A Framework of Mobile Transaction Use: The User's Perspective

Mohammed A. Alqahtani

Supervisor
Dr Pam J. Mayhew

A thesis submitted to the School of Computing Sciences of the University of East Anglia for the fulfilment of the degree of Doctor of Philosophy (PhD) in Computing Sciences

Abstract

The remarkable advances of mobile technologies and the prevalence of mobile devices have profoundly transformed telephony systems. They provide functionalities which surpass telephony needs, and which motivate the development of value-added mobile services and functions. The number of mobile phones in use far exceeds any other technical devices that could be used to market, sell, produce, or deliver products and services to consumers. These developments open lucrative opportunities to retailers and service providers. The literature highlights the fact that mobile transactions (m-transactions) are one of the most critical incentives for successful mobile commerce (m-commerce). However, the successfulness of m-transaction systems in Saudi Arabia requires a strong acceptance of the Saudi consumers. The importance of this study is accentuated by the fact that mobile commerce and its services are still in their infancy and there is still an apparent lack of acceptance of mobile transactions amongst Saudi users. Research needs to address the issue of acceptance of m-transactions from the user's perspective, particularly within developing countries as they suffer from a noticeable lack of studies in this field.

This research initially starts with a comprehensive literature review about the critical factors affecting the acceptance and use of electronic commerce (e-commerce), m-commerce and focuses on m-transactions, including different technology acceptance models and theories, helping to investigate whether there exists an effective comprehensive framework for adopting m-transactions within the context of Saudi Arabia and, more specifically, from a consumer's perspective. Furthermore, to emphasize the true value measure of m-transaction, we must comprehend and evaluate the potency and limitations of mobile purchasing and the key factors affecting the m-transaction use decision. M-transactions hold a huge potential for online business and sales, but merely having an m-transaction service "hosted" on the World Wide Web (WWW) should not lead us to believe that customers will rush into mobile commercial websites for their desired products. Recognising that fact and realizing that there are different important factors and concerns over m-transactions playing a significant role, highlight the need for investigating and developing a framework that encompasses the critical factors affecting the intention to use m-transaction within the context of a Saudi consumer's perspective. In order to achieve this goal, this study evolved in several stages aiming to reach a satisfactory level of maturity. These stages can be divided into three main phases: (1) exploratory phase which contains three exploratory studies which helped to add the cultural qualities as a further dimension that would play a significant role in such a unique cultural region. Consequently, a holistic framework is integrated that includes the key factors affecting the intention to use m-transactions. This framework is empirically validated in (2) a further study using a statistically representative sample size of 1008 Saudi users from different demographic backgrounds. The empirical analysis revealed that security, ease of use, usefulness, social influence, navigational structure, telecommunication infrastructure, individualism, masculinity, power distance, uncertainty avoidance, and visual appeal have a significant impact on the intention to use m-transactions. Amongst those factors, ease of use was the most significant influential factor. Therefore, this led to (3) another study aiming to empirically investigate the level of ease of use (usability) of conducting m-transactions within the Saudi context. In total, this research comprised five different empirical studies to extend our understanding of the phenomenon of m-transactions. The ultimate product of this research is to develop a consolidated framework for the intention to use m-transactions, combined with a set of recommendations for mobile websites and application developers, designers, government, and other organizations that intend to extend their business in the mobile commerce area, and this should eventually benefit the users.

"*The reality is not always what you thought to be unless you investigate it yourself.*"

Acknowledgements

First and foremost, I give praise, honour and glory to Allah the Lord of the universe, as without his blessings none of this work would have been achieved.

I would like to express my sincere gratitude and appreciation to my supervisor, Dr Pam Mayhew, for her great assistance and support, in addition to her patience and encouragement since I initially started my PhD to achieve a high level of research skills. I would also like to thank my co-supervisor, Dr Wenjia Wang, for his assistance and support, especially during the statistical analysis stage.

Great thanks and gratitude go to Professor Stuart Barnes, Deputy Director of Research (Medway) and Director of the Centre for Value Chain Research, for his guidance and valuable suggestions from the early stages of this research. My appreciation also goes to Professor Andy Day, Deputy Head of School, Director of Infrastructure, Environmental Awareness Officer and Head of Graphics Group, for his useful and valuable discussions, directions and comments on different phases of this research.

I gratefully acknowledge Dr Geoffrey Hubona, the founder of The Georgia R School, for his suggestions and valuable consultations with regards to statistical software and methods. Also special thanks go to Dr James Gaskin, Department of Information Systems, Brigham Young University, for his great help and suggestions, for his excellent statistical video tutorials and for his kind replies to my many inquiries by email.

I would like to express my gratitude to Dr Ali Al-Badi, Head of Department of Information Systems, College of Economics & Political Science, Sultan Qaboos University, for his great help and guidance in conducting the research studies and experiments, and for his informative comments and suggestions. I would truly like to express my gratitude to all those who took part and participated in this research, especially those who were interviewed in the exploratory studies, those who participated in validations studies and those involved in the questionnaire evaluation (judgement) and pre-testing process. In particular, special thanks go to Dr Jaber Alruwaili, Dr Mubarak Aldwsry, Dr Hamed Aldwsry, Mr Roobaea Alroobaea, and Mr Obead Alhadreti for their help, support and dedication to my work in the exploratory phase as well as during the process of the survey pre-testing, piloting, and translation. My appreciation goes to the Dammam and King Saud universities and other institutions for their help in distributing the research's surveys. I am grateful to everyone who helped in conducting this research, whether I mentioned their names or unintentionally forgot to mention them. Finally, I would like to give a special thanks to my father and to my mother, to all my family members (my sister and all my brothers) for being there whenever there is a need and for their support. Special gratitude goes to my wife and to my son for their help, support and sacrifices. Also thanks to my grandfather as he passed away during my PhD study, for his support. May Allah have mercy upon his soul and grant him the highest level in Paradise.

Dedication

To my mother

Table of Contents

List of Figures

List of Tables

Chapter 1 Introduction and Research Overview

1.1 Introduction

The remarkable advances in mobile technologies and the current high prevalence rate of mobile devices have profoundly transformed the telephony system. These mobile devices are equipped with functionalities which surpass telephony needs, and which motivate the development of value-added mobile services and functions. The number of mobile phones in use far exceeds the number of any other technical devices that could be used to market, sell, produce, or deliver products and services to consumers. These developments have opened up lucrative opportunities to retailers and service providers (Bamasak, 2011; Dahlberg et al., 2008). Moreover, mobile communication technologies have successfully penetrated consumer markets throughout the world. Mobile applications have become especially valued in an era where time is precious and a high value is attached to convenience. Furthermore, the rapid diffusion of wireless devices, including mobile and smart phones, personal digital assistants (PDAs), and other handheld devices, has made mobile commerce a major driving force for the next phase of electronic commerce (i.e. mobile commerce). Mobile transactions (m-transactions) are an important emerging application of mobile commerce which facilitate mobile commerce transactions by providing the customer with a convenient means to pay (Yang et al., 2012; Petrova and Mehra, 2010a). In addition, mobile commerce is expected to have an even greater influence on organisations, as wireless technologies and applications start to challenge the existing processes, strategies, structures, roles of individuals, and even cultures of organisations (Huang et al., 2007).

1.2 Introduction to Mobile Transactions

From the literature review, it can be observed that the terms 'mobile payment' and 'mobile transaction' usually refer to the same action. Petrova and Mehra (2010a) describe mobile payment in their study as a method of payment for products and services through mobile commerce which can be viewed as "a service-enabling transaction with a monetary value conducted via a mobile telecommunications network". Furthermore, mobile payment can be seen as a natural evolution of electronic payment, and enables feasible and convenient mobile commerce transactions (Mallat, 2007). On the other hand, Huang el. al. (2007) describe mobile transactions as one of the most important components of mobile commerce, which could involve a variety of applications, for example, a mobile banking and brokerage service, mobile money transfers, mobile payments, and micro-payments (small sum of money, e.g. payment less than 1 USD). The two terms 'mobile transaction' and 'mobile payment' are very similar and interconnected/interrelated. Therefore, this research will use these two terms interchangeably.

The recent literature highlights the fact that m-transactions are one of the most critical incentives for successful mobile commerce (Yang et al., 2012; Bamasak, 2011; Kim et al., 2010). However, for m-transaction systems in Saudi Arabia to be successful, consumers and relevant stakeholders, including private and public organisations, need to accept its usage (Bamasak, 2011; Kim et al., 2010). Jin et al. (2014) highlighted in their research the importance of the user/customer opinions in a market-driven IT product (e.g. m-transaction). The customer's views and opinions should be considered in prioritising the engineering characteristics of that IT innovation, however, the problem is "these reviews are often neglected and are seldom utilised directly by designers." (Jin et al., 2014). Furthermore, Liu et al. (2013a) stated that "the valuable voice of the customer, benefit consumers and product designers". Various factors from different angles may hinder consumers' use of this new technology. For example, the degree to which consumers are familiar with m-transactions, and their general awareness of the technology, may influence their intentions to use it. Moreover, perceived security and privacy are usually of great concern to consumers when purchasing online, and they may play a critical role in their acceptance of m-transactions. Companies and organisations that intend to do business via mobile devices should consider the impact of the different factors that

concern consumers and may significantly affect their use and acceptance of their services. With respect to mobile commerce, consumer adoption behaviour is still emerging (Wei et al., 2011). Therefore, this research contributes to the study of this complex and challenging issue by investigating, extracting and analysing the needs, preferences, and expectations of consumers within the Saudi context.

This research begins with a comprehensive literature review about the critical factors affecting the acceptance and use of mobile commerce and m-transactions, including both consumer-centred approaches and system/technology-centred factors. This helps to investigate whether or not there already exists an effective comprehensive framework for adopting m-transactions within the context of Saudi Arabia and, more specifically, from the consumers' perspective.

This study will consider and discuss different aspects and perspectives of m-transactions such as: how the usability of mobile application affects the decision to conduct an m-transaction; how the consumer's perceived trust in a service affects his/her intention to purchase wirelessly and use mobile services; how social influences encourage the use of wireless services and m-transactions; whether the cost of trying a new technology affects the level of acceptance and use of m-transactions; whether security concerns will significantly limit the use of mobile services and purchasing online; whether the cultural background of the consumer plays a critical role in the acceptance and use of m-transactions; and whether the legalisation (cyber-laws) of m-transaction would increase the level of online purchasing via wireless networks.

1.3 Problem Statement

The Web has developed from a collection of linked (hyper-linked) pages into a collection of online services that are incorporated through the Internet. The advance in technology during the 21st century has led to an escalating use of the Internet for commercial purposes (Kraemer et al., 2006). As a result, the use of normal transactions has been reformed to meet the era of technology. Nowadays, users can buy from a website with an electronic transaction. Also it has been predicted that, in the near future, electronic purchases will affect all businesses by the year 2050 or thereabouts (Laudon and Traver, 2011). Moreover, wireless technologies have penetrated consumer markets throughout the world. Mobile communication technologies and the Internet are viewed as two dominant global communication networks (Dai and Palvia, 2009). According to the latest report of Portio Research (2012), a research company based in the UK focussing on the mobile and wireless industry, the number of mobile subscribers worldwide will grow at a Compound Annual Growth Rate (CAGR) of 7.3% to nearly 8.5 billion between 2011 and the end of 2016. Moreover, $1.3 trillion (USD) were generated by mobile services worldwide in 2011. This revenue is now predicted to increase to almost $1.8 trillion (USD) at a CAGR of 6.3% between 2011 and 2016. In addition, there is an increasing mobility in today's contemporary society, the number of mobile device subscribers has grown sharply in recent years, and the mobile telephony industries have escalated significantly. Alongside these expansions, wireless services have gradually become a part of everyday life (Yang et al., 2012; Schierz et al., 2010).

In line with the foregoing, a great number of scholars, analysts and studies have emphasized that there is an enormous marketplace potential for mobile commerce applications and services. With regards to the Information Communication Technology (ICT) research community, it is becoming one of the foremost topics of interest and a key priority for many business organisations. The vision of scholars and industry representatives can be seen now by the opportunities made obtainable by wireless services, envisioning that the next or real wave of e-commerce growth will be in the field of mobile commerce (Kourouthanassis and Giaglis, 2012; Wei et al., 2011; Shih et al., 2010; Huang et al., 2007; Jakimoski, 2014). Mobile commerce will change e-commerce paradigms and even have a significant influence on the medical and insurance industries (Shih et al., 2010). Moreover, mobile communication technologies have penetrated global consumer markets, meaning that mobile commerce is able to impact greatly on business activities and consumer behaviour, as well as nationwide and worldwide markets (Dai and Palvia, 2009). Notwithstanding, the IT industry in many

developing countries is not sufficiently robust (Molla and Licker, 2005a). Also, some financial sectors may not have the maturity to tackle electronic transactions, and transportation facilities may be insufficiently developed (Molla and Licker, 2005b). Alqahtani (2012) stated that while developed countries have harnessed and adopted electronic purchasing, developing countries are not yet fully adapted to its adoption. In particular, mobile transactions are still not showing a significant trend towards growth and wider acceptance in many regions, although this trend is seen in some European countries (Petrova and Mehra, 2010a). Moreover, mobile commerce is recognised as being in its infancy stage and therefore consumer acceptance and adoption behaviour are still an emerging domain of mobile commerce research (Wei et al., 2011; Kim et al., 2010; Min et al., 2008), and identifying the factors affecting mobile commerce acceptance is of importance (Dai and Palvia, 2009). Recent literature highlights the fact that m-transactions are one of the most critical incentives for adopting mobile commerce (Yang et al., 2012; Bamasak, 2011; Kim et al., 2010). However, the success of m-transaction systems requires a strong acceptance by consumers and relevant stakeholders, including private and public organisations (Bamasak, 2011; Kim et al., 2010; Pousttchi and Wiedemann, 2007; Liu et al., 2013a), and there is apparently an insufficient acceptance of m-transactions amongst consumers (Yang et al., 2012; Schierz et al., 2010; Kim et al., 2010). Therefore, this study will aim to identify the key factors affecting the intention to use m-transactions.

The final illustration of the problems encountered by e-commerce comes from the fate of many mobile payment services. These services became a much-discussed topic in the early 2000s, and continued to be so even after the boom of the Internet (Dahlberg et al., 2008). A number of mobile payment services were introduced all over the world, including access to electronic payments and Internet banking. Surprisingly, many of these services were unsuccessful. For instance, the majority of the mobile payment services which were available in European Union (EU) countries and listed in the European Personnel Selection Office (EPSO) database in 2002 have been discontinued (Dahlberg et al., 2008). One good reason for the failure of these services is that the targeted consumers did not accept or use them. This gives a clear example of the fact that, in order to facilitate the development and diffusion of successful mobile payment services, it is important to understand and identify what could prevent and induce consumers to accept mobile services and technologies. On the other hand, some research firms have given optimistic predictions about mobile payment services. The management consulting company 'Arthur D. Little', for instance, forecast a growth of mobile payment services from $11.7 Billion (USD) in 2005 to $37.1 Billion (USD) in 2008 (Arthur D. Little, 2004). This increased number would account for approximately 8% of the gross mobile services market. Yet in spite of these positive forecasts, the reality seems to be quite different, and the situation is usually unfavourable for those companies offering mobile payment services. According to Gartner Inc. (2009) in 2008, only 1% of all mobile cellular users had used mobile payment services. Accordingly, the real market diffusion of mobile payment services significantly deviates from expectations.

1.4 Research Motivations

The focus of this research is to investigate the use of m-transaction from the Saudi users' perspective. As the e-commerce counted as the previous wave of m-transaction (Kourouthanassis and Giaglis, 2012), therefore, in order to fully understand the underlying problem the researcher decided to examine e-commerce before paying more attention to m-transaction.

The Figure 1.1 show geographically the developed and developing countries. While the diffusion and utilisation of e-commerce has grown dramatically in developed countries, the proliferation of e-commerce in developing countries has fallen far below expectations (Wei et al., 2010; Petrazzini and Kibati, 1999; Travica, 2002; Nir, 2007; Molla and Licker, 2005a) and, in paricular for this research focus, in Saudi Arabia (Alqahtani et al., 2012; AlGhamdi et al., 2011; Aleid et al., 2009; Aldwsry, 2012). A forecast for the global growth of e-commerce shows that developed countries spend more on e-commerce than developing countries do, and it is predicted that in 2016 the spending will dramatically increase; however developing countries remain at the bottom of the list (*see Figure 1.2*).

Studies indicate that businesses in developed countries differ from those in developing countries with respect to information technology and e-commerce (Molla and Licker, 2005b; Molla and Licker, 2005a).

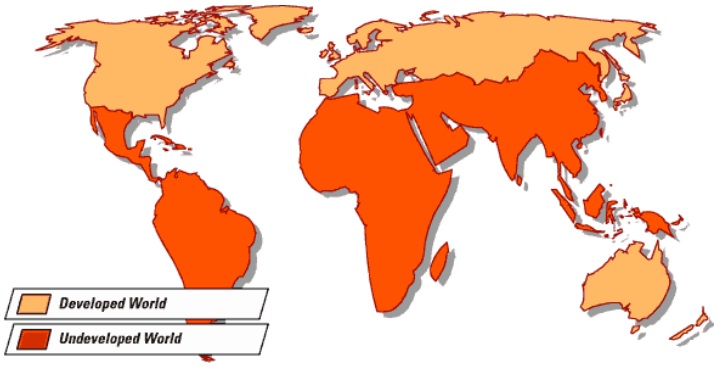

Figure 1.1: Developed and Undeveloped Countries.
Source: (BBC, 2012)

This difference is caused by the contextual managerial, environmental and organisational constraints. Furthermore, businesses implementing e-commerce in developing countries face substantially greater challenges than businesses in developed countries, due to the unreliability of the internet connection, the poor availability of access to the internet due to poor infrastructure, the high cost of doing so, and also the low level of ICT penetration throughout the country (Molla and Licker, 2005b; Molla and Licker, 2005a). Aleid et al. (2009) carried out an investigation of e-commerce acceptance and adoption in Saudi Arabia from the consumers' perspective. They find that there are a number of factors that may inhibit the diffusion of e-commerce into Saudi Arabia (e.g. infrastructure, security, and e-commerce laws). There are other studies with similar findings (AlGhamdi et al., 2011; Al-Ghaith et al., 2010; Al-Somali et al., 2009; Aldwsry, 2012). The existence of such obstacles, or a gap in the adoption and intention to use e-commerce and its services in Saudi Arabia, were the motivations for this study. Furthermore, the foregoing situation was one of the stimuli for this study to explore and investigate firstly the current situation of e-commerce acceptance and adoption, and secondly wireless or mobile commerce in general, and m-transactions in particular.

