2: As per the findings, trust was not seen to be a significant factor for social network application. It is recommended that this factor could be further analysed with regard to financial markets like m-banking, m-payment etc.

Recommendation 3: The findings showed that the greatest impact on behaviour intention was of performance expectancy. It is recommended that this aspect could be explored in further detail.

Recommendation 4: The revised UTAUT model in Saudi Arabia was tested to determine citizens' acceptance of technology (m-commerce applications). This study could be extended further to other GCC and regional nations. Hence, a comparative analysis of m-commerce adoption between the countries could be carried out.

Recommendation 5: Another part of this study was the testing of the revised UTAUT model in Saudi Arabia, to determine the extent of citizens' adoption of technology (MSNSs applications). Further study could be on mobile payment, and comparative analysis could also be carried out.

8.10 Chapter Summary

According to the author's information, this research is the first to have explored the matter of m-commerce acceptance and usage in Saudi Arabia. It is also stated that, in any single country in the GCC region, this is the first research work to have surveyed such a large population (3,000+). The study utilised the Theory and Unified Theory of Acceptance and Use of Technology (UTAUT), and it proved the effect of certain salient aspects found in the existing literature on e-government application and adoption in Saudi Arabia. Thus, it could be stated that this study contributes to the information regarding citizens' adoption of m-commerce applications and services in Saudi Arabia.

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Appendix 1

Questionnaire

Empirical analysis of drivers of mobile commerce adoption

Confidentiality Statement

The data obtained from this questionnaire will be treated as strictly confidential and only be used for the purpose of this academic research. No information will be attributed to any person or organization.

The Purpose of the study:

This questionnaire is part of a doctoral (PhD) research project essentially aiming at investigating the key factors that influence the adoption of m-commerce in the context of public institutions in Saudi Arabia.

I would very much appreciate if you would be so kind as to spare 5-10 minutes of your time to fill out this questionnaire. Without your co-operation, it is not possible to complete this study. Responses are based on your own experiences, and there are no right or wrong answers.

Background information

In the course of m-commerce adoption in Saudi Arabia, implementation barriers and influential factors for adopting m-commerce in different regions and countries may or may not be the same as those found in the developed countries with varying degrees of intensity or importance.

As you complete this questionnaire, please focus on the process of adoption of m-commerce on Communication Services in Saudi Arabia. Could you please relate all your answers to your experience or your perception of the use of M-commerce services.

Section A: Demographic Items:

These questions are being asked so that comparison can be made between different groups of respondents. All responses will remain confidential, with no individual being identified.

Age:

- ☐ 15 to 18 years
- ☐ 19 to 25 years
- ☐ 26 to 35 years
- ☐ 36 to 45 years
- ☐ Over 45 years

Gender:

- ☐ Male
- ☐ Female

Education Level:

- ☐ Less than high school
- ☐ High school
- ☐ Diploma
- ☐ Bachelor
- ☐ Post-graduate

How often do you use m-commerce services?

- ☐ Daily
- ☐ More than onec a week
- ☐ Weekly
- ☐ Monthly
- ☐ Once

☐ None

Please circle the number which reflects your level of agreement.

[1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree]

Performance Expectancy						
1	M-commerce services enable me to accomplish tasks more quickly.	**1**	**2**	**3**	**4**	**5**
2	M-commerce services enable enhanced my task effectiveness.	**1**	**2**	**3**	**4**	**5**
3	M-commerce services make it easier to do my task.	**1**	**2**	**3**	**4**	**5**
4	M-commerce services, improve my task performance.	**1**	**2**	**3**	**4**	**5**
5	M-commerce save me time in performing tasks.	**1**	**2**	**3**	**4**	**5**
Effort Expectancy						
1	It is not easy to use m-commerce services.	**1**	**2**	**3**	**4**	**5**
2	Learning how to use m-commerce services would be difficult for me.	**1**	**2**	**3**	**4**	**5**
3	It is not easy to get m-commerce services to do what I want them to do.	**1**	**2**	**3**	**4**	**5**
4	It is not convenient to access m-commerce services.	**1**	**2**	**3**	**4**	**5**
Behaviour Intention						
1	I intend to continue to m-commerce services in the future.	**1**	**2**	**3**	**4**	**5**
2	I will always try to use m-commerce services in my daily life.	**1**	**2**	**3**	**4**	**5**
3	I recommend others to use m-commerce services.	**1**	**2**	**3**	**4**	**5**
4	My interest in m-commerce services will increase in the future.	**1**	**2**	**3**	**4**	**5**
Cost						
1	M-commerce transactions are costly	**1**	**2**	**3**	**4**	**5**
2	The subscription fee is expensive for me.	**1**	**2**	**3**	**4**	**5**