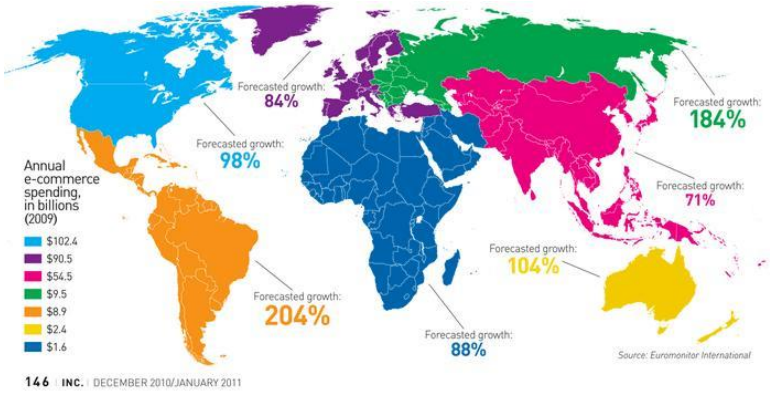

Figure 1.2: Forecast for global growth of e-commerce.
Source: (Shivers, 2011)

Furthermore, to emphasise the true value of the measure of m-transactions, we must comprehend and evaluate the potency and limitations of mobile purchasing and the key factors affecting the decision to use it, which are the foundation of mobile commerce. M-transactions possess a huge potential for generating online business and sales, but merely having an m-transaction service "hosted" on the World Wide Web (WWW) does not mean that customers will rush to mobile commercial websites for their desired products. Recognising that fact, and realising that there are different important factors and concerns over m-transactions, may highlight the need for investigating and assembling a framework that encompasses the critical factors affecting the acceptance and use of m-transactions from the perspective of Saudi Arabian consumers.

One of the motivations for this study is the recent astonishing growth in the online population and the revenues generated (see Figure 1.3). According to recent figures, the number of users of the internet worldwide grew from 360 million in December 2000 to more than 2.405 billion in June 2012, showing a growth rate of around 566.4%, and 32.7% penetration (Internet World Stats, 2012a). From $159 Billion (USD) in 2004 to around $963 Billion in 2013 was the global online commerce revenue forecast (J.P. Morgan, 2011). The number of mobile subscribers worldwide will grow to nearly 8.5 billion by the end of 2016. Moreover, $1.3 trillion (USD) were generated by mobile services worldwide in 2011, now predicted to increase to almost $1.8 trillion (USD) at a CAGR of 6.3% between 2011 and 2016 (Portio Research, 2012).

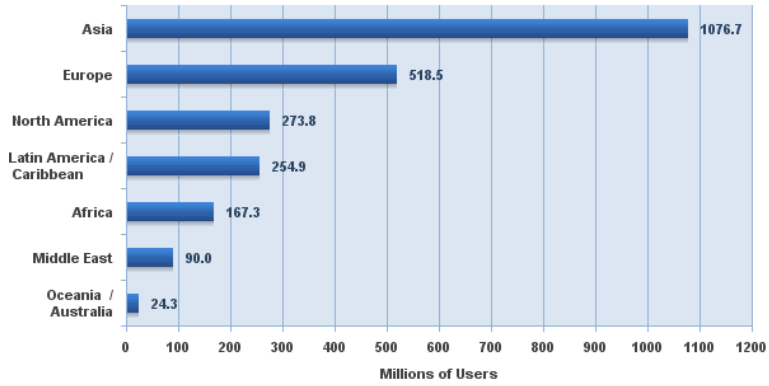

Figure 1.3: Internet Users in the World by Geographical Regions – 2012 Q2.
Source: (Internet World Stats, 2012b)

More specifically, a recent report on e-commerce (Orloff, 2012) indicated that the retail sector in Saudi Arabia is considered as the largest amongst GCC countries and the retail sector is forecast to reach almost $66.7 billion (USD) in 2012, whereas electronic retail sales reached only $520 Million (USD) in 2012. Moreover, Saudi Arabia is the top country in the world with regard to mobile device penetration, with 180% per 100 inhabitants (i.e. 95% of the whole population possess a mobile device). Furthermore, the same report shows that 70% of mobile users do use the internet on their mobiles, and only around 20% have the readiness to change to m-transactions (Orloff, 2012).

1.5 The Research Importance

This study will exclusively focus on Saudi Arabia which can be considered as a perfect marketplace for electronic shopping activities amongst the developing countries in the Middle East region. The Saudi government has made distinctive efforts and achievements in order to keep pace with development and adoption of advanced technologies. Also the Saudi government has paid growing attention to the pursuit of electronic shopping systems to support national, regional and international businesses (Sait et al., 2004). Another reason for selecting Saudi Arabia is that *"a high level of cultural and social homogeneity prevails there. Almost 100 per cent of the Saudi population, 20 million according to a 2006 statistic, speak Arabic which is a member of the western branch of the Semitic Family of languages. It is the religious and literary language of Islam. In addition, almost all of the inhabitants are Muslim. The combination of common language and common religion has led to a common sense of heritage and cultural unity amongst the Saudis".* (Eid, 2011).

A summary of facts is presented below which further illustrate the importance of this study:

- There is an enormous amount of investment in the cyber-market in Saudi Arabia which has great potential for organisations and consumers (Eid, 2011; Lee Heng et al., 2010; Al-Badi, 2005) and there is an optimistic future for m-transactions in Saudi Arabia (Bamasak, 2011; Alqahtani et al., 2012).
- Mobile payments are predicted to replace cash and credit cards by 2020 (Smith and Rainie, 2012).

- Electronic purchasing and payment, penetration and adoption in Saudi Arabia are still under-served markets compared to other regional markets (Orloff, 2012; AlGhamdi et al., 2011; Aleid et al., 2009; Alshehri and Meziane, 2011).
- Technology infrastructure and consumer behaviour, which are considered as key challenges, are affecting e-commerce and m-commerce in Saudi Arabia (Bamasak, 2011; Al-Ghaith et al., 2010; Orloff, 2012; Alqahtani et al., 2014a; Alshehri and Meziane, 2011).
- The success of m-transaction systems requires consumers to accept the system (Liu et al., 2013a; Mallat, 2007) which also strongly applies in Saudi Arabia (Bamasak, 2011; Alqahtani et al., 2014a).
- There is limited published research which explores the antecedent factors and which captures the adoption/acceptance of m-transactions from the customers' perspective (Mallat, 2007; Dai and Palvia, 2009) and almost none in Saudi Arabia (Alqahtani et al., 2014a).
- Mobile commerce is still in its early stage in developing countries, and therefore m-transactions are also in their infancy phase and need more thorough investigation (Dai and Palvia, 2009; Yang et al., 2012).
- There are almost no studies that investigate the factors that could prevent Saudi Arabian consumers from adopting and using m-transactions from the users' perspective (Bamasak, 2011; Algethmi, 2014).
- In view of all of the above, it is important to build a conceptual framework that can combine the most important factors affecting the adoption/use of m-transactions in Saudi Arabia.

1.6 The Research Aim and Objectives

The overall aim of this research is to investigate m-transaction adoption in developing countries from the users' perspective, taking Saudi Arabia as a case study. The main objectives of this research are: (1) to devise a multi-perspective framework for the intention to use m-transactions in developing countries such as Saudi Arabia; (2) to explore the e-commerce and m-transaction situation in Saudi Arabia at a user level and to gain insight into various issues that may affect consumers' intention to use m-transactions within the country; (3) to identify which particular factors affect consumers' intention to use m-transactions, and how they affect this intention.

In order to meet the research objectives, the research methodology study applied the adoption of blended research design under a pragmatism philosophy to investigate the research problem (see *Chapter 3: Research Methodology and Design*). The researcher collected data from primary, as well as secondary sources from a total sample size of 1208. Furthermore, these objectives can be achieved through adopting the following multi-methods research approach: (i) conducting descriptive/interpretive research on the literature and previous studies/work; (ii) carrying out an exploratory phase containing three parts: (A) study amongst Saudi consumers to investigate the main factors that play a role in the adoption of e-commerce from a consumer's perceptive and, hence, construct a classification of categories of the influential factors of e-commerce; (B) carrying out a subsequent exploratory study which focuses on mobile transactions, to investigate and identify the significant factors that impact consumers' intention to use m-transactions in Saudi Arabia. This can then be used to develop a thorough conceptual framework that conceptualises the influential factors of the intention to use m-transactions from a user perspective; (C) conducting a focus group study to validate and identify the important factors of the proposed conceptual framework; (iii) validating the developed conceptual framework by conducting quantitative study with a larger sample size (~1000 Saudi users); (iv) and finally a study aimed to empirically investigate the most important result of the previous study, which is the level of the ease of use (usability) of conducting m-transactions within the Saudi Arabian context.

1.7 Research Questions

The e-commerce boom of the millennium has replaced the dot.com boom of the 1990's, and more recently the new boom in mobile commerce has arrived. This was one of the inspirations for this research, to contribute to the understanding of the critical factors that affect the intention to use m-transactions, and how these factors can be put into practice to facilitate the penetration and the development of mobile services, particularly as a payment method. Furthermore, in order to tackle the foregoing research objectives, a question was derived in this research project: *what are the factors that have significant impact on the users' tendency to use m-transactions in Saudi Arabia?*.

1.8 Introduction to Research Approach and Methodology

One of the cornerstones of this research is its developed framework of the intention to use m-transactions from a consumer's perspective (see *Chapter 7: Research Conceptual Framework* for more details). To do this, the research plan passes through four main stages. In order to appropriately investigate the underlying problem, the researcher decided to utilize a triangulation method for the research methods due to its appropriateness for this kind of study (for further details on the research methodology and design, refer to *Chapter 3: Research Methodology and Design*). It was, therefore, decided to integrate the following research methods:

The first stage started by using a descriptive/interpretive approach for the study of information and system acceptance, users' concerns about technology, from the related literature. Focusing on the literature allowed an investigation of the up-to-date issues and the activities of other researchers in the field, as is generally recommended for studies of this kind. This uncovered issues such as: security, privacy, ease of use and the inducement or dissuasion impacts of these factors on mobile services' acceptance and use; the users' perceived characteristics such as trust, awareness and social influence; and the models and theories of acceptance of technology. Further details can be found in *Chapter 3: Research Methodology and Design* (*Section 3.5.1*).

The second stage is the exploratory phase which contains three parts of exploratory studies, part 1: started by conducting an exploratory study. The aim of this study was to investigate the main factors that play a role in the adoption of e-commerce from a consumer's perceptive in Saudi Arabia, and hence construct a classification of categories of the influential factors of e-commerce. A 'grounded theory' methodology was used to collect and analyse the data and develop the proposed framework. Thus, semi-structured interviews were conducted with Saudi Arabian residents to elicit their opinions about e-commerce influential factors in Saudi Arabia. In this study, the research aims to elicit the consumers' perspective (i.e. what people in Saudi Arabia think and believe about adopting e-commerce). This includes thoughts, beliefs and opinions. This information was gathered by asking general questions (see appendix A) and recording notes and comments about the important ideas and concepts. The semi-structured interviews were conducted during August 2011 in Saudi Arabia. Further details can be found in *Chapter 3: Research Methodology and Design* (*Section 3.5.2*).

At this phase of the research, the researcher had developed a knowledge about the factors that concern Saudi users with regards to purchasing online, however, there was a need to focus on m-transactions. Therefore, part 2 of this phase was conducted using a similar study method to the previous study. However, the researcher derived the interview questions from a modified Unified Theory of Acceptance and Use of Technology (UTAUT) model (*see Appendix B*), as the issue being addressed by this study is relative to the acceptance and adoption of a new technology/innovation. This study was more focused and its vision was restricted to the use of mobile services, particularly m-transactions. The overall aim of this study was investigating the key factors that affect the adoption and intention of using m-transactions from a consumer's perceptive, and hence developing a framework that encompassed and categorized the influential factors of m-transactions. Further details can be found in *Chapter 3: Research Methodology and Design* (*Section 3.5.3*).

This stage was followed by another qualitative study, **part 3**, which was a Focus Group (FG) method. This experiment also followed the qualitative approach by involving eight online purchasing experts as participants. To ensure the professionalism of the participants, they needed to meet certain criteria. They had to be well-informed about electronic purchasing and have a wide range of online services experience and knowledge; in fact their experience ranged from 5 years to 10 years or more. This stage aimed to evaluate and confirm the results of the prior stages. However, the real goal was to evaluate and confirm the proposed conceptual framework of m-transactions' acceptance and use. Therefore, the results of these four studies were integrated and utilised to develop the conceptual framework of m-transaction acceptance and use and a set of hypotheses were derived. Further details can be found in *Chapter 3: Research Methodology and Design* (*Section 3.5.4*).

The third stage aimed to validate the hypotheses/propositions and the developed conceptual framework using a quantitative study method. The data collection method for this experiment was a survey. The main reason for using a survey was its suitability (as a technique for collecting the required data) for handling a large amount of information about the elements and variables that needed investigation. This method was employed to explore user preferences and beliefs with regard to accepting and using m-transactions by customers in Saudi Arabia. Further details can be found in *Chapter 3: Research Methodology and Design* (*Section 3.7*). **The fourth stage,** this study was an extension of the five previous studies, and the results indicated that usability is the most influential factor in Saudi users' intentions to employ mobile transactions. It aims to investigate and empirically test the usability level of mobile transactions from the perspective of Saudi users; this was achieved by conducting usability experiments with real mobile applications with the target group. In other words, this study was part of a larger research project and it served as a validation/verification tool to answer the question "Why does the ease of use of mobile transactions have the highest impact on the intention to use mobile transactions in Saudi Arabia?" Further details on this study can be found in *Chapter 3: Research Methodology and Design* (*Section 3.8*). Please see Table 1.1, which summarises all the different stages of the research.

Furthermore, in this research, it was decided to employ a blend of quantitative and qualitative methods as well as a triangulation of techniques in order to get a wider picture of the phenomenon under study (i.e. the intention to use m-transactions from Saudi users' perspective). It was decided to employ triangulation as mentioned earlier (a justification and further details can be seen in *Chapter 3: Research Methodology and Design, Section 3.3*), integrating the following methods: descriptive/interpretive, interviews, surveys, a focus group, and 'think-aloud'.

The researcher attempted to design the research, outlining its milestones and expected outcomes as shown in Figure 1.5. The diagram was kept updated whenever there was any deviation from, or improvement to, the plan. Ideally, the research would progress in the manner indicated by the small dark arrows in Figure 1.5. That is, each part of the three stages (i.e. research design, data collection and data analysis) would start only after the previous stage had been completed, meaning that the activities in each stage could be iterated until satisfaction was achieved. However, it is possible to go back to enhance the findings by updating previously stated facts according to new findings. For example, the researcher may need to compare findings with others described in the literature. Another example is that after conducting a pilot study, the researcher may find that there is a need to refine the instruments according to the pilot study findings. The dotted line arrows indicate the feedback process and the possible backtracking process.

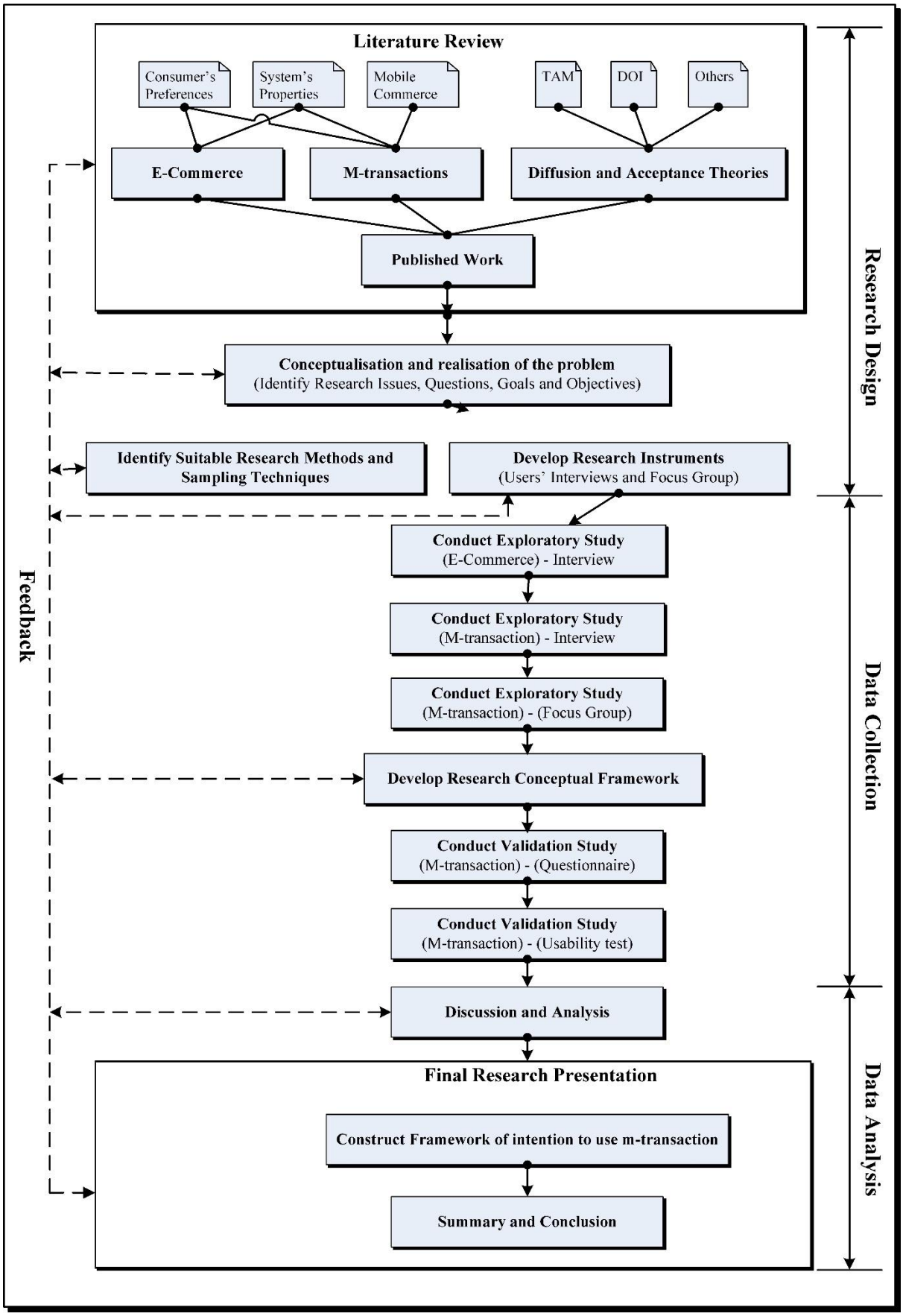

Figure 1. 1: Research Design and Methodology.

1.9 Thesis Structure

This section outlines the thesis, which consists of twelve chapters.

Chapter One: Introduction and Research Overview

This chapter briefly discusses the scope of this research. It provides the reasons for undertaking this research as well as the importance of the topic and the research question. It introduces an overview of the research methods. It discusses the research problem and the definition of m-transaction is also provided to ensure that the reader has a clear overview of this research.

Chapter Two: Background and Related Literature

This chapter provides an analytical review of previous academic research of technology and innovation acceptance and diffusion theories and Models. It also includes the literature review about e-commerce and m-transaction adoption. Furthermore, it discusses mobile transaction phenomenon, history and different generations. Also the current key issues with regards m-transaction, were discussed.

Chapter Three: Research Methodology and Design

This chapter presents a detailed description of the research design and methodology. Following a general discussion of the underlying research philosophy, this chapter justifies the mixed qualitative and quantitative approach that has been chosen for this research. Then it describes the research data collection and instruments adopted. It then addresses the analysis techniques.

Chapter Four: Exploratory study in Electronic Commerce – Interviews

This chapter provides a description of the first part of the exploratory phase, which aims to investigate the main factors that play a role in the adoption of e-commerce from a consumer's perceptive in Saudi Arabia, and hence to develop a classification of categories that conceptualises the influential factors of e-commerce. It also describes the exploratory study purpose and motivation. It then reports in details the study results and findings. Then it discusses its findings with a set of recommendations.

Chapter Five: Exploratory Study in Mobile Transaction – Interviews

This chapter describes the second part of the exploratory phase, which aims to investigate the key factors that affect the intention to use m-transactions from a consumer's perceptive within Saudi Arabia, and categorises the influential factors of m-transactions. This study's purpose and motivation are presented in this chapter. This chapter also reports a discussion of the study's results and findings, then, provides a set of recommendations.

Chapter Six Exploratory Study in Mobile Transaction – Focus Group

This chapter describes the third part of the exploratory phase, which aims to discuss the previous stages and provides more rigidity to the developed framework by identifying the important factors that can impact Saudi users' decisions to use m-transactions. The study purpose, motivations, discussion and recommendations are presented in this chapter.

Chapter Seven: Conceptual Framework

This chapter discusses the research conceptual framework and contains a detailed description of its components. It establishes the context of this research, highlighting the factors that are expected to affect the intention to use m-transaction. It discusses the research developments and shows how they have evolved in several stages, aiming to reach a satisfactory level of maturity and shed light on interesting results. Importantly, it discusses the conceptual framework used as a basis for understanding and validating the factors influencing the intention to use m-transaction as well as the proposed propositions/hypotheses.

Chapter Eight: The Empirical Settings and Data Validation (Validation Study 1)

This chapter presents and discusses the empirical settings and the research constructs' measurements of the research survey. It describes the users' survey method and the sample profile (demographic analysis). It present the survey design, sampling and piloting. Then it discusses the survey administration and the data preparation, including the data screening process as well as the missing data analysis.

Chapter Nine: Quantitative Data Analysis – Validation Study 1

This chapter tests the reliability and validity of the research constructs and their measurements (items). This chapter includes two main analyses: measurement analysis and structural analysis. The systematic application for the evaluation of the measurement models is discussed in this chapter. Then the underlying framework and the conceptualized hypotheses, and the factors that meant to be

influential in adopting m-transaction within the Saudi society, are tested and the results are reported in this chapter.

Chapter Ten: Validation Study 2 - Usability Study

This chapter intended to verify the research findings by empirically testing the usability level of conducting transactions via a mobile application in Saudi Arabia. It also presents the study purpose and motivation. Furthermore, it discusses the literature review about mobile transaction usability. Then, this chapter provides a discussion of the results and suggests a number of recommendation based on the problems discovered.

Chapter Eleven: Discussion of Findings

This chapter provides detailed evaluation of the findings drawn from qualitative and quantitative assessment of the research problem. It justifies the research findings and compares them with previous work in the field.

Chapter Twelve: Research Conclusion

Here conclusions are drawn from the current research. It begins by summarising the research and its major findings. It concludes by discussing the research's recommendations, limitations and by suggesting avenues for future work. It finally presents the research contributions to theory, knowledge and practice.

Chapter 2 Background and Related Literature

2.1 Introduction

This chapter reviews the literature of e-commerce as well as m-transaction. It starts with the history of mobile phone telephone and its different generations. Then it will discuss the literature review about e-commerce and m-transaction adoption. A focus will be put on the key issues affecting m-transaction adoption. This will be followed by definitions with regards m-transactions, and a discussion of different innovation acceptance theories with emphasis given to IT innovations will be presented.

2.2 Mobile Transaction Phenomenon

In the 1930s the development of wireless communication systems started with the use of 'walkie-talkies' throughout the Second World War to enable soldiers to be in contact with their headquarters (Elliott and Phillips, 2003). In 1946, the first commercial radiotelephone service in the US was introduced by AT&T Bell, which facilitated communications between mobile users in cars and the public fixed network. Furthermore, there are different developments in wireless network generations such as first generation 1G in 1980s, second generation 2G in early 1990s, third generation 3G between 2000s and fourth generation 4G in 2005 (Bhalla and Bhalla, 2010)

Since the invention of m-transactions, several studies have introduced and defined m-transactions from the consumer's perspective. The inventor Vazvan (1996), who invented a *Real Time Tele-Payment System* (Figure 2.6), describes a mobile payment invention as: In order to pay the customer's bills, a mobile telephone subscriber types in the payment (bill) information and the payee's account number into the mobile payment application which is integrated in his/her mobile telephone. After dialling the telephone number of a computing station, which is based in the bank, the payment information will be sent to the computing station via a mobile communications network. Then, upon a positive check of the calling party's identity by the computing station, the payment will be transferred from the calling party's bank account to the payee's account and then both parties will be informed about the relevant payment (Vazvan, 1996).

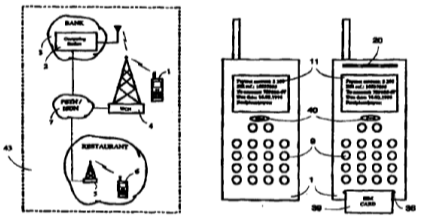

Figure 2.1: Real Time Tele-Payment System.
Source: (Vazvan, 1996)

Mobile payment services, generally, are a special form of the electronic handling of payments. Reviewing existing definitions and literature, there are several distinct commonalities and differences. Most conceptualizations highlight the mobile device as the key characteristic distinguishing mobile payments from other types of payment. Some researchers focus on a pure technical perspective (e.g. Hashemi and Soroush, 2006; Serrano-Alvarado et al., 2005), while others consider the consumer's perspective (e.g. Kim et al., 2010; Petrova and Mehra, 2010a). Regarding the functionality of mobile payments, all definitions refer to the transfer of financial receivables between parties. Differences can be seen when it comes to the phases of the payment process that are considered to be part of the mobile payment. Hashemi and Soroush (2006), for example, proposed a technique to enhance security measurements with a robust mobile payments protocol using a specific transport channel, SMS text. Serrano-Alvarado et al. (2005) proposed an adaptable m-transaction

model (AMT). Their model mainly considers the surrounding environment architecture with regards to transaction management and execution. The aim of their AMT is to increase commit probabilities and make it possible to choose the way transactions will be executed according to their costs. Furthermore, some studies consider the importance and value-added of mobile applications and solutions (Huang et al., 2007). Shin (2009a) studied and tried to understand the importance of the mobile wallet as a value-added solution (application) to mobile payments from the consumer's perspective.

Kim et al. (2010) defined m-transactions as "any payment in which a mobile device is utilized to initiate, authorize, and confirm a commercial transaction". In their study, they tried to examine the factors influencing the intention to use m-transactions. They reviewed the literature regarding mobile payment services, and analysed the effect of m-transaction system characteristics and consumer-centric factors on m-transaction usage across different types of m-transaction consumers. They then used the Technology Acceptance Model (TAM) as a base to propose an m-transaction research model which, in addition to TAM, contains two consumer-centric factors (i.e. *personal innovativeness* and *m-payment knowledge*) and four m-transaction system characteristics (i.e. *mobility, reachability, compatibility, and convenience*). Their results show that the strongest predictors of the intention to use m-transaction are both perceived ease of use and perceived usefulness.

Dahlberg et al. (2008) conducted a study which aimed to give a thorough review of existing work by reviewing more than 70 articles with regards to m-transactions. They defined *m-transactions* as "payments for goods, services, and bills with a mobile device (such as a mobile phone, smart-phone, or personal digital assistant (PDA)) by taking advantage of wireless and other communication technologies" (Dahlberg et al., 2008). Moreover, Kim et al. (2010) refer in their study to the fact that different user groups may perceive the advantages of m-transactions differently, and adopt new transaction technologies accordingly. While there is a need to understand the user-group level behaviour, there have been few attempts to fill the gap in the user-group level research.

2.3 Transaction Definition

There are different phases/procedures that a mobile payment has to go through. Mainly, there are nine phases as follows: (1) the customer has to register his details (e.g. financial and personal details) on a payment services provider (PSP) (e.g. banks, credit card company); (2) the customer makes a purchase request from a content provider (CP) (e.g. merchant); (3) the CP passes the purchase request to the PSP; (4) the PSP authenticates the request and obtains authorization from a Trusted Third Party (TTP) (e.g. bank, credit card company); (5) then the PSP authorizes the purchase to the CP; (6) the CP delivers the content to the customer; (7) the TTP issues a bill to the customer; (8) the customer pays the TTP, (9) the PSP shares the profit with the TTP and with the CP. Figure (2.7) illustrates these steps (Bamasak, 2011).

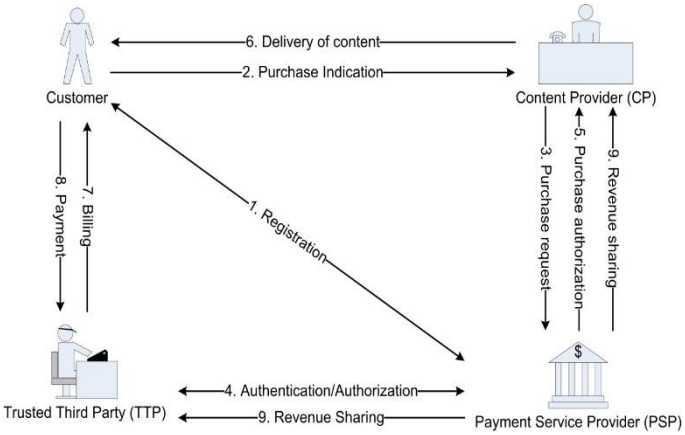

Figure 2.2: Mobile Payment Main Phases.
Adapted from (Bamasak, 2011)

The figure simplifies the m-transaction multi procedures that can be done by a user regardless their location or the time. Further discussions and definitions will be discussed in next sections.

Although e-commerce and m-commerce are similar in regards the payment phases/procedures, however, m-commerce mainly different from e-commerce in two aspects. One aspect is the screen size and interface design and interaction. For example, the small screen size, small keyboard and input solutions, and mainly hand-held devices size. Secondly, m-commerce is distinguished from e-commerce mainly by the ubiquity feature, which allow you to conduct m-transaction almost anywhere, where in e-commerce is usually limited to a certain place.

2.4 Mobile Transaction

The term mobile transaction (m-transaction) has recently been introduced to the market world and it can be considered as the result of the success of electronic commerce (E-Commerce) (Karnouskos et al., 2004). An m-transaction can be defined, in a simplified manner, as any transaction with a monetary value that is conducted through a wireless telecommunication network (Barnes, 2002).

Mobile transactions are a natural evolution of electronic transactions, and enable feasible and convenient mobile commerce transactions. In other words, the use of a mobile device to conduct a payment or transaction for purchasing a product is one practical example of a mobile commerce application. Furthermore, mobile transactions facilitate mobile commerce payments by providing the consumer a convenient, ubiquitous means of paying the financial receivables. Cheong et al.'s (2008) definition is: "M-commerce is electronic commerce over wireless devices and requires a transaction of monetary value through a wireless telecommunication network. Without the transactions of monetary value, M-commerce cannot be realized." From these, the author has developed a simple, yet arguably more comprehensive, definition of m-transaction, as follows:

> *In this study, an m-transaction is defined as any payment or funds in which a mobile device (such as a mobile phone or smart phone) is used for initiation, authorization, and confirmation of a commercial/monetary transaction, by taking advantage of a wireless telecommunication network. Furthermore, m-transactions are typically conducted remotely via Wireless Application Protocol (WAP) billing, Mobile Web, premium rate SMS, directly to the subscribers' bill and directly to credit cards.*

Mobile applications have become particularly valued in an era where time is precious and the weight attached to convenience is important. Likewise, the rapid diffusion of wireless devices, including mobile and smart mobile phones, personal digital assistants (PDAs), and other handheld devices, have made mobile commerce a key driving force for the next wave of electronic commerce.

Moreover, mobile commerce is projected to have an even greater influence on organizations, as wireless technologies and applications begin to challenge the traditional processes, strategies, structures, roles of individuals, and even cultures of organizations. Furthermore, Huang et al., (2007) stated that "Many scholars and analysts have asserted that there is a huge market potential for mobile commerce applications. It is becoming one of the major topics of interest for the IS research community and a key priority for many business organizations. The eyes of scholars and industry representatives are now on the opportunities offered by wireless media, envisaging that the next – or the real – phase of e-business growth will be in the area of mobile commerce" (Huang et al., 2007).

In Table 2.1, the researcher has summarized a number of the previous studies on m-transactions acceptance, use and usability. This summary includes the research purpose, methods, theory/constructs and the results of that research. Amongst those studies, Bamasak (2011) was conducted in Saudi Arabia but it only focused on the status of mobile payment by surveying 200 mobile phone users and asking mainly three questions regarding: if they are willing to purchase via mobile devices, what are the purchased services, and about the mobile phone users' concerns toward mobile payment process. There are a number of limitations in this study, such as: the considered/studied factors are limited to only security, unauthorized use of phone to make purchase, complexity, and limited amount of money per transaction. No theoretical model was developed or tested, and finally no any acceptance models were based on this study. Furthermore, a study by Algethmi (2014) was conducted in Saudi Arabia to investigate the factors affecting the utilizing of mobile services during travel process only (i.e. Airline sector). This research applied mixed methods of quantitative and qualitative approaches. However, there are limitations in this study, such as: the qualitative study recruited only three participants, the qualitative method was only as a complement to the survey approach and not involved in developing the research conceptual framework and therefore, no primary resources or exploratory studies were implemented in this research. Consequently, the research conceptual framework was only built on secondary resources (i.e. literature review). Furthermore, the research conceptual framework only contains perceived usefulness, perceived ease of use, compatibility, mobility, use situation, social influence, perceived risk and personal innovativeness. However, other factors such as government E-readiness, cost, trust, navigational structure, visual appeal, and telecommunication infrastructure were overlooked in the conceptual framework. Moreover, the effects of Saudi culture were not considered in this research. In addition, the sample size for the study by Bamasak (2011) was 200 and the sample size for Algethmi (2014) was 307, where the sample size for the current research exceeds 1000.

Literature about more detailed aspects (e.g. ease of use, usefulness, culture …etc) will be discussed whilst discussing the research framework's factors and hypotheses later in Chapter 7 (Section 7.4).

2.5 Background of E-Commerce Adoption

Several different aspects of the factors affecting consumer adoption and acceptance of e-commerce have been explored by different researchers. Wei et al. (2010) have conducted a recent study to provide an understanding of the adoption of online shopping within Asian countries. Their investigation falls into three main categories: consumer attitudes towards online transaction management systems; the privacy and security of consumers' personal information within vendor systems; and trust in the reliability of online sellers. Their findings show that security issues relating to the online transaction procedure and the reliability and trustworthiness of online merchants have a direct impact on consumers' confidence in adopting e-commerce (Wei et al., 2010). Another comprehensive study was conducted by Farhoomand et al. (2000) to investigate the e-commerce adoption barriers at a global level. In order to identify the main barriers affecting the acceptance of e-commerce across borders, they carried out field studies of ten companies in Finland and Hong Kong. The findings of their research suggest that the key inhibitors to the orderly acceptance and

deployment of e-commerce at the global level are: 'resistance to change', 'lack of education about the potential of global e-commerce', and 'lack of flexible software'.

Furthermore, Al-Somali et al. (2009) identified the factors that encourage the adoption of online banking by customers in Saudi Arabia. They developed their research constructs based upon the technology acceptance model (TAM) and incorporated some other control variables. They tested their model by conducting a survey questionnaire amongst 400 bank customers. The results of the study indicate that 'the quality of the Internet connection', 'the awareness of online banking and its benefits', and 'social influence and computer self-efficacy' all have significant impacts on the perceived usefulness (PU) and perceived ease of use (PEOU) of online banking acceptance. 'Education', 'trust' and 'resistance to change' also have a significant impact on the likelihood of adopting online banking. In the United States many other studies have contributed to an understanding of e-commerce adoption (Grandon and Pearson, 2004; Kabbaj, 2003; Lassar et al., 2005); and also throughout Europe (Corner et al., 2005; Monsuwé et al., 2004; Littler and Melanthiou, 2006); and in Australia (O'Cass and Fenech, 2003; Lichtenstein and Williamson, 2006; Corbitt et al., 2003) and Asia(Yiu et al., 2007; Wei et al., 2010; AlGhamdi et al., 2012a).

However, there have been few investigations in developing countries concerning the implementation of e-commerce (AlGhamdi et al., 2012b). Also there has been very little research into the factors that account for the different levels of sophistication of e-commerce use by businesses in developing countries compared to the developed ones (Molla and Licker, 2005b). Likewise, there is a limited amount of published research exploring the antecedents that control the adoption/acceptance of e-commerce by customers in developing countries in the Middle East (Alqahtani et al., 2012; Al-Somali et al., 2009; AlGhamdi et al., 2011; Aleid et al., 2009; Alshehri and Meziane, 2011). A search of the literature indicated that little research had been done investigating what was preventing Saudi consumers from adopting e-commerce (Aldwsry, 2012; Alshehri and Meziane, 2013).

2.6 Background of M-transaction Usability

Usability is a core term in Human-Computer Interaction (HCI) and it can be defined as "Ease of use and acceptability of a system for a particular class of users carrying out specific tasks in a specific environment" (Holzinger, 2005). Despite the growing interest in m-commerce platforms, the poor usability of mobile sites and applications for commercial activities is a prominent major obstacle to the adoption of mobile solutions. "Such difficulty discourages users from accessing mobile Internet sites," (Matthew, 2014). Furthermore, Min and Li (2009) highlighted the importance of usability as a factor for adopting mobile commerce; their study in China confirmed that usability is crucial to consumers' use of mobile transactions. Buranatrived and Vickers (2002) revealed that usability acts as a second barrier, after security, to the acceptance of m-commerce. Venkatesh et al. (2003b) in the USA also investigated the usability of mobile sites, identifying it as a significant requirement for successful m-commerce applications. Furthermore, they emphasised that the usability of Internet-based commercial sites on the traditional Personal Computer (PC) should not necessarily be equated directly with m-commerce and thus, special attention should be paid to m-commerce usability. Their study, based on surveys of mobile Internet users, concluded that usability is the biggest source of frustration for consumers. Thus, a vital requirement for the success of m-commerce applications is first understanding which aspects of usability are important to users, and how they may differ in a wireless context; this will help to ensure that the customers' experiences are positive. Another study by Li and Yeh (2010), conducted in Taiwan across two large cities in three universities, analysed a total of 200 responses from distributed surveys to gain an understanding of the factors affecting users' trust in mobile devices. Their research discovered that design aesthetics had a significant impact on perceived usefulness and ease of use, and that all of these were ultimately shown to have an important effect on customers' trust in mobile commerce (Li and Yeh, 2010). Zhang and Adipat (2005) pointed out that mobile devices create major challenges for investigating the usability of mobile applications,

due to factors such as their small screen size. Nielsen and Budiu (2012) in their book "Mobile Usability" referred to the fact that the percentage of visiting users who successfully accomplish their desired action (conversion rate) is very low in mobile users (1.4%) compared to users of personal computers (PCs) (3.5%). They offered two reasons for this dramatic difference: the mobile users' experiences (usability) often lead to frustration, which results in the experiences being ranked below the users' expectations; in addition, some companies perceive mobile site design as an area not worth investing in. Nielsen and Budiu recommended that companies should optimise their mobile sites and enhance their usability, thus increasing the conversion rate of mobile users to a competitive level of that of PC users (Nielsen and Budiu, 2012). The system/product experience varies from person to person due to the concept of 'usability'.