3	The cost of the handset is high.	**1**	**2**	**3**	**4**	**5**
Facilitating Conditions						
1	My environment does not encourage me to use of m-commerce services.	**1**	**2**	**3**	**4**	**5**
2	I do not have the resources necessary to use m-commerce services.	**1**	**2**	**3**	**4**	**5**
3	M-commerce services are not compatible with other technologies I use.	**1**	**2**	**3**	**4**	**5**
4	If I have difficulty using m-commerce services, there are no professionals to help me.	**1**	**2**	**3**	**4**	**5**
Social influence						
1	Friends' suggestions and recommendations will affect my decision to use m-commerce services.	**1**	**2**	**3**	**4**	**5**
2	Family members/relatives do not have an influence on my decision to use m-commerce services.	**1**	**2**	**3**	**4**	**5**
3	I will use m-commerce services if the service is widely used by people in my community.	**1**	**2**	**3**	**4**	**5**
Trust						
1	It is not safe to use mobile social network services.	**1**	**2**	**3**	**4**	**5**
2	Transactions conducted through mobile social network services will NOT be secure.	**1**	**2**	**3**	**4**	**5**
3	My personal information will not be kept confidential while using mobile social network services technology.	**1**	**2**	**3**	**4**	**5**
4	I believe my privacy would be divulged	**1**	**2**	**3**	**4**	**5**

Thank you for your participation

Appendix 2

Questionnaire

Predicting consumer decisions to adopt mobile social network services: an empirical examination

Confidentiality Statement

The data obtained from this questionnaire will be treated as strictly confidential and only be used for the purpose of this academic research. No information will be attributed to any person or organization.

The Purpose of the study:

This questionnaire is part of a doctoral (PhD) research project essentially aiming at investigating the key factors that influence the adoption of m-commerce in the context of public institutions in Saudi Arabia.

I would very much appreciate if you would be so kind as to spare 5-10 minutes of your time to fill out this questionnaire. Without your co-operation, it is not possible to complete this study. Responses are based on your own experiences, and there are no right or wrong answers.

Background information

In the course of m-commerce adoption in Saudi Arabia, implementation barriers and influential factors for adopting m-commerce in different regions and countries may or may not be the same as those found in the developed countries with varying degrees of intensity or importance.

As you complete this questionnaire, please focus on the process of adoption of m-commerce on Communication Services in Saudi Arabia. Could you please relate all your answers to your experience or your perception of the use of Mobile social network services, which are part of m-commerce services.

Section A: Demographic Items:

These questions are being asked so that comparison can be made between different groups of respondents. All responses will remain confidential, with no individual being identified.

Age:

- ☐ 15 to 18 years
- ☐ 19 to 25 years
- ☐ 26 to 35 years
- ☐ 36 to 45 years
- ☐ Over 45 years

Gender:

- ☐ Male
- ☐ Female

Education Level:

- ☐ Less than high school
- ☐ High school
- ☐ Diploma
- ☐ Bachelor
- ☐ Post-graduate

How often do you use mobile social communication services?

- ☐ Daily
- ☐ More than onec a week
- ☐ Weekly
- ☐ Monthly
- ☐ Once
- ☐ None

Please circle the number which reflects your level of agreement.

[1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree]

Performance Expectancy						
1	Mobile social network services enable me to accomplish tasks more quickly.	**1**	**2**	**3**	**4**	**5**
2	Mobile social network services enable enhanced my social communication effectiveness.	**1**	**2**	**3**	**4**	**5**
3	Mobile social network services make my social relations easier.	**1**	**2**	**3**	**4**	**5**
4	Mobile social network services improve my task performance in conducting social communication.	**1**	**2**	**3**	**4**	**5**
5	Mobile social network services save me time in performing social communication.	**1**	**2**	**3**	**4**	**5**
Effort Expectancy						
1	It is not easy to use mobile social network services.	**1**	**2**	**3**	**4**	**5**
2	Learning how to use mobile social network services would be difficult for me.	**1**	**2**	**3**	**4**	**5**
3	It is not easy to get mobile social network services to do what I want them to do.	**1**	**2**	**3**	**4**	**5**
4	It is not convenient to access mobile social network services.	**1**	**2**	**3**	**4**	**5**
Behaviour Intention						
1	I intend to continue to use mobile social network services in the future.	**1**	**2**	**3**	**4**	**5**
2	I will always try to use mobile social network services in my daily life.	**1**	**2**	**3**	**4**	**5**
3	I recommend others to use mobile social network services.	**1**	**2**	**3**	**4**	**5**
4	My interest in mobile social network services will increase in the future.	**1**	**2**	**3**	**4**	**5**
Cost						
1	M-commerce transactions are costly	**1**	**2**	**3**	**4**	**5**