There are many usability evaluation methods (UEMs) which can be employed to discover usability problems in a system, and to measure the success of users in achieving particular goals within a specified context. In-lab usability testing has been used as the standard method for evaluating and improving the usability of mobile devices. Indeed, a meta-analysis study revealed that 71% of mobile device evaluations were conducted in lab-based settings (Kjeldskov and Stage, 2004). With this method of testing, a mobile application is evaluated in a prepared environment. The testing sessions are recorded by cameras, and the recordings are analysed by the evaluators (Nayebi et al., 2013). Think-aloud (TA) protocol is commonly employed as a complementary technique with in-lab testing, where users are encouraged to verbalise their thoughts while performing a predefined set of tasks (Kallio and Kaikkonen, 2005). They are carefully observed by evaluators, who analyse their behaviour and record the problems encountered by them; these are then compiled into a list of usability problems. Metrics such as the number of errors, the total time spent, the success rate and user satisfaction are also recorded for further analysis. The usability problems uncovered by this process can then be corrected to improve the quality of the product (AlRoobaea et al., 2013a). Furthermore, there are three TA approaches: concurrent, retrospective and constructive interaction. The concurrent approach is the most commonly-used for usability testing; it involves participants verbalising their thoughts whilst performing tasks in order to evaluate a system (van den Haak, 2008). The retrospective approach is less frequently used; it involves participants accomplishing their tasks silently, and then afterwards commenting on their work, prompted by a recording of their performance. After the experiment, experts can review all the recordings to uncover the usability problems. Constructive interaction is more generally known as Co-Discovery Learning, where two participants work together to perform a task, verbalising their thoughts while interacting (AlRoobaea et al., 2013b).

Field studies are another type of UEM, which in contrast to lab-based testing, take into account the dynamic mobile context and unreliable wireless networks. This method involves recording observations and interviewing users, with the aim of understanding their requirements of the product (Nayebi et al., 2012). However, it has some limitations, such as problems that can arise with the use of video recordings or observations, difficulties in gathering data, and the inability to control conditions; the researcher need to physically move around in a dynamically changing environment. In addition, it may be problematical to create realistic environments that capture the richness of the mobile context (Zhang and Adipat, 2005).

The ultimate results of applying either user testing (UT) or TA approaches is a list of usability problems, which then need to be categorised in some way to enable further analysis. The problems can be classified into different groups, using a numeric scale to measure the severity of each problem. For example, Nielsen developed a rating scale which consists of five scales: '0' means that this issue is not a usability problem at all; '1' signifies that this is a cosmetic problem which does not need to be fixed, unless extra time is available on the project; '2' means that this issue is a minor usability problem, and fixing it should be given low priority; '3' corresponds to a major usability problem

which should be given high priority, and finally '4' signifies that this issue is a usability catastrophe, and that it is imperative to fix it before the product is released (Nielsen, 1995).

2.7 Background of M-Transaction Adoption

The literature has highlighted the importance of considering the user's perception and feedback in developing an IT innovation (Arastehfar et al., 2014; Liu et al., 2013b; Liu et al., 2012; Bamasak, 2011). Furthermore, Arastehfar et al. (2014) emphasize the significant role of customers' opinion and feedback in the early design stage of market-driven IT product design. As the provision of m-transactions to customers may provide great advantages to any electronic commerce organization, the acceptance and subjects relating to appropriate mobile payment usage are of critical importance (Kim et al., 2010; Au and Kauffman, 2008; Mallat, 2007; Ondrus and Pigneur, 2006). Mobile users' intentions to use m-transactions are of particular interest to researchers and practitioners alike, since several of the stakeholders (e.g. financial institutions, trusted third parties, payment service providers, and systems, software and supporting service providers) can benefit significantly from acquiring a better understanding of the key factors underlying mobile users' intentions to use (Dahlberg et al., 2003a; Lim, 2008; Ondrus and Pigneur, 2006).

Both the m-transaction service providers and their customers are prime actors in the m-transaction services market. Various parties, with different roles, are involved in the market, including consumers, merchants, telecom operators and financial institutions. The influence and the interests of these parties affect how technologies and other resources are organized into m-transaction services, and how these services are offered to, and used by, the markets. Moreover, m-transaction services compete with traditional and other electronic transaction services to attract customers and other parties. Using m-transaction services is a logical choice when paying for mobile services. Yet, in order to succeed, m-transaction services may need to offer added value and be available for other relevant payments as well (Dahlberg et al., 2008).

In the following sections a brief discussions about the key factors that highlighted by the literature review with regards to m-transaction acceptance and taking into account the users' perspective. Further discussions will be summarized in Table 2.2. In addition, there will be more discussions with regards the factors that expected to affect the Saudi user's decisions in using m-transaction in *Chapter 7 Research Conceptual Framework, (Section 7.4)*.

2.7.1 Compatibility

Compatibility refers to the degree to which an innovation is perceived by a user as being consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 2003). In other words, compatibility captures the consistency between an innovation and the values, experiences, and needs of potential adopters. Therefore, a high level of compatibility of an innovation boosts the user's intention to use. This is owing to the fact that an innovation that seems to be incompatible with the values and norms of a social system will not be adopted as swiftly as an innovation that is compatible (Rogers, 2003). This quality is considered one of the most relevant constructs in the context of adoption research (Tornatzky and Klein, 1982; Mallat, 2007). In addition, a study by Sarel and Marmorstein (2004) showed that compatibility appears to have a significant impact on willingness to adopt an innovation (Sarel and Marmorstein, 2004; Dai and Palvia, 2009). This is a consistent with Teo and Pok (2003) and Wu and Wang (2005) who found that compatibility is a significant indicator in predicting users' intention to use mobile technology and services. Furthermore, mobile services' compatibility with consumers' needs and lifestyles, and the possibility of trying out new services, have a positive effect on attitudes towards adoption (Ding et al., 2004; Mallat, 2004). Therefore, if the new idea confers meaning or is more familiar to the individuals, they will be more willing to adopt it as it appears to be compatible with their lifestyle.

2.7.2 Trialability

Rogers' (2003) construct of trialability refers to the degree to which users can experiment with an innovation, prior to its adoption. Trialability presumes that individuals who have had a great deal of opportunity to try an innovation are more likely to adopt it than those who have not, since the trial of the innovation offers a way for the potential adopters to be confident that using this innovation will meet their expectations (Agarwal and Prasad, 1997; Rogers, 2003; Tan and Teo, 2000). This is consistent with Gerrard and Cunningham (2003), who argue that experimenting with the innovation can persuade users that their mistakes can be resolved, therefore providing a more predictable situation and providing greater confidence in the use of the innovation. Furthermore, Chen and Adams (2005) propose that, in developing a theoretical model of user acceptance of mobile payments services, mobile payment trialability should be related positively to individual users' intentions to use mobile payments. Consequently, once an innovation is experienced, it is more probable that it will be adopted (Alqahtani et al., 2012).

2.7.3 Observability

Observability is the degree to which the outcomes/results of an innovation are visible to others, and how easily the benefits can be communicated to others (Rogers, 2003). According to Moore and Benbasat (1991), observability integrates two specifically different facets: result demonstrability, which refers to the outcomes of using the innovation; and visibility, which is the observability of the innovation itself. An innovation that is not easily observable has potential diffusion and adoption issues (Chen and Adams, 2005). If the results of using some innovations are easy to observe and visible to individuals, then they will be more likely to adopt them. An innovation should attract the attention of the targeted user group, in order to make them aware of the service. For example, the results of using m-transactions (e.g. accomplishing financial needs, flexibility, convenience, ubiquity and new channel choice) are observable and visible by individuals, so this system would be diffused faster than an innovation that is not so visible.

2.7.4 E-Commerce Presence

If a company does not use and harness online/internet technologies and benefits, it would be old-fashioned, obsolete, slow moving and slow to expand, less flexible and, most likely, outperformed by other competitors who have already established their own electronic commerce (Tsygankov, 2004). Furthermore, the presence of E-Commerce in companies and organizations in the real marketplace is one important step in the adoption of E-Commerce in the surrounding society. The research findings have shown that companies must have a presence online, as enabling customers to do business online is vital for businesses (Andam, 2003). Furthermore, Molla and Licker (2005b) highlight the importance of the role played by industry in striving for electronic 'readiness' in the country. Indeed, conducting E-Commerce successfully relies on the support provided by industry. The expansion of such industries creates advantages by making available fast and efficient access to E-Commerce. For its evolution in developing countries, certain conditions are crucial: the availability and affordability of services from the IT industry; the structure of the financial sector; and the reliability and wide range of carrier and transportation facilities. The IT industry, in many developing countries, is not sufficiently robust. Also, the financial sector does not have the maturity to tackle electronic transactions, and the transportation facilities are insufficiently developed (Molla and Licker, 2005b).

On the other hand, despite the fact that the retail sector in Saudi Arabia is the largest amongst the Gulf Cooperation Council Countries (GCC) with a prediction of SR 250 Billion (£42 Billion) by 2012, "markets such as Saudi Arabia remain underserved in comparison to other regional markets in terms of E-commerce market penetration and adoption" (Orloff, 2012). In their research paper, Aleid et al. (2009) added that Saudi Arabia has not reached a sophisticated level of E-Commerce. They pointed out that as the country still has only a very small number of electronic companies and shops,

consumers are facing the problem of a lack of diversity and maturity in electronic business competition. Furthermore, with a culture of high uncertainty avoidance like Saudi's culture, the absence or the very low penetration of electronic commerce opportunities will lead the Saudi user to avoid the use of m-transactions.

2.7.5 Privacy

Privacy is an essential human right recognized in the UN Declaration of Human Rights, the International Covenant on Civil and Political Rights, and in many other international and regional treaties. Privacy supports human dignity and other important values such as freedom of association and freedom of speech. It has become one of the most important human right concerns of the modern age (Privacy International, 2002). The difficulty of defining the concept of privacy has often been introduced in the literature (Introna, 1997; Solove, 2002; Bennett and Regan, 2004). A renowned US privacy scholar comments on this subject that "no definition of privacy is possible because privacy issues are fundamentally matters of values, interests and power" (Westin, 1995, quoted in Gellman, 1998). According to Privacy and Human Rights (Privacy International, 2002), privacy can be divided into four facets: *information privacy*, which includes the establishment of rules governing the collection and handling of personal data such as credit information and medical records; *bodily privacy*, which involves the protection of people's physical selves against invasive procedures such as cavity searches and drug testing; *privacy of communications*, which concerns the privacy and security of mail, telephone calls, email and other forms of communication; and *territorial privacy*, which covers the setting of limits on intrusion into the local and other environments such as the workplace or public space (Privacy International, 2002). Within the context of mobile payments, Karnouskos et al. (2004) discuss privacy and state that "The sensitive user data must be protected. Furthermore it should not be possible for any party to get the full payment process data, e.g., by linking a specific purchase to a specific user and/or her bank account". Privacy has been found to be one of the factors that influences mobile payment adoption by users (Dewan and Chen, 2005; Dai and Palvia, 2009; Wu and Wang, 2005).

On the other hand, websites usually require personal information from users for purposes such as membership, feedback forms, newsletter subscription, order forms, etc. Electronic shopping, generally, has critical consumer privacy weaknesses and issues concerning monetary transactions, product purchases and merchandise services (Pavlou, 2001; Udo, 2001). Although internet shopping has gradually come into use in many fields, a number of users are still worried about personal privacy and transaction security (Wu and Wang, 2005). Wu and Wang (2005) stated that privacy problems are still less than satisfactory and must be overcome in order for users to accept mobile payments (Wu and Wang, 2005). Furthermore, Singh and Hill (2003) consider that privacy is highly valued by users because it allows and facilitates the use of transactions and also increases trust, which is vital to reassure users that their privacy will be kept intact.

2.7.6 Network Coverage

The infrastructure of the internet/network is considered to be a crucial element in the success of electronic transactions through any platform (e.g. personal computer (PC) or mobile devices) and via any medium (e.g. wired or wireless connections). With regards to developing countries, research has highlighted the major influence that the quality of the infrastructure has on E-Commerce adoption (Molla and Licker, 2005a). Al-Somali et al. (2009), in their study of online banking in Saudi Arabia, found that the quality of the internet/network connection was a strong predictor factor of conducting financial transactions online. Furthermore, Al-Ghaith et al. (2010) conducted a survey about the adoption of online services and E-Commerce in Saudi Arabia and performed an in-depth analysis of the 651 responses that they received. They strongly recommended that the Saudi government should pay more attention to the ICT infrastructure and improve its quality, in order to enhance electronic services, and E-Commerce use and adoption amongst Saudi consumers. "One of the major challenges

remains the technology infrastructure and consumer behaviour, which impacts on businesses' e-readiness and e-willingness". (Orloff, 2012). Despite the fact that the penetration of internet subscriptions and users has dramatically increased in Saudi's main cities, the rest (e.g. rural areas and villages) are still suffering from a poor ICT infrastructure of ICT (Aleid et al., 2009). Although Saudi Arabia is the largest country amongst the GCC countries and has the highest population, there are only three GSM/3G operators serving the whole Saudi population. These companies are STC, Mobily and Zain. This, as a result, will lead to the absence of competition and, therefore, encourage service providers to focus exclusively on the main cities and, to some extent, neglect the minor cities and villages.

2.7.7 Postal Services

For an electronic shopping to be a successful system, it is essential to have a transportation infrastructure to deliver goods and products to their customers (e.g. carrier/freight/cargo companies) at a national and international level, enabling the movement of physical products to their destinations (Andam, 2003). Furthermore, Andam (2003) stated that, for business to customer (B2C) transactions, offering a means of transporting packages is a must for that system (Andam, 2003). A commercial website is useful if it delivers the services and products it promises to, however, if the level of customers' delivery is not satisfactory, then that website is not useful (Al-maghrabi et al., 2009). Moreover, in the developed countries, the postal service is a "taken for granted" means of such delivery. "There are multiple factors which currently affect the slow progression of E-commerce in Saudi Arabia. The most important challenges remain gateway payment systems; difficulties performing banking transactions; the usage of P.O box systems rather than residential postal addresses and finally the speed and access of internet services." (Orloff, 2012).

The need for reliable delivery services has increased alongside the proliferation of electronic buying, to a point that it has become essential for almost all companies in order to conduct successful business (Travica, 2002). Furthermore, Travica (2002) stated in his study that the delivery system depends on transportation. Therefore, the delivery system should be trustworthy, effective and supportive as electronic commerce evolves. The greatest and the most important advantage of electronic purchasing, is that it enables a business concern or individual to reach the global market. It caters to the demands of both the national and the international market, as business activities are no longer restricted by geographical boundaries. With the help of m-transactions, even small enterprises can access the global market for selling and purchasing products and services. However, for successful electronic purchasing, delivery infrastructure (transportation) is crucial (Travica, 2002).

Furthermore, Alqahtani et al. (2012) found in their study that to adopt electronic payments and purchasing in Saudi Arabia, the postal service was important factor and gained the high attention by Saudi users amongst other factors. In their study, they found that individuals were not satisfied with the current postal services and they referred to it as one of the obstacles to adopting electronic shopping and purchasing. Abanumy (2006) stated in his study that the postal system in Saudi Arabia is a weak system, there is no effective delivery of mail, and users need to collect their mail in person from the small number of distributed post offices in Saudi Arabia.

2.7.8 Cyber-Law

It goes without saying that unambiguous legislation is vital for the regulation of the systems and the protection of the rights of all parties involved in any commercial transaction and activity, and its absence would almost certainly lead to a chaotic situation (AlGhamdi et al., 2011). Travica (2002) clearly states in his study that, with the diffusion of E-Commerce into developing countries, regulations and laws (e.g. customer protection legislation) and the quality of telecommunications certainly do affect the rate of progress of E-Commerce activities in many countries. Furthermore, Plant (2000), in his book, identified the lack of customer protection law as one of the obstacles to E-

Commerce diffusion. Andam (2003) states, in answering the question "What are the components of a typical successful E-Commerce transaction loop?", that governments should establish a legal official framework (i.e. laws and regulations) for electronic transactions. This framework would include all types of electronic documents and legal organizations that would impose the legal framework by protecting consumers' and businesses' rights and by preventing swindling and fraud between parties. The willingness of organizations to regulate E-Commerce is considered to be an essential element (but one that is presently lacking in developing countries) for the encouragement of the trust necessary to perform electronic business satisfactorily (Molla and Licker, 2005a). Furthermore, Hu et al. (2008) explain the reasons why m-transactions are successful in some countries (e.g. Europe) and not successful in others (e.g. most developing countries) because they have been dampened by incompatible systems, regulations and standards. "This is further hampered by unclear regulations within the virtual sphere; under-developed customer and after-sales services and lack of trust by consumers in online buying processes. However, despite these challenges, there exist a number of drivers which indicate that the retail environment in Saudi Arabia is ripe to adopt E-commerce. The most significant of these drivers includes the size of the retail sector in Saudi Arabia; the largest in the GCC contributing to 17% of GDP. In addition, strong government support to developing ICT technologies; a vibrant technology sector; and connected demographics demonstrate the existence of strong foundations for E-commerce driven business." (Orloff, 2012).

2.7.9 Awareness

Several studies considered awareness and its importance, and demonstrated that the degree to which users are familiar with mobile payments and their general awareness of the service may affect their attitude towards it. Within the context of mobile payments, Petrova and Mehra (2010a) state that mobile services awareness refers to the relative innovativeness of mobile payment as a service where customer lack of knowledge and prior service experience may influence their attitude to use it. Furthermore, according to Sathye's (1999) research, the use of online banking services, which is a good example of Electronic transactions, is considered new to many customers and the lack of awareness of online banking is a crucial factor in preventing customers from adopting it (Sathye, 1999). In his study of 500 Australian customers, he concluded that customers were not aware of the potential benefits, advantages and disadvantages related to online banking (Sathye, 1999). This was also supported by another study by Howcroft et al. (2002), which found that the issue of lack of awareness and knowledge of online banking services and their potential benefits are found to be sufficient causes for consumers' reluctance to use these services (Howcroft et al., 2002).

A recent study built a research framework of constructs and relationships derived from existing models, in order to empirically explore mobile payment adoption. Their results show that service awareness, including familiarity and understanding of mobile payments, is an important factor, positively influencing users' intention to use mobile payments (Petrova and Mehra, 2010a). Another recent study looks into the status of mobile payments in Saudi Arabia with respect to consumers' acceptance of, and concerns about, mobile payments. Its results are consistent with the previous studies, showing that awareness plays an important role and is a factor which can significantly affect the intention to use m-transactions (Bamasak, 2011).

Saudi Arabia benefits from close to 66% of the population having access to computers and the internet. These figures show that the population has a well-developed e-readiness and e-awareness that would enable the adoption of E-commerce. (Orloff, 2012). Therefore, the ignorance of mobile payment technology and its potential advantages can be a critical obstacle, preventing adoption of m-transactions amongst users. Consequently, stakeholders should take this into account by investing in raising awareness and educating users about mobile payments and the advantages that they can bring (e.g. usefulness, convenience and value-added).

2.7.10 Personal Innovativeness

Personal innovativeness is defined as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system" (Rogers, 2003, p. 22). Personal innovativeness or technology readiness could also be identified as the risk-taking propensity existing in certain individuals (Massey et al., 2005). According to Agarwal and Prasad (1997), individuals with higher personal innovativeness are more likely to form a positive attitude towards using innovations than those with less personal innovativeness. Thus, the personality variable will determine traits in terms of innovativeness of the individual towards the innovation. Rogers (2003) has indicated general socio-economic predictors of personal innovativeness. For instance, age is not considered a factor for personal innovativeness, whereas education and literacy are considered essential predictors for personal innovativeness (Rogers, 2003).

The Diffusion of Innovations theory takes account of the fact that individuals have differing predilections towards acting innovatively. Rogers (2003) acknowledged that some people are able to manage high levels of uncertainty and respond more positively. Agarwal and Prasad (1997) argued the same, and explained this tendency as personal innovativeness, noting that it indicated the risk-taking propensity existing in some individuals and not in others. Furthermore, the extent of a person's innovativeness that influences his or her intention to adopt innovations is determined by whether there is a lack of prior perception of ease of use or perceived usefulness due to little knowledge about the innovation. The construct of personal innovativeness is vital to a research study of individual behaviour towards innovations (Rogers, 2003). Furthermore, this variable will assist in recognising individuals who can be expected to adopt innovations in information technology faster than others (Agarwal and Prasad, 1997).

The Table 2.1 summarizes a number of the key issues with regards to m-transaction as well as the factors mentioned in the discussions above.

Table 2.1: Summary of Key Issues with Regards M-transaction.

Factors	(Teo and Pok. 2003)	(Wu and Wang.	(Cheong and Park. 2008)	(Chen and Adams.	(Molla and Licker.	(Karnouskos et al.. 2004)	(Jennex et al.. 2004)	(Goeke and Pousttchi.	(Goyal et al.. 2012)	(Zhang et al.)	(Shih et al., 2010)	(Thakur and Srivastava.	(Chong et al.. 2012b)	(Faqih and Jaradat.	(Orloff, 2012)	(Jaradat and Al Rababaa.	(Amoroso and	(Hongxia et al.)	(Mallat, 2007)	(Pham and Ho)
Compatibility	✓	✓		✓					✓										✓	✓
Trialability				✓									✓							✓
Observability				✓																
E-commerce Presence					✓															
Privacy						✓			✓			✓					✓			
Infrastructure/Speed							✓												✓	
Postal Services															✓					
Cyber-Law							✓								✓					
Awareness					✓										✓					
Personal Innovativeness												✓								✓
Subjective norm/Social Influence	✓									✓		✓	✓	✓		✓	✓	✓		
Perceived behavioural control	✓			✓																
Usefulness/Relative Advantage	✓	✓	✓	✓				✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Ease of Use	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Image/visual appeal	✓		✓											✓			✓			✓
Risk	✓	✓								✓		✓					✓	✓	✓	✓
Government	✓																			
Cost		✓	✓					✓	✓				✓					✓	✓	✓
Attitude	✓		✓	✓							✓						✓			
Facilitating Condition			✓									✓				✓	✓	✓		
Government					✓															
Trust						✓	✓	✓	✓				✓				✓		✓	✓
Security						✓		✓	✓								✓		✓	

Payment Scenario/Gateway	✓	✓			
Expressiveness	✓				
Universality/Ubiquity		✓			
Experience			✓		
Service Quality				✓	
Variety of Services				✓	
Navigational Structure/Output Quality					✓
Anxiety					✓
Playfulness					✓
Content Quality					✓

2.8 `Knowledge Gap

Even though the studies conducted on assessing m-commerce adoption and diffusion have significantly improved our understanding of m-commerce innovation, several gaps can be identified in the literature. A great number of the studies have only considered the deductive approach (e.g. using quantitative data collection) in different countries such as: China, Korea, Germany, New Zealand (Yang et al., 2012; Kim et al., 2010; Schierz et al., 2010; Petrova and Mehra, 2010b; Cheong et al., 2008; Kim and Kim, 2005). For example, Cheong et al. (2008) conducted an empirical study that surveyed more 1000 users in Korea using online questionnaire to investigate which factors make mobile subscribers reluctant to accept m-payments. Although his sample include males and females, using only one approach (i.e. deductive) can inherent limitations in explaining results and generalising the findings which usually occurs in single research method (Creswell and Clark, 2011). On the other hand, studies who considered only inductive approach (e.g. using qualitative approach) in countries like: Turkey, China, Finland, Switzerland and Australia (Öztürk and Rızvanoğlu, 2013; Wei et al., 2011; Min and Li, 2009; Dahlberg et al., 2008; Huang et al., 2007). For example, Mallat (2007) conducted focus group interviews with six groups (i.e. 8 teenagers, 7 students, 8 young adults, 8 young adults, 6 parents and 9 middle-aged) to examine factors that affect consumer adoption of mobile payments. The study's results can suffer from shortcomings in employing theoretical stance and understanding a research objective through multiple research phases (Creswell and Clark, 2011; Saunders and Tosey, 2013).

Finally, other studies who attempts to combine the two approaches (i.e. inductive and deductive) in countries such as Germany, (Shin, 2009a; Pousttchi and Wiedemann, 2007). However, these studies base their research questions on a previously developed theoretical background (e.g. TAM). For example, Algethmi (2014) who online surveyed 307 Saudi users to investigate the factors influencing the utilizing mobile services during travel process (i.e. airline sector) and, then, interviewed 3 Saudis to complement the survey approach. This study utilized TAM and DOI acceptance theories, which built for western countries, as a base for the conceptual framework.

The current research address these gaps by applying triangulation in data collection to facilitates the validation of the findings, assists in explaining diverging results and compensates for the limitations inherent in a single research method (Cohen et al., 2000) and mixed methods (i.e. inductive and deductive) to (1) explain initial results; (2) generalise exploratory findings; (3) enhance a study with a second method; (4) best employ a theoretical stance and (5) understand a research objective through multiple research phases (Creswell and Clark, 2011). Also the current research start with an exploratory phase which is considered as essential point for conducting research (Giddens, 1984).

2.9 Technology Acceptance Theories

There are a number of models that have been proposed for information technology (IT) acceptance research. However, Venkatesh et al. (2003a) argued that many competing models in IT acceptance explained only between 17% and 53% of the variance in user intentions to use information technology. There are eight prominent models to be considered: The Technology Acceptance Model (TAM), The Diffusion of Innovation Theory (DOI), The Theory of Planned Behaviour (TPB), The Motivational Model (MM), The Theory of Reasoned Action (TRA), a model combining The Technology Acceptance Model and The Theory of Planned Behaviour (C-TAM-TPB), The Model of Pc Utilization (MPCU), and The Social Cognitive Theory (SCT). The following section will discuss the well-known two acceptance theories (i.e. TAM and DOI). However, a summary of these eight models will be presented in Table 2.3.

Technology Acceptance Model (TAM): the current reseach integrates Davis' Technology Acceptance Model as one of its cornerstones, owing to the fact that it is well-established and has been extensively used in research on information technology acceptance. TAM was developed from the Theory of Reasoned Action (TRA) by social psychologists (Fishbein and Ajzen, 1975), which is a well-constructed model that has been used broadly to predict and explain human behaviour in

various domains (Fishbein and Ajzen, 1975). Davis (1986) introduced the TAM to explain computer or any technology-based usage behaviour (Davis, 1989; Davis, 1986). A large number of studies in different time scales have highlighted the powerful capability/usefulness of TAM to explain technology usage and it has been implemented to measure the acceptance/intention-to-use behaviour of information technology from different perspectives. Two recently conducted studies by two researchers with a wide experience in information technology (IT) acceptance/adoption show the wide use and implementation of TAM. First is a study conducted by Venkatesh, which is one of the most cited studies in this field. Venkatesh developed the original TAM to derive the Technology Acceptance Model 2 (TAM2) (Venkatesh and Davis, 2000); the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003a); and the Technology Acceptance Model 3 (TAM3) (Venkatesh and Bala, 2008). The latter stated clearly that "The most widely employed model of IT adoption and use is the technology acceptance model (TAM) that has been shown to be highly predictive of IT adoption and use" (Venkatesh and Bala, 2008). The other study conducted a comprehensive literature review of TAM from a bibliometric perspective (Chang et al., 2010). They searched relevant articles such as reviews, proceeding papers, editorial materials, corrections, and meeting abstracts from 1956 to 2009, using the keyword of "technology acceptance model" in different databases. They found a sum of 689 papers whose topic was related to "technology acceptance model" from 1991 to 2009. Their findings can be summarized in two statements: (1) the technology acceptance model literature shows that TAM has had a steady growth, as well as an increase in the number of citations; and (2) it is generally considered as the most significant theory (Chang et al., 2010). This justifies the suitability of TAM for studies in mobile technology acceptance (Algethmi, 2014; Zhou, 2013; Kim et al., 2010; Schierz et al., 2010).

Notwithstanding the previous advantages of TAM, several studies have mentioned that TAM suffers from a number of limitations. Legris et al. (2003), have detected heterogeneous results regarding the constructs of TAM and proposed that these may result from systematic factors being left out; they recommended incorporating additional variables to provide an even stronger model (Legris et al., 2003; Dahlberg et al., 2003b; Pousttchi and Wiedemann, 2007; Wu and Wang, 2005). Furthermore, TAM tends to neglect the social context in which a technology is being adopted; TAM assumes that there are no barriers to prevent an individual from using a particular system if he/she has chosen to do so; and TAM assumes that there is only a singly technology available to users (Malhotra and Galletta, 1999; Mathieson et al., 2001; Shin, 2009a). In order to handle these above-mentioned issues, this study adapted one of the latest versions of TAM (i.e. Unified Theory of Acceptance and Use of Technology (UTAUT)) and included other important factors from the literature review and the exploratory phase by the researcher (e.g. trust, government e-readiness, security, social influence, cultural dimensions and cost).

Diffusion of Innovations (DOI): diffusion of innovations is a multidisciplinary theory frequently applied in IT adoption research. The innovation adoption process is defined by Rogers (1995) as "the process through which an individual or other decision-maker unit passes from first knowledge of innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (Rogers, 1995). Empirical research has supported the applicability of the diffusion theory in predicting the adoption of various information technologies such as the internet (Forman, 2005), online shopping (Blake et al., 2007; Chen and Tan, 2004) and E-commerce (Eastin, 2002). The diffusion of innovations theory has also been widely used to explain the adoption of a variety of wireless applications (Grantham and Tsekouras, 2005) and mobile technologies (Pagani, 2004; Kauffman and Techatassanasoontorn, 2005; Yoo et al., 2005; Vrechopoulos et al., 2002). Furthermore, Furneaux (2005) highlighted the extensive use of DOI; in his work he refers to 77 different Information System (IS) and Information Technology (IT) articles that use the theory of DOI (Furneaux, 2005). A number of studies have applied Rogers' Diffusion of Innovations theory as a one of its bases because it is well-established and has been extensively used in research on information technology diffusion (Prescott and Conger, 1995; Braak and Tearie, 2007; Choudhury and Karahanna, 2008; Conrad, 2009), particularly in the

context of developing countries (Prescott and Conger, 1995). Further, the Diffusion of Innovations theory is one of the earliest technology adoption theories used in Information System (IS) research.

Nevertheless, a number of studies have pointed out some shortcomings of DOI. This framework focuses only on a level of analysis (i.e. a macro level) (Shin, 2009a). The macro level relates to the characteristics of the assimilation and the diffusion process of the new technology, the factors influencing it, and whether or not this process follows the generally accepted patterns of innovation assimilation (Rogers, 1995; Nachmias, 2002). Another study by Lyytinen and Damsgaard (2001) tests the usefulness of the diffusion of innovation research in developing theoretical accounts of the adoption of complex and networked IT solutions. The results of their analysis show that DOI-based analyses miss some important facets in the diffusion of complex technologies (e.g. social construct and learning intensive artifacts) (Lyytinen and Damsgaard, 2001). According to Venkatesh et al. (2003a), a summary of the important models with regards to IT acceptance, and their theorized determinants of intention and/or usage are illustrated in the Table 2.3.

Table 2.2: A Summary of the Eight Prominent Information Technology Acceptance Theories.

Acceptance Theory	Author(s)	Core Determinants	Definitions
Technology Acceptance Model (TAM)	(Davis, 1989)	Ease of Use	"the degree to which a person believes that using a particular system would be free of effort"(Davis, 1989).
		Usefulness	"the degree to which a person believes that using a particular system would enhance his or her job performance".
The Diffusion of Innovation Theory (DOI)	(Rogers, 1995)	Relative Advantage	"the degree to which an innovation is perceived as being better than its precursor"
		Compatibility	refers to the degree to which an innovation is perceived by a user as being consistent with the existing values, past experiences, and needs of potential adopters
		Complexity	Refers to the innovation's difficulty perception by a user.
		Triability	to the degree to which users can experiment with an innovation, prior to its adoption.
		Observability	is the degree to which the outcomes/results of an innovation are visible to others, and how easily the benefits can be communicated to others
The Theory Of Reasoned Action (TRA)	(Fishbein and Ajzen, 1975)	Attitude Toward Behaviour	"an individual's positive or negative feelings (evaluative affect) about performing the target behaviour"
		Subjective Norm	"the person's perception that most people who are important to him think he should or should not perform the behaviour in question"
The Motivational Model (MM)	(Davis et al., 1992)	Extrinsic Motivation	The perception needed by the users to perform an activity "because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions"

		Intrinsic Motivation	The perception needed by the users to perform an activity "for no apparent reinforcement other than the process of performing the activity per se"
Theory of Planned Behaviour (TPB)	(Ajzen, 1991)	Attitude Toward Behaviour	"an individual's positive or negative feelings (evaluative affect) about performing the target behaviour"
		Subjective Norm	"the person's perception that most people who are important to him think he should or should not perform the behaviour in question"
		Perceived Behavioural Control	"the perceived ease of difficulty of performing the behavior"
Combined TAM and TPB (C-TAM-TPB)	(Taylor and Todd, 1995b)	Attitude Toward Behaviour	"an individual's positive or negative feelings (evaluative affect) about performing the target behaviour" (Fishbein and Ajzen, 1975)
		Subjective Norm	"the person's perception that most people who are important to him think he should or should not perform the behaviour in question" (Fishbein and Ajzen, 1975)
		Perceived Behavioural Control	"the perceived ease of difficulty of performing the behavior"(Fishbein and Ajzen, 1975)
		Perceived Usefulness	"the degree to which a person believes that using a particular system would enhance his or her job performance".(Davis, 1989)
The Model of Pc Utilization (MPCU)	(Thompson et al., 1991)	Job-fit	"the extent to which an individual believes that using [a technology] can enhance the performance of his or her job"
		Complexity	"the degree to which an innovation is perceived as relatively difficult to understand and use"
		Long-term consequences	"Outcomes that have a pay-off in the future"

		Affect Towards Use	"feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act"
		Social Factors	"individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations"
		Facilitating Conditions	"provision of support for users of PCs may be one type of facilitating condition that can influence system utilization"
The Social Cognitive Theory (SCT)	(Compeau and Higgins, 1995b)	Outcome expectations - Performance	The performance-related outcome concerned with job related outcomes.
		Outcome expectations – Personal	The personal expectations within the individual's esteem and sense of accomplishment.
		Self-efficacy	Is the person's judgment of being able to use a certain technology (e.g. PC) to finish a certain assignment or job.
		Affect	Refer to a person liking for a certain behaviour (e.g. PC use).
		Anxiety	Refer to the person's emotional reaction (anxious) regarding performing a certain behaviour (e.g. Using PC).

2.10 Summary

This chapter has discussed the literature review on m-transaction adoption at the user level mainly in developing countries. It helped to enlighten the researcher's knowledge and expand the understanding of the underlying problem and it addressed, in particular, the factors that might affect the decisions or the intention to use m-transaction from the Saudi user's perception. It also discussed and summarized the different IT innovation acceptance theories which help in forming the research theoretical background.

The next chapter provides an outline of the major quantitative and qualitative research methods, highlighting the advantages and disadvantages of each method and the rationale behind the methods chosen for this research in each stage. Also it reviews the sampling techniques, highlighting the technique employed in this research and justifying its use. The chapter concludes by identifying the processes and procedures employed to collect the study data.

Chapter 3 Research Methodology and Design

3.1 Introduction

The previous chapter (C*hapter 2: Background and Related Literature*) established the context of this research by reviewing the comprehensive literature on mobile transactions (m-transactions) as well as the most important technology adoption/intention theories. This encompassed highlighting the factors that affect the intention to use m-transactions, all of which provide a guideline for proceeding with this research. However, in this chapter the focus will be on the research methodology for the research's different studies. The research methodology earns significant importance in a research project because it supports the selection of appropriate tools to investigate a particular problem (Kothari, 2011). According to VanderStoep and Johnson (2008), research studies are mostly based on the typical approaches and types of research methods; however, in the information systems' field, the research tools and designs can be modified and innovated depending on the research context.

The present research chapter provides a detailed research methodology showing how the researcher investigates the key factors that shape and influence the consumer intent of using m-transactions. The chapter discusses the research design, approach and instruments adopted to meet the research objectives. The chapter also provides details regarding the sample and data analysis and measurement techniques used to resolve the research problem, and to provide constructive research findings.