2	The subscription fee is expensive for me.	**1**	**2**	**3**	**4**	**5**
3	The cost of the handset is high.	**1**	**2**	**3**	**4**	**5**
Facilitating Conditions						
1	My environment does not encourage me to use of mobile social network services.	**1**	**2**	**3**	**4**	**5**
2	I do not have the resources necessary to use mobile social network services.	**1**	**2**	**3**	**4**	**5**
3	Mobile social network services are not compatible with other technologies I use.	**1**	**2**	**3**	**4**	**5**
4	If I have difficulty using mobile social network services, there are no professionals to help me.	**1**	**2**	**3**	**4**	**5**
Social influence						
1	Friends' suggestions and recommendations will affect my decision to use mobile social network services.	**1**	**2**	**3**	**4**	**5**
2	Family members/relatives do not have an influence on my decision to use mobile social network services.	**1**	**2**	**3**	**4**	**5**
3	I will use mobile social network services if the service is widely used by people in my community.	**1**	**2**	**3**	**4**	**5**
Trust						
1	It is not safe to use mobile social network services.	**1**	**2**	**3**	**4**	**5**
2	Transactions conducted through mobile social network services will NOT be secure.	**1**	**2**	**3**	**4**	**5**
3	My personal information will not be kept confidential while using mobile social network services technology.	**1**	**2**	**3**	**4**	**5**
4	I believe my privacy would be divulged	**1**	**2**	**3**	**4**	**5**

Thank you for your participation

Appendix 3

Questionnaire

Factors that influence the adoption of mobile Twitter - an empirical study in Saudi Arabia

Confidentiality Statement

The data obtained from this questionnaire will be treated as strictly confidential and only be used for the purpose of this academic research. No information will be attributed to any person or organization.

The purpose of the study:

This questionnaire is part of a doctoral (PhD) research project essentially aiming at investigating the key factors that influence the adoption of m-commerce in the context of public institutions in Saudi Arabia.

I would very much appreciate if you would be so kind to spare 5-10 minutes of your time to fill out this questionnaire. Without your co-operation, it is not possible to complete this study. Responses are based on your own experiences, and there are no right or wrong answers.

Instructions

In the course of m-commerce adoption in Saudi Arabia, implementation barriers and influential factors for adopting m-commerce in different regions and societies may or may not be the same as those found in the developed countries, with varying degrees of intensity or importance.

As you complete this questionnaire, please focus on the process of adoption of m-commerce on Communication Services in Saudi Arabia. Could you please relate all your answers to your experience or your perception of the use of accessing Twitter from a mobile which is part of m-commerce services.

Section A: Demographic items:

These questions are being asked so that comparison can be made between different groups of respondents. All responses will remain confidential, with no individual being identified.

Age:

- ☐ 15 to 18 years
- ☐ 19 to 25 years
- ☐ 26 to 35 years
- ☐ 36 to 45 years
- ☐ Over 45 years

Gender:

- ☐ Male
- ☐ Female

Education Level:

- ☐ Less than high school
- ☐ High school
- ☐ Diploma
- ☐ Bachelor
- ☐ Post-graduate

How often do you Access Twitter from mobile devices?

- ☐ Daily
- ☐ More than onec a week
- ☐ Weekly
- ☐ Monthly
- ☐ Once
- ☐ None

Section B: Research Data

Please circle the number which reflects your level of agreement.

[1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree]

Performance Expectancy						
1	Using Twitter from mobile device enables me to accomplish tasks more quickly.	**1**	**2**	**3**	**4**	**5**
2	Using Twitter from a mobile device enhances my social communication effectiveness.	**1**	**2**	**3**	**4**	**5**
3	Using Twitter from mobile device makes it easier to maintain my social relations.	**1**	**2**	**3**	**4**	**5**
4	Using Twitter from mobile device saves me time in performing social communications.	**1**	**2**	**3**	**4**	**5**
Effort Expectancy						
1	It is not easy to use Twitter from mobile devices.	**1**	**2**	**3**	**4**	**5**
2	Learning how to use Twitter from mobile device services would be difficult for me.	**1**	**2**	**3**	**4**	**5**
3	It is not easy to use Twitter from a mobile device to do what I want it to do.	**1**	**2**	**3**	**4**	**5**
4	It is not convenient to use Twitter from mobile devices.	**1**	**2**	**3**	**4**	**5**
Behaviour Intention						
1	I intend to continue to use mobile Twitter services if the future.	**1**	**2**	**3**	**4**	**5**
2	I will always try to use mobile Twitter services in my daily life.	**1**	**2**	**3**	**4**	**5**
3	I recommend that others use Twitter from mobile devices.	**1**	**2**	**3**	**4**	**5**
4	My interest in using Twitter from mobile device will increase in the future.	**1**	**2**	**3**	**4**	**5**
Cost						
1	M-commerce transactions are costly	**1**	**2**	**3**	**4**	**5**
2	The mobile Twitter service fee is expensive.	**1**	**2**	**3**	**4**	**5**
3	The cost of the handset is high.	**1**	**2**	**3**	**4**	**5**

Personal innovativeness						
1	If I heard about new technology, I would look for ways to experiment with it.	**1**	**2**	**3**	**4**	**5**
2	Among my peers, I am usually the first to try out new technology.	**1**	**2**	**3**	**4**	**5**
3	In general, I like to try out the new information technology.	**1**	**2**	**3**	**4**	**5**
4	I like to experiment with new information technology.	**1**	**2**	**3**	**4**	**5**

Thank you for your participation