3.2 Research Paradigm

Different research studies are conducted under the typical framework of "The Research Onion" (see Figure 3.1) which was introduced by Saunders et al. (2009); the Research Onion, "by which means we have chosen to depict the issues underlying the choice of data collection techniques and analysis procedures" (Saunders et al., 2009). Kuhn (1969) describes research paradigm in two different senses: first, it stands for "the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community" second, it denotes "one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science."(Kuhn, 1969). A research paradigm is a framework that embraces three different fields of philosophy: ***ontology***, which specifies the nature of reality; ***epistemology*** which is concerned with the relationship between the researcher and reality; and ***methodology*** which is the set of techniques used to investigate this reality. These three strands of research philosophy influence the way that a researcher regards the research process (Guba and Lincoln, 1994). Ontology studies the nature of reality and asks "what assumptions do we make about the way in which the world works?"; epistemology studies the nature of knowledge and asks "what is acceptable knowledge in a particular field of study?"; while methodology is concerned with how research is conducted, and how the methods used can be influenced by the theoretical and philosophical assumptions upon which the research is built (Saunders et al., 2009). Furthermore, the research philosophy adopted contains important assumptions about the way in which the researcher views the world. These assumptions will reinforce the research strategy and the methods the researcher chooses as part of that strategy (Johnson and Clark, 2006). For example, a researcher who is investigating the resources required by a certain healthcare department would collect different data in a different way to a researcher who is concerned with understanding the emotions and behaviour of healthcare workers in the same environment. They will choose different methods and strategies of data collection and analysis, and their opinions about which data is useful would also be different.

Therefore, different research philosophies (paradigms) have been introduced in order to guide the researchers within different disciplines. Saunders et al. (2009) detailed the key research philosophies as: ***axiology*** "what roles do our values play in our research choices" a field of philosophy that studies the crucial role that values play in our decisions; ***realism*** "do objects exist independently of our

knowledge of their existence" is another branch of philosophy, and it can be used in many contexts, including scientific enquiry. Realists endorse two main ideas: that what our senses perceive and show us constitutes reality and truth, and furthermore that objects are real and exist independently of the human mind. It is therefore possible in science to make comments about unobservable phenomena as well as observable phenomena**.** ***Positivism*** "working in the tradition of the natural scientist" is an epistemological stance that focuses on the use of empirical evidence derived from direct experience. The methodology is highly structured so that results can be reproduced, much as in physics and the natural sciences; ***interpretivism*** "understanding differences between humans as social actors" is an epistemological view that promotes understanding distinctions between individuals in their role as social actors; and ***pragmatism*** "do you have to adopt one position" is a stance that focuses on the research question itself in determining the research philosophy to be adopted, arguing that it is possible to combine both positivist and interpretivist positions (Saunders et al., 2009; Saunders and Tosey, 2013). Furthermore, Tashakkori and Teddlie (1998); Saunders et al. (2009) claim that the rationale to choose any of the identified methods and approaches directly relies on the nature of research problem and question investigated by the researcher.

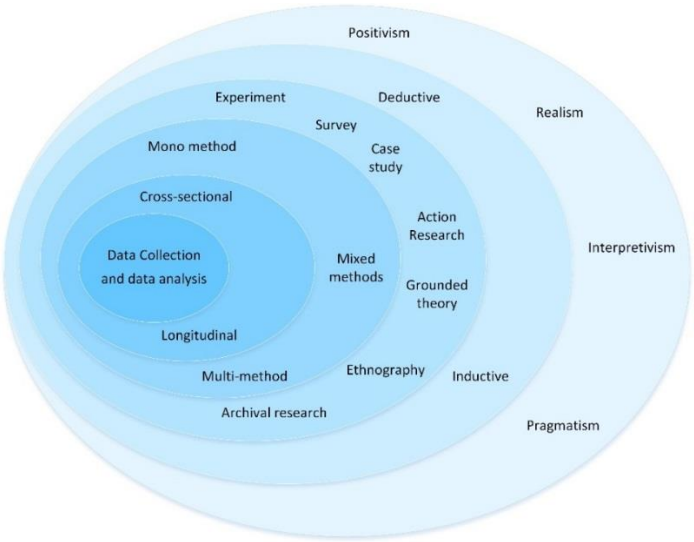

Figure 3.1: The Research Onion.
Source: (Saunders and Tosey, 2013)

This study is seen as falling within the pragmatism paradigm; the focus is on the research question itself, rather than on one particular research philosophy. In this way, the question can determine the epistemology, ontology and axiology that are adopted. The research question here does not lend itself unambiguously to either a positivist or an interpretivist philosophy, so this confirms the pragmatist's position, which maintains that it is perfectly possible to have variations in the epistemology, ontology and axiology. This echoes the fact that mixed methods, both qualitative and quantitative, can be highly advantageous within one piece of research (Saunders and Tosey, 2013; Saunders et al., 2009; Tashakkori and Teddlie, 1998). For example, this research intends to focus on the Saudi context to understand the user intent towards m-transactions; to investigate such a problem, the researcher is provided with two main research designs that include qualitative and quantitative. The Table 3.1 summarises the four research philosophies.

Table 3.1: Comparison of the Four Research Philosophies.

	Positivism	**Realism**	**Interpretivism**	**Pragmatism**
Ontology: the researcher's view of the nature of reality or being	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology : the researcher's view regarding what constitutes acceptable knowledge	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: the researcher's view of the role of values in research	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

Source: (Saunders et al., 2009)

3.3 Research Approach and Methodology

Dori (2002) identifies that the research approach is a key tool that guides researchers towards the right accomplishment of the research objectives. For example, if a research intends to explore reasons behind the users' acceptance of m-transactions; it is very important to carefully choose the research approach that can help to provide justified answers to address the issue with constrained resources. In line with this, Creswell (2003) stated that the research approach used to perform particular research studies could be either inductive or deductive. Beiske (2007) supports the inductive approach because

it uses a bottom-up approach to investigate the research problem in order to test the research hypothesis. For example, the inductive approach can help the researcher to form a specific intent about the consumer acceptance of m-transactions and then relate it to the theory in order to develop a generalized perspective of Saudi users. Contrary to the inductive approach, the deductive approach is used to create a specific intent from a generalized opinion to establish the research hypothesis (Saunders et al., 2009). For example, under the deductive approach, the researcher can test the impact of identified factors on the consumers' acceptance of m-transactions and then provide specific findings for the Saudi users of m-transactions. The Table 3.2 illustrates the major differences between deductive and inductive approaches to research (Saunders et al., 2009):

Table 3.2: Main Differences Between Deductive and Inductive Approaches to Research.

Deduction emphasizes	**Induction emphasizes**
• scientific principles • moving from theory to data • the need to explain causal relationships between variables • the collection of quantitative data • the application of controls to ensure validity of data • the operationalization of concepts to ensure clarity of definition • a highly structured approach • researcher independence of what is being researched • the necessity to select samples of sufficient size in order to generalise conclusions	• gaining an understanding of the meanings humans attach to events • a close understanding of the research context • the collection of qualitative data • a more flexible structure to permit changes of research emphasis as the research progresses • a realisation that the researcher is part of the research process • less concern with the need to generalise

Choosing an appropriate research approach during the research design is a major task for researchers (Walsham, 1995), as there are multiple methodologies to choose from. In addition, selecting an appropriate approach is a difficult task, since the field of information systems is multi-disciplinary "Contributions to the study of information systems come from the natural sciences, mathematics, engineering, linguistics and behavioural sciences" (Land, 1992). Robert (2003) states that the qualitative research designs enable researchers to develop theoretical understanding of a research topic. Hoque (2006) supports the application of qualitative research design because it is one of the most refined methods to develop connection between the research and the theory. Contrary to this, quantitative research designs are promoted as a viable research design to carry out scientific and empirical research studies. Madhavan et al. (2009) claim that the quantitative research design allows measuring the relationship between two or more variables.

In the field of information technologies and systems, the two approaches are distinctively used to explore the new dimensions of ICT; however, reliance on one method may produce constrained results due to the missing elements. For example, if the researcher adopts qualitative research, it would only be limited to inductive reasoning of consumer acceptance of m-transactions. Hence, sole reliance on subjectivity may diminish effectiveness and reliability of the research findings due to the likelihood of biasness errors (Thomas, 2003). On the other hand, the researcher may choose quantitative design to quantify the impact of each identified factor on the consumer acceptance of m-transactions; however, the research findings will be constrained due to the inability of the researcher to connect research with the theory (Saunders et al., 2009).

The term triangulation is assigned to the practice of combining two or more research methods for the purpose of building a broader picture of the phenomenon under study. This facilitates the validation

of the findings, assists in explaining diverging results and compensates for the limitations inherent in a single research method. Triangulation is defined by Cohen et al. (2000) as "the use of two or more methods of data collection in the study of some aspects of human behaviour". On the other hand, Creswell and Clark (2011) highlight the importance of mixed methods when one data source may be insufficient, and for the following additional reasons: (1) to explain initial results; (2) to generalise exploratory findings; (3) to enhance a study with a second method; (4) to best employ a theoretical stance and (5) to understand a research objective through multiple research phases. Furthermore, diversity in research methodologies (i.e. qualitative and quantitative) is considered as a major strength of information systems (IS) research. Mixing methodologies in research is considered potentially superior to a single method design (Venkatesh et al., 2013). Bryman and Bell (2007) explain in their book the difference between quantitative and qualitative methods. Quantitative research can be interpreted as a research strategy that stresses quantification in collecting and analysing the data, involving a deductive approach to the relationship between theory and research, in which the accent is placed on the testing of theories. It has incorporated the practices and norms of the natural scientific model and of positivism in particular; and represents a view of social reality as an external objective reality. On the other hand, qualitative research can be interpreted as a research strategy that usually places greater emphasis on words rather than quantification in collecting and analysing the data, involving an inductive approach to the relationship between theory and research, in which the emphasis is placed on the formation of theories. Furthermore, the researcher uses the grounded theory methodology (GTM) to analysis the gathered data from the interviews (see section 4.5.2).

Saunders et al. (2009) recommend the combination of the research approach "Not only is it perfectly possible to combine deduction and induction within the same piece of research, but also in our experience it is often advantageous to do so". In this research, it was decided to employ a blend of quantitative and qualitative methods as well as triangulation of techniques in order to get a wider picture of the phenomenon under study (i.e. the intention to use m-transactions from Saudi users' perspective). It was decided to employ triangulation as mentioned earlier, integrating the following methods: *Descriptive/interpretive, Interviews, Surveys, Focus Group*, and *'Think-aloud (user usability test)* to study this area. The Table 3.3 summaries the current research methodologies and strategies (data collection).

Table 3.3: Summary of Research Approach and Methodology.

Methodology	Users	Literature	Strategy	Sample Size
Qualitative analysis	☒	☑	Descriptive/Interpretive	-
Qualitative analysis	☑	☑	Exploratory (1) Interviews	40
Qualitative analysis	☑	☑	Exploratory (2) Interviews	122
Qualitative analysis	☑	☑	Exploratory (3) Focus Group	8
Quantitative analysis	☑	☑	Validation (1): Questionnaire	1008
Qualitative analysis	☑	☑	Validation (2): Think-Aloud (Usability test)	30

3.4 Research Design

Research design provides "a framework for the collection and analysis of data. A choice of research design reflects decisions about the priority being given to a range of dimensions of the research process" (Bryman and Bell, 2007). When using a mixed-methods design, researchers must decide on the relative importance of the quantitative and qualitative aspects of their design. By weighting the quantitative and qualitative methods to be used, the researcher can prioritize them and their ability to answer the study's questions. There are three possible prioritizing strategies in mixed methods design: equal priority (where the two strands may have the same priority); quantitative priority (where the researcher put a greater emphasis on the quantitative and the qualitative strand comes in

a secondary role); and qualitative priority (where the qualitative strand have higher importance over the quantitative strand) (Creswell and Clark, 2011). In addition, it is up to the researcher to make decisions regards timing of the two strands. Timing refers to the complete strands, not just data collection, and the order in which the researcher will use the two sets of data within the study (Creswell, 2003). Creswell (2003) classified timing within mixed methods designs in three ways: ***concurrent,*** which is when the researcher uses both strands during the same phase of the study; ***sequential***, when the researcher employs both strands in separate phases, so that data collection and analysis of one strand occurs before the other (the researcher can decide the best order in which to use each strand); or ***multiphase combination,*** which is when there are several phases within the study, which may use the strands in a concurrent or sequential manner.

This research has applied the multiphase combination for designing the different research studies. This research starts with three qualitative studies to help in building the research framework, then a quantitative study to test and generalize the results, then a final qualitative study to add further understanding of the final results. The three levels of understanding suggested by Giddens (1984) are supported by other researchers arguing that an exploratory phase is essential as a starting point of research (Krathwohl, 1993; Straub and Carlson, 1989). Straub and Carlson (1989) argue that an IS research typically begins with a qualitative exploratory stage, which is usually followed by confirmatory research to empirically test hypotheses or propositions generated from the first exploratory phase. With reference to Giddens (1984) framework, this research begins with an exploratory phase that includes an investigation process and a framework designing process, which is followed by an explanatory phase that consists of a testing process and an analysis process. Finally, this is followed by another study to validate the results. Within these three phases, a mixed-method approach that involves both quantitative and qualitative techniques is suitable as suggested by the pragmatism paradigm. An overall research design is illustrated in Figure 3.2.

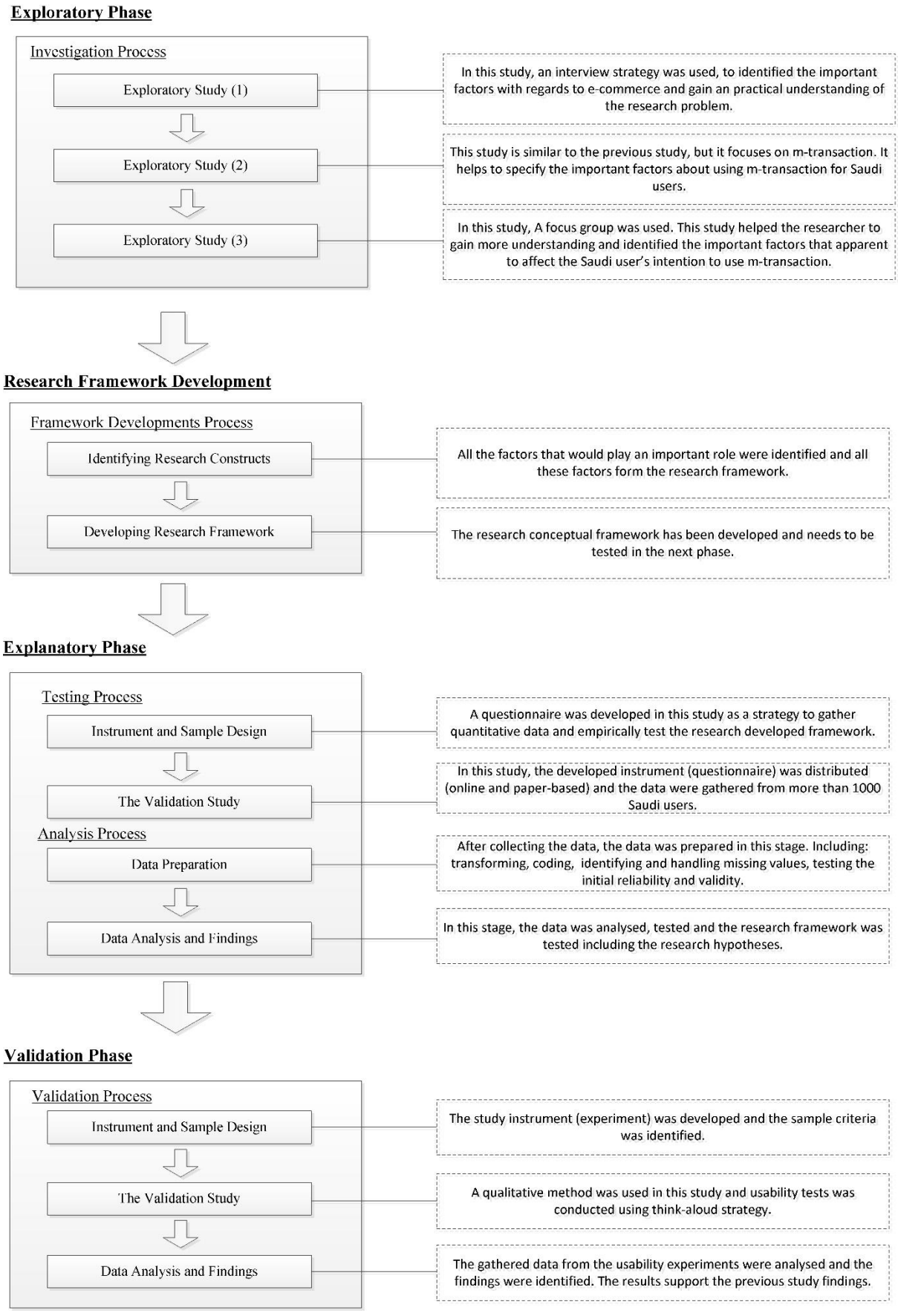

Figure 3.2: The Research Design.

3.5 Research Instrument(s)

The research under discussion reflects an endeavour to investigate the user perspective of m-transactions in Saudi Arabia. For better interpretation and analysis, the researcher adopted a triangulation practice of combining two or more research techniques to investigate the research problem through the evaluation of a rich pool of data and information extracted from varied sources. In line with the chosen research method, the researcher combined five evaluation methods including descriptive, interview, focus group, surveys, and think-aloud (user-usability test).

3.5.1 Interpretative

Descriptive or interpretive research usually refers to the existing literature or past achievements, in addition to actual present happenings. Hart (1998) defined a literature review as "the use of ideas in the literature to justify the particular approach to the topic, the selection of methods, and demonstration that this research contributes something new". A methodological review of past literature is a critical endeavour for any academic research (Webster and Watson, 2002) and the need to discover what is already known in the body of knowledge prior to introducing any research study should not be underestimated (Hart, 1998). Significant developments in our knowledge, and in our ability to develop theories, can be achieved through an in-depth review of this kind. A comprehensive review of past research/developments may not only lead to new visions but is also more likely to ensure that subsequent research is based on past endeavour. Researchers, furthermore, have criticized the Information Systems (IS) field for having insufficient theories and outlets for a quality literature review (Levy and Ellis, 2006). Moreover, Webster and Watson (2002) noted that the IS field should greatly benefit from effective methodological literature reviews that are "… strengthening IS as a field of study". The strengths of this method of research lies in its capability to represent reality following an in-depth self-validating process in which assumptions/presuppositions are constantly questioned, and the understanding of the phenomena under study is refined. The weaknesses of this approach may include the problems reviewers face in understanding the results of a research with which they may be unfamiliar. Other influential matters are associated with the researchers' skills and ability to recognize their biases and assumptions.

Therefore, in order to perform qualitative and conceptual understanding of the research topic, the interpretative instrument was adopted to perform a thorough review of relevant research studies that have been conducted in the similar domain. The purpose and reason to use interpretative instrument is that it helped to develop in-depth subjective understanding of the underlying topic. For example, the instrument enabled an understanding of the main factors that shape and influence consumer intent to use m-transactions in Saudi Arabia. The rational for choosing descriptive instrument was to create a substantial base of evidence that can later on support the findings and analytical interpretations of the research to be conducted in the next chapters (*Chapter 4, 5 and 6*).

Marshall and Rossman (1999) argue that "a thoughtful and insightful discussion of related literature builds a logical framework for the research that sets it within a tradition of inquiry and a context of related studies". Their study highlighted the importance of the literature review stage, as it enables researchers to gain a deeper understanding of the matter under consideration, and to clarify central questions. As the information is gathered from different sources, it offers a variety of different viewpoints, revealing any underlying assumptions and providing opportunities for refinement and redefinition of the research questions (Marshall and Rossman, 1999). In the exploratory phase of this research, the literature review assisted in identifying the theories that m-transaction adoption is based upon, particularly in high-income developing countries. Consequently, the determinants of adopting m-transaction can be conceptualised and used in this study's framework.

3.5.2 Interviews for Exploring E-commerce in Saudi Arabia

Under triangulation practice, the researcher chose interviews as a suitable method to gather primary data on the research topic. The rationale for choosing interview is that it is a useful qualitative instrument to perform in-depth evaluation of a particular issue or problem (Thomas, 2003). The researcher chose interviews to collect generic and specific views of respondents regarding the adoption of electronic purchase (E-commerce) as a first step to understand the underlying topic (i.e. m-transactions) in Saudi Arabia. According to Bryman and Bell (2007), the interview is a key instrument to carry out exploratory research studies because it helps the researcher to explore feelings and thought processes of individuals regarding the underlying research problem. In support, Lu et al (2011) promote the adoption of interview as an exploratory study instrument because it adds human dimensions to impersonal data. This research uses interviews to justify the qualitative research design and to gather insights into the life experiences of the research respondents regarding the use of electronic purchase. These interviews were conducted from a sample size of 40 users to gather general views and opinions about the cultural influences that are likely to shape consumers' acceptance of electronic purchase in Saudi Arabia. In their book, Corbin and Strauss (2008) summarise the benefits of qualitative research as sharing these characteristics: 'a humanistic bent', 'curiosity', 'creativity and imagination', 'a sense of logic', 'the ability to recognise diversity as well as regularity', 'a willingness to take risks', 'the ability to live with ambiguity', 'the ability to work through problems in the field', 'an acceptance of the self as a research instrument', and 'trust in the self and the ability to see value in the work that is produced'.

This study has been conducted using a grounded theory methodology (GTM) which was developed by Glaser and Strauss in 1967. Following GTM allows a qualitative method to be used which provides the following valuable characteristics: shedding light on a person's daily life experience; evaluating contributors' perspectives; investigating the interactive processes between researcher and respondents; and being descriptive based on people's words (Marshall and Rossman, 1999). Therefore, this study aimed to elicit consumers' opinions i.e. what people in Saudi Arabia think and believe about adopting e-commerce. This included thoughts, beliefs and opinions. This information was gathered by asking general questions (see Appendix A) and recording notes and comments about the important ideas and concepts. The semi-structured interviews were conducted during August 2011 in Dammam, Khobar, Riyadh and Jeddah as they are the four main cities in Saudi Arabia, which are highly populated and have high business potential (Central Department of Statistics & Information, 2010). All the interview questions were piloted with Saudi users (5 Saudi users) to make sure all the questions are understandable, and experts in the domain (3 experts in designing and conducting interviews) were sought for their advice and comments. All comments from both users and experts were addressed carefully (e.g. rewording questions, add further information and changing the structure and format). All the participants were selected regardless of their age, income and gender. The researchers approached people from private and public organizations in different locations (e.g. universities, companies, schools, Internet cafes, streets and shops). However, this research is about adopting e-commerce, so the researcher had to verify that the participants were Internet users before starting the interviews. The sample size was 40 interviewees. For further details on the study, please refer to *Chapter 4: Exploratory study in Electronic Commerce – Interviews.*

3.5.3 Interviews for Exploring M-transaction in Saudi Arabia

For the second exploratory study, the researcher increased the research horizon by approaching a relatively large sample for interview procedures. Yin (2008) claims that conducting interviews from a large sample is a exhausting process; however, Kourouthanassis and Giaglis (2012) respond that interview is the best instrument to gather individual views on sensitive issues. Hence, the researcher chose interviews to explore personal opinions and feelings of participants regarding mobile transactions. With reference to Unified Theory of Acceptance and Use of Technology (UTAUT) theory, the researcher designed semi-structured interviews to gather primary data on using m-

transactions by Saudi users (see Appendix B). The interview sessions enabled the researcher to come up with the possible factors that can be related back to the critical evaluation of the literature studies in order to develop an appropriate research framework for blended research investigation. Therefore, the researcher was able to conduct the interviews with Saudi users in order to create a list of selected factors that influence the consumer intention to use m-transactions.

For validity reasons, the instrument was extensively pre-tested and evaluated through academic and practical experts to whom copies of the interview's questions were sent for judgment. The instrument was then piloted and adjustments were made accordingly with the support of professional experts and particular attention was given to wording and overall structure and presentation of the interview items. Similar to the previous study, this study was conducted in the same cities, which are highly populated and have high business potential. These four cities can be considered as a representative for Saudi society as people from different parts of the Kingdom joined for work and a better life style (Central Department of Statistics & Information, 2010). The semi-structured interviews (see Appendix C) were conducted during May/June 2013. The researcher aimed to interview the public with no limit to a special feature or demographic characteristics; hence, all participants were selected regardless of their age, income and gender. The researchers approached people from private and public organizations in different locations (e.g. universities, companies, schools, Internet cafes, streets and shops). However, this research is about adopting m-transaction, so the researchers had to verify that the participants were a mobile and Internet users before starting the interview. The sample size of these interviews was 122 interviewees. This study involved exploratory research using a qualitative approach. By adopting this approach, the researcher was able to gain an in-depth understanding of the consumers' concerns regarding adopting m-transaction in Saudi Arabia. Please see *Chapter 5: Exploratory Study (2) Mobile Transaction* for further details.

3.5.4 Focus Group for Exploring M-transaction in Saudi Arabia (Study 3)

In terms of explorative studies, focus group interviews have been suggested as a suitable method (Calder, 1977) and previous research has highlighted their feasibility and capability for studying innovative mobile transactions (Jarvenpaa and Lang, 2005; Mallat, 2007). The strength of the focus group interview method is that it is dynamic and interactive, so it has the ability to provide researchers with elaborated perspectives of the participants on the topic under discussion; it has been considered an especially informative way of developing a research model in a new research area (Mallat, 2007; Wilkinson, 2004). Therefore, the researcher chose focus group interviews as a suitable instrument of data collection on the research problem. Onwuegbuzie et al. (2009) highlight that the focus group interviews provide an interactive means to collect data on a particular issue. Kothari (2011) supports the application of focus group interviews as a dynamic instrument to provide a detailed perspective of a research participant on the research title. Furthermore, the researcher chose to conduct focus group interviews in order to add reliability to the extensive pool of information and data gathered for the investigation of factors that shape consumers' acceptance of m-transactions.

For the focus group members to interact successfully and work dynamically as a group, a number of important criteria need to be met in the selection of members. Stewart and Shamdasani (1990, p. 33) note that "the usefulness and validity of focus group data are affected by the extent to which participants feel comfortable about openly communicating their ideas, views or opinions" (cited in Mallat, 2007). Groups that have formed naturally have proved to be particularly relaxed, thus easing the conversations amongst the participants (Bryman, 2004). As a result, in order to facilitate a proper discussion and interaction throughout the sessions, a naturally formed group was selected for this study with a total of eight mobile experts. The participants knew each other as classmates, friends, co-workers or via a common hobby. Experience in online purchasing and using a mobile phone that has internet access were two factors deemed to be necessary in order for the participants to be able

to discuss the relevant topic. According to Krueger and Casey (2009) the recommended size for a focus group ranges from 4 to 12, therefore 8 participants were involved in this study. The majority of the participants (6 out 8) had experience of mobile transactions.

The study was effective and useful because it helped the researcher to identify important factors with the potential to influence m-transactions. In addition, the exploratory study enriched the conceptual framework of the research by adding a new dimensions i.e. culture and social influence. The researcher investigated culture as moderator to influence the users' intention to use m-transactions amongst Saudi Arabians. However, the direct influence of culture dimensions were also considered in the analysis (see *Chapter 9: Quantitative Data Analysis*). Therefore, the focus group research findings related to culture added value to the previous studies. For further discussion on this study please refer to chapter 6 (C*hapter 6: Exploratory Study in Mobile Transaction – Focus Group*).

The results of the focus group have helped to identify the most important factors that expected to influence the intention to use m-transaction within the Saudi context and, thus to build the research conceptual framework.

3.6 Conceptual Framework

The conceptual framework is an important and significant part of any research study. It includes beliefs, expectations, assumptions, concepts, and theories, which might support the underlying research study (Huberman and Miles, 2002). According to Heinrich (1984) "Even carefully collected results can be misleading if the underlying context of *assumptions is wrong*" (cited in Maxwell, 2012, p. 39). Conceptual framework has been defined by Huberman and Miles (2002) as a written document which "explains, either graphically or in narrative form, the main things to be studied, the key factors, concepts, or variables and the presumed relationships among them" (p. 18). The use of a conceptual framework is for both large and small scale theories (Maxwell, 2009) as well as different contexts such as applied sciences (Hobbs and Norton, 1996), marketing (Jaworski et al., 1993), and social sciences (Hyman et al., 1970), so its application and definition in explicit terms may vary according to its usage and type of research to be conducted.

In this present research, each study is conducted in a successive order to provide solid input and an information base for the next study. For example, based on the studies' results drawn from the exploratory phase, the researcher developed a thorough conceptual framework to understand Saudi users' perspective on the use of m-transactions. The Figure 3.3 illustrates the results from the exploratory phase studies and how they integrated in order to identify the most important factors that represent the research conceptual framework. Consonant with these studies, the next quantitative study is performed to test and evaluate this conceptual framework in order to design and conclude the final recommendation. Furthermore, the usability study is conducted next to justify the results of the previous study (i.e. questionnaires) by conducting usability experiments and applying the concurrent technique on m-transaction current application in Saudi Arabia.

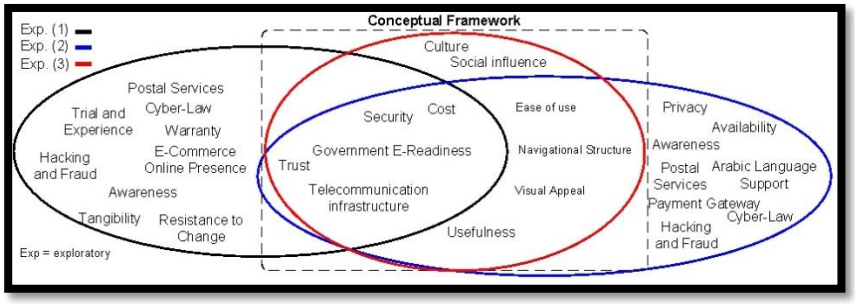

Figure 3.3: Conceptual Framework of the Research.

3.7 Questionnaires for Validating The Conceptual Framework

The variables in the developed framework were latent and could not be measured directly (Hair Jr et al., 2014). Thus, a set of measurement indicators was generated to operationalize each construct, using existing indicators from previous studies when available, or adapting them if necessary. All constructs were measured reflectively. Each of the indicators was measured using a 7-point Likert-scale. These interval scales ranged from 1 – strongly disagree, 2 – disagree, 3 – disagree somewhat, 4 – not applicable, 5 – agree somewhat, 6 – agree, and 7 – strongly agree. The survey data, with regards to demographics and descriptive data, was primarily measured using nominal scales.

The researcher recruited the users from different locations in different public and private organizations located in Saudi major cities (e.g. Riyadh, Jeddah, Dammam and Khobar) as well as hosting the questionnaire online. The collected surveys were 1008 including paper-based and online-based. Please refer to *Chapter 8: The Empirical Settings and Data Validation (Validation Study (1))*, section 8.6 for further details.

Using the empirical data from the distributed questionnaires, the measurement properties were assessed and hypotheses were verified using the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach (Chin, 1998a; Wold, 1982). The PLS-SEM approach has enjoyed steady popularity as a key multivariate analysis method in management information system (MIS) research (Ringle et al., 2012; Gefen et al., 2011). Structural equation models (SEM) allow both exploratory and confirmatory modelling, meaning that they are suited to both theory development and theory testing. Confirmatory modelling usually starts with a hypothesis that is represented in a causal model. The concepts used in the model should then be operationalized to allow testing of the relationships between the concepts. The model is tested against the obtained measurement data to identify how well the model fits the data. The causal assumptions embedded in the model frequently have falsifiable implications which can be tested against the data. (Bollen, 1998).

This approach (PLS-SEM) was chosen for the data analysis since, compared to covariance-based approaches, it is advantageous when the research model has a large numbers of indicators and relatively complex, the measures are not well established, and/or the relationships between the indicators and latent variables may need be modelled in different modes (e.g. formative and reflective measures) (Chin and Newsted, 1999; Fornell and Bookstein, 1982; Urbach et al., 2010). Furthermore, PLS may be better suited as it has fewer demands with regards to sample size and residual distributions (Ringle et al., 2012; Fornell and Bookstein, 1982; Gefen et al., 2000; Urbach et al., 2010). The software package SmartPLS 3.0 (Ringle et al., 2014) was used for the statistical calculations. A PLS path model consists of two elements. First, there is a structural model (also called the inner model in the context of PLS-SEM) that represents the relationships (paths) between the constructs. Second, there are the measurement models (also referred to as the outer models in PLS-SEM) of the constructs that display the relationships between the constructs and the indicator variables. In general there are two types of measurement models: one for the exogenous latent variables (i.e. those constructs that explain other constructs in the model) and one for the endogenous latent variables (i.e. those constructs that are being explained in the model) (Hair Jr et al., 2014). Please refer to *Chapter 9: Quantitative Data Analysis* for further details on this study.

3.8 Usability for Validating/Confirming The Questionnaires' Results

This study aims to address the results of the previous study (questionnaires) by applying usability tests to investigate the current situation of m-transaction usability within the Saudi context. Choosing the correct evaluation method is important; scientifically validated information on appropriate testing

methods is valuable for usability practitioners. According to van den Haak et al. (2009) the Thinking-Aloud protocol is one of the most important usability evaluation methods (UEMs) and it has been a key evaluation framework ever since the 1980s, and it remains important today in the Information System (IS) field. In this study, user testing and think-aloud 'concurrent approach' methods were chosen. These methods are suitable to examine the usability (i.e. ease of use) level (van den Haak et al., 2009; Benbunan-Fich, 2001) and whether usability is indeed the critical factor that affects Saudi Arabian consumers' intention to use m-commerce. According to van den Haak et al. (2009) Think-aloud protocols were originally developed to discover people's cognitive processes, i.e. what they were thinking at any given moment and, nowadays, these protocols are used in a wide range of fields, but are particularly common in the context of usability testing. The process allows researchers to obtain great insights into how certain tasks such as reading, writing or translating are actually performed, and what decisions are made during the process (van den Haak, 2008). Verbal reports can be generated concurrently, i.e. while the task is being performed, or retrospectively, i.e. after the task has been completed. As noted by Ericsson and Simon (1998), when giving a concurrent verbal report, participants retrieve information from their short term memory (STM), while with a retrospective verbal report, the participants must rely on their long-term memory (LTM). Ericsson and Simon (1998) argue that if the retrospective report is made very soon after the task has been performed, a great deal of that information can still be retrieved relatively easily by the participants, and data collected in this way can still be regarded as valid. However, the more time that is allowed to elapse between the task completion and the verbalisation of their thoughts, the more likely it is that the participants will omit some of the information. For this reason, and to reduce the chances of this happening, it is now common practice for researchers to make a video recording of the task, which the participants can then use as an aide memoire to help them to recall what they were thinking at any given point during the performing of the task. However, in order to understand and evaluate the current usability level of m-transaction, the concurrent technique was applied in this study with Saudi users.

The experiments took place in a typical usability lab setting in Saudi Arabia from July 2014 to September 2014 in the three main cities (Dammam, Jeddah and Riyadh). As in previous studies, all the participants were selected regardless of their age, income and gender. The researchers approached people from private and public organizations in different locations (e.g. universities, companies, schools, Internet cafes, streets and shops). Furthermore, the researcher used social network to recruit as many participants as possible. As this research is about testing the usability of m-transactions (i.e. Souq.com application), the researcher had to verify that the participants were mobile users and, familiar with mobile commerce, and had conducted a mobile transaction before, but had not used the tested application before (this was verified in the demographic section of the questionnaire). The sample size of this experiment was 30. The researcher adopted the role of the evaluator in all the sessions, noting all the comments made by the users. The evaluator used a stopwatch to record the time spent by each user on each task, and an observation sheet to write down the behaviour of each user and the problems discovered. After the users had finished their tasks, they were asked to rate their level of satisfaction about using the application in a System Usability Scale (SUS) questionnaire (Brooke, 1996) with a five point scale – 1 for strongly disagree and 5 for strongly agree. Bangor et al. (2008) suggested slightly modified statements from those used in the original SUS instrument by (Brooke, 1996). The changes are (1) replacing the word "cumbersome" with "awkward" and (2) replacing the word "system" with "product". This study applied this slightly modified SUS and also replaced the word "product" with "application". To add a valid assessment of what the absolute numerical score of SUS means, a 7 point adjective rating scale can be used to judge the SUS scores. This has become known as the "university grade analog" (Bangor et al., 2008). This study applied this technique and again replaced the word "product" with "application". Each participant conducted the experiment individually and the researcher ensured that every participant felt at ease whilst performing the tasks. Furthermore, users were given a chance to write down their comments and

feedback on the application, and explaining any reaction that was observed during the test. Subsequently, the researcher extracted the problems from the observer sheet and they were merged into a final master problem list.

3.9 Risk Assessment

Dependency on one typical research method to gain access to sufficient information may simply multiply the weaknesses of a researcher; as a solution to this problem, the research under discussion adopted different research methods in an attempt to develop an in-depth understanding of the forces that shape Saudi users' intention to use m-transactions. According to Gillespie (1995), social sciences research activity may be subject to three types of risks. First is risk and harm of injury, unfair treatment, stress, guilt, and self respect issues to the participants if they participate in the research activity. Second is the risk of damage in knowledge and professional relationships of respondents which might include purposeful infringement of regulations, confidentiality issues, plagiarism, and data falsification. The last is the risk and harm to the community or society due to the research activity to be conducted which involves effect of societal/cultural norms and beliefs on the research outcomes and effect of that on society.

According to Milgram (1963), risk of psychological harm is more common in social science research as he reported that "subjects were observed to sweat, tremble, stutter, bite their lips, groan, and dig their fingernails into their flesh. These were characteristic rather than exceptional responses to the experiment". Moreover, Walster (1965a) argued that a social researcher might reduce self respect and self esteem by hurting the feelings of participants if they are not comfortable with the questions asked or the research issues being investigated. Moreover, social science research may contain the possible risk of harming the feelings of religious groups, racial or ethnic monitories.

Data falsification is another important risk in the research. Azrin et al. (1961) reported in their studies that falsification and fudging of data is common. The present study has minimized the risk associated with the proposed research by complying with research ethical considerations. The researcher has maintained the confidentiality of participants so that there should be no potential harm to the participants in terms of their social and community participations (such as self respect, esteem). Moreover, in the case of Saudi Arabia, the researcher intended to apply a simple random sampling technique; however, the issue was that it created an ineffective sample size to resolve the research problem. In addition, the random sampling technique was unable to meet all criterion set to select the sample size. The researcher overcame this issue by adopting judgmental and response-driven sampling, which will be discussed in the next section, to select a suitable sample size that meets the entire selection criterion for the research. Use of an online survey helped in covering more of the sample population; however, it also increases the risk of gathering unreliable sets of data. As a solution to this problem, the researcher conducted reliability and validity test to overcome the possible risk.

3.10 Sample Size and Sampling Technique

The present research aims to conduct a detailed evaluation of the user perspective of m-transactions adoption in the Saudi context. The target population of the research was all individuals residing in Saudi Arabia and belonging to different facets of life. The researcher targeted the population of individuals from public and private organizations; who live in the main Saudi cities, however, time and budget constraints limited the researcher from visiting more cities to cover more of the population. As suggested by many researchers in earlier literature, the selection of the sample is crucial due to its potential to have substantial influence on the reliability and authenticity of the research findings under a blended research design (Beiske, 2007). According to Saunders and Tosey (2013), probability and non-probability are the key techniques used to select an appropriate sample size. Probability sampling adopts a random sampling approach to create equal known chances of

selecting each sample subject while non-probability sampling adopts a convenience sampling approach to create unknown chances of selecting each sample subject (Bryman and Bell, 2003).

In this regard, all the Saudi living individuals cannot be approached for data collection because of time and resource limitations. Moreover, the present research adopts a combination of more than one research technique; it may be difficult to depend on a single sampling technique. Hence, response-driven convenient and purposive sampling, which comes under non-probability sampling techniques, are being followed to draw the required sample size out of the target population of Saudi citizens. It will be difficult to apply probability based random sampling in case of present study because it is hard to compile a complete list of the respondents of present study as well as to approach them (Creswell and Clark, 2011). The response driven snowball sampling technique being followed in the present study was originated by Heckathorn (1997) as a version of snowball sampling to estimate about the hidden population's social network on an unbiased basis. This kind of sampling technique uses initial participants as sources to induct suitable peers from their circle of social networking instead of using an investigator to identify them. The process continues until the researcher has reached the pre-determined size of the sample (Johnston and Sabin, 2010). According to Heckathorn (1997), such a sampling technique is effective in reducing the selection biasness of the survey team while lowering the possibilities of overrepresented biases that can be linked with the participants of a large network. In addition, Johnston and Sabin (2010) state that the respondent-driven sampling uses recruiters' peer pressure as an enticement to push up contribution.

Therefore, the researcher used social networks and response-driven sampling as well as personal distribution to select the sample based on a purposive sampling technique. Out of the target population, purposive sampling is applied as suggested by Saunders and Tosey (2013) and only those individuals are selected for data collection who fulfilled the basic criteria of using a mobile device. According to Patton (1999), purposive sampling tool is applied to gather responses from "information rich" respondents and "from which the most can be learned" (Merriam, 2009) and these respondents might be capable enough to contribute in the development of theory as well as achieving research objectives. Miles and Huberman (1994) recommended that ethical compliance and feasibility, capability to offer true explanation, analytical generalizability, relevance to underlying research phenomenon or research question, and capability to produce rich knowledge are the basic guidelines to conduct a study in social science.

So, rationalized choice of these sampling techniques is well illustrated by the procedure followed by the researcher to create an optimum sample size for productive results. The researcher contacted almost all Saudi universities for data gathering through e-mail; however, the response rate was zero so the researcher visited the Dammam University (in Dammam city) and King Saud University (in Riyadh city) and other institutes such as Mail Company and training centres, shops, cafes …etc for 1500 survey paper distribution. Online survey and social channels such personal emails, online portal of sabq.org, Twitter, LinkedIn and other social networks were also used by the researcher to gather data from online survey version. Nonetheless, the response rate of contacted persons was 1008 responses out of which 924 are usable for research data gathering and analysis.

In order to perform interviews for exploratory study 1, the researcher selected a sample of 40 participants comprising of individuals belonging to universities, schools, shops, internet cafes and companies from public and private sector. For the second interview based exploratory study, the researcher chose a sample size of 122 participants to participate in semi-structured interviews. The two interview studies were conducted to generate consumer responses on the current situation about m-transactions in Saudi Arabia. The semi-structured interview questions helped to gather data on the possible factors that shape consumer acceptance of m-transactions in Saudi Arabia. In addition, the researcher chose a sample size of 8 respondents from the target population; majority of the sample subjects have prior experience of mobile transactions. Nonetheless, the researcher set two parameters

for participants to qualify for the focus group interviews and these parameters included online purchase experience and mobile phone usage. The reason to set these two parameters for sample participants' selection was to ensure data validity and consistency of responses generated from focus group interviews. The sample size for validation study is 1008. Furthermore, the researcher performs validation study 2 (usability test) with a sample size of 30 to conduct experiment in a typical lab setting of Saudi Arabia during July 2014 to September 2014. Irrespective of gender, age and income, the researcher selected sample participants from public and private organizations. Therefore, the total sample size of the present research project is 1208 participants.

3.10.1 Sample Size

From a statistical point of view, a suitable sample size is said to be $N \geq 104+m$; where N refers to the sample size and *m* refers to the independent variables (Tabachnick and Fidell, 2007). According to Hair Jr et al. (2014), the 10times rule of thumb suggests that a sample size need to be equal to the greater of a) 10times the formative indicators' largest number, which is used to determine a particular construct; b) 10times the structural paths' largest number that directs towards a specific latent construct in the SM (structural model). A simple interpretation of the rule of thumb that, the minimum size of a sample needs to be ten times of the highest number of arrows that are pointed towards the latent variable in the model path (Hair et al., 2010).

In the research framework, there are three latent constructs which having structural paths directed at them (i.e. *intention to use*, *usefulness* and *trust*). The number of structural paths (arrows) directed at the latent construct *intention to use* is 14, plus, 3 directed at *usefulness* and 3 directed at the construct *trust*. Subsequently, there are total of 20 structural paths (arrows) in the conceptual framework. Thus 200 should be the minimum sample size for this research in order to be able to generalise the research findings to the entire population. However, this research has a sample size of 1208, therefore, the sample size is sufficient and the results can be generalized.

3.11 Data Collection Methods and Process

According to Kothari (2011) there are two methods of data collection which are primary and secondary. The primary method of data collection comprises of sources that provide first-hand and fresh data on the research topic such as questionnaire, telephonic conversation to undertake a personal investigation. On the other hand, secondary method of data collection is defined as the combination of sources that provide pre-searched information and material such semi-official websites, newspapers, research organizations and articles. However, Saunders et al. (2009, p. 258) argued that, in order to make the most of suitable research methods, researchers usually utilize a hybrid method i.e. a combination of primary and secondary methods to achieve the investigation objectives in more effective manner. The reason to choose a hybrid method is to develop a rationalized understanding of a particular research problem on the basis of fresh empirical testing results with support of reviewed and earlier published evidence.

In the present research project, the researcher chooses hybrid data collection method to investigate the m-transaction usage intent of Saudi users by both primary and secondary sources. Secondary data has been obtained from the earlier literature and other published sources to develop a conceptual and theoretical understanding of the research topic. The earlier literature provides sufficient support in finalizing a research methodology and refinement of research objectives and questions in the conceptual framework/theoretical model. The primary data has been collected by using four tools, interviews, focus group, survey questionnaire and experiments. A survey questionnaire has been developed to collect the primary quantitative data under the basic guidelines as provided by Easterby-Smith et al. (2012) that express "each item should express only one idea, to avoid jargon and colloquialisms, to use simple expression, to avoid use of negatives, and to avoid leading questions".

The survey questionnaire has several parts which include a brief introduction regarding the study, the demographics and the mainstream questions.

During the process of data collection through questionnaires, the target respondents were first briefed about the usefulness of the study and asked for their informed consent and willingness to fill out the research questionnaire. Moreover, the ethical consideration of no harm and risk was also ensured and the researcher told the respondents the data obtained will be kept confidential and anonymity will be maintained. This was done in accordance with the ethical considerations highlighted by Bryman and Bell (2007). According to the basic assumption and principles of purposive sampling technique, only those respondents were asked to fill the questionnaires who have a mobile device and, preferably, internet access so that they can provide full and more accurate information on the basis of which results could be generalized to the target population.

In addition, as discussed above, the hybrid and triangulation method has been followed to validate and confirm the results of data obtained through questionnaire (Jick, 1979). In this regard, semi-structured interviews were conducted. Under the present proposed research design and research philosophy, semi-structured interviews could be considered as most suitable and preferable data collection technique (Bryman and Bell, 2007) as compared to structured and unstructured interviews. The researcher is restricted with already defined questions and might lose the primary (embryonic) observable fact regarding underlying research issue in structured interviews. Contrary to structured interviews, unstructured ones are without any predefined set of questions to be asked and there is a high probability that researchers might forget and miss many important elements of research during interview. The researcher might ask respondents more questions to test out the research issue in more detail and to reach the factual points. These semi structured interviews were conducted in face to face meetings at convenience of the interviewees.

3.12 Data Measurements and Reliability

Once data is collected, it is very important to measure and test the validity and reliability of this data to provide credible research findings. In order to accomplish this, the researcher performs three different tests to check internal reliability and validity of data.

3.12.1 Internal Consistency Reliability

At first, the researcher uses the traditional criterion of Cronbach's alpha to measure internal reliability and consistency of the data sets; however, the measure is constrained in its ability to provide a precise measure of internal consistency reliability. Therefore, the researcher also uses the composite reliability measure as an alternative to provide accurate reliability results by considering indicator variables' different outer loadings (Hair Jr et al., 2014). The researcher uses IBM SPSS Statistics 19 and SmartPLS 3.0 to generate reliability outputs of Cronbach's alpha and composite reliability, respectively. In order to interpret the composite reliability statistics, the researcher follows typical Nunnally's benchmark i.e. 0.7; if the tested reliability is 0.7 and above; it means that the collected data on latent variables is consistent and acceptable (Nunnally, 1978). In addition, the benchmark of 0.7 sets the preferable value to qualify under Cronbach's alpha measurement test.

3.12.2 Convergent Validity

The researcher uses convergent validity to test indicator reliabilities; the rationale to choose convergent validity is that it helps to measure the degree to which the measures of the same construct are positively correlated with each other (Hair Jr et al., 2014). In order to perform convergent validity on the latent variables, the researcher uses Average Variance Extracted (AVE) as the validity measure. The SmartPLS 3.0 is used to perform the test of the indicators' reliabilities. If the resulting

value for a loading is 0.7 or above, it means that the observed variable's 50% variance relates to the latent variable (Nunnally et al., 1967).

3.12.3 Discriminant Validity

Discriminant validity uses empirical standards to provide a measure of testing the degree to which one construct differs from the other. In this research project, the researcher chooses two discriminant validity measures including cross loading analysis and the criterion proposed by Fornell and Larcker (1981). The rationale to apply cross loading analysis is that it helps to measure whether the cross loadings surpass the outer loadings of the indicators, which if not may create a problem of discriminant validity (Hair et al., 2011). To perform the test, the researcher uses SmartPLS 3.0. The second validity measure is logical to apply because it provides comparison of AVE's square root with the construct correlations. The researcher uses this criterion to develop a correlation matrix for the research constructs.

3.13 Data Analysis

For analysing the collected data, the researcher performs various tests to generate reliable empirical results to investigate the research intent.

3.13.1 Questionnaire for Validation Study 1

The researcher adopts a reflective measurement approach to measure the latent variables of the research framework (Hair Jr et al., 2014). The researcher uses Likert-scale to measure each identified indicator on a scale of 1-7 while nominal scale is used to measure the survey data related to descriptive and demographics. In this validation study, the researcher measures the strategic fit between the theory and the empirical data collected through the distributed questionnaires.

3.13.2 Partial Least Squares Structural Equation Modelling (PLS-SEM) Approach

The PLS-SEM approach is used to assess and hypothesize the measurement properties extracted from the questionnaire data. The rationale to apply this approach is that it helps to perform the multivariate analysis through confirmatory and exploratory modelling; thus allowing the research to maintain link between the theory and practice (Hair Jr et al., 2014). Contrary to the covariance-based approaches, the PLS-SEM enables the researcher to analyse the data collected from a complex model consisting of a large numbers of indicators (Hair Jr et al., 2014). The researcher uses this approach to analyse the research framework variables at two levels; at the first level, the approach creates structural relationships between the constructs and at the second level, it designs measurement models to identify relationships between the indicator variables and the constructs.

3.13.3 Usability Test for Validation Study 2

Being the prevalent usability evaluation method (UEM), think-aloud is used as an approach to determine the extent to which usability plays the critical role of affecting the intention of Saudi users to use m-transaction. The researcher chooses a verified sample of 30 participants to perform experiments in a typical usability lab setting for a defined time period i.e. July-September 2014. Assuming the role of the evaluator, the researcher observes individual behaviour and records individual time spent on each task with the use of a stopwatch. Later on, a questionnaire based on 5-points System usability scale (SUS) is filled in by each user to rank his/her satisfaction level.

3.13.4 Multi-Group Tests

In order to measure multi-groups, the researcher performs two different tests (Path Coefficients and Henseler) on four different groups of the whole sample size (i.e. gender, distribution methods, online Purchase experience and mobile internet access). Further discussions about the different multi-

groups tests (e.g. Henseler's test) will be presented in *Chapter 9: Quantitative Data Analysis (Validation Study [1])*, section 9.5.2. The researcher performs Path Coefficients test on these groups to decompose the correlation into different components to better interpret the effects e.g. how gender affects the users' intentions to use m-transactions. The rationale to use Path Coefficients is to develop a linear expression of the possible causal connection between the intended variables. In addition, the researcher performs Henseler's MGA Test on the dependent and exogenous variables to determine whether the difference between the Path Coefficients is significant.

3.14 Ethical Considerations

The ethical considerations in research are of extreme importance, particularly in qualitative research where human aspects are involved (Eysenbach and Till, 2011). Every piece of research conducted needs to conform to three ethical considerations that include anonymous, autonomy and confidentiality. In order to ensure that the research is conducted in an ethical manner, the researcher assured to adopt the standard ethical requirements. For instance, in accordance with Bryman and Bell (2007), earlier research papers, quotes, and theories discussed have been properly cited and referenced, the responses and data have been gathered after the due permission of the individuals, interviews have been transcribed, and they were assured that their confidentiality will be maintained and responses have been used for research and academic purpose only. Moreover, as recommended by many earlier research studies, the researcher has complied with four basic principles of ethical considerations in research, namely voluntary and informed consent, confidentiality and anonymity, objectivity and fairness, and risks and harms (Walster, 1965b; Gillespie, 1995). The major and primary ethical issue of the underlying research is voluntary and informed consent. The respondents of the present study have been fully briefed about the nature of the research and the informed consent has been sought first to provide the data for present research. The questionnaires were distributed and interviews have been done with only those individuals who have shown their willingness to provide data. In addition, they were assured that their responses and interviews will be kept confidential and anonymity has been a basic ethical concern for this research study. As most of the people do not want to show their identity in public documents, the researcher has not displayed the name of any respondents or their personal information anywhere in the research report.

Along with this, objectivity and fairness has been maintained and bias has been avoided to the maximum possible extent. The use of statistical software has facilitated the researcher to be value-neutral. The researcher has also tried his level best to gather responses from the individuals who are not vulnerable to any risk or harm. Although, the research questions of the present study are not aimed at asking personal information (which could be related to any harm to them in respect to personal esteem, any injury or disease, or personal behaviour), the researcher has put maximum efforts into ensuring that there should be no harm and risks to research participants. Finally, the research is approved by the UEA Computing Sciences Research Ethics Committee; hence, it meets the key ethical considerations that may affect reliability and credibility of the research project.

3.15 Chapter Summary

In summary, the research methodology study recognized the strength of a blended research design under a pragmatism philosophy to investigate the research problem. The researcher collected data from the secondary sources (e.g. literature review), as well as from primary sources (e.g. exploratory phase) from a total sample size of 1208 Saudi users. The researcher chose an interpretative instrument and three exploratory studies (interviews and focus groups) to gather secondary and primary data. Furthermore, the researcher conducted two validation studies to test the developed conceptual framework for generalizing the research findings within the context of Saudi Arabia. For data measurement and reliability testing, the research used three main tests including internal consistency, convergent and discriminant validity tests. The study also indicated that several tests are performed

to check the credibility and reliability of collected data sets, while IBM SPSS Statistics 19 and SmartPLS 3.0 are the key pieces of software used for empirical testing and analysis.

Chapter 4 Exploratory Study in Electronic Commerce – Interviews

4.1 Introduction

This chapter discusses the first study of the exploratory phase of this research. It is the first attempt to identify an initial scope of online/electronic purchasing within the Saudi context. The research took this study as the departure point, since as mentioned earlier in this thesis (Section 1.2), the literature review indicated that electronic purchasing (e-commerce) was the first generation of m-commerce. This chapter will introduce the study's overview and motivation, then, it will address the analysis of the data gathered from the interviews. In addition to the findings discussion, a set of recommendation for e-commerce in Saudi Arabia will be produced based on the data analysis and interpretation.

4.2 The Study Overview

The availability and continued growth of Internet technologies (IT) have created great opportunities for users all over the globe to benefit from these services and use them in a variety of different ways. The use of IT to conduct business online is known as Electronic Commerce (e-commerce). While developed countries have harnessed and adopted e-commerce, developing countries are not yet fully adapted to its adoption. The aim of this study is to investigate the main factors that play a role in the adoption of e-commerce from a consumer's perception and, hence, develop a framework that conceptualises the influential factors of e-commerce. A 'grounded theory' methodology was used to collect and analyse the data and develop the proposed categorization of factors of e-commerce. Thus, semi-structured interviews were conducted with Saudi residents to elicit their opinions about e-commerce influential factors in Saudi Arabia. The findings of the study suggest that the factors that have the most significant impact on the adoption of e-commerce in Saudi Arabia are security, fraud and hacking, trust, cyber-law, awareness and perceived usefulness, postal services, government e-readiness, resistance to change, e-commerce presences, cost, telecommunication infrastructure, tangibility, warranty, trial and experience.

4.3 The Study Problem and Motivation

The rapid diffusion and continuous development of Internet technologies have dramatically transformed many features of commerce and daily life. These Internet technologies enable consumers to search for information and purchase goods and services through direct interaction with an online store. Businesses have taken advantage of the great potential to extend their presence in the cyber-market beyond geographical boundaries and time restrictions (Park and Kim, 2003; Al-Somali et al., 2009; Ranganathan and Ganapathy, 2002). As a result, this has created a very popular concept called 'e-commerce', which has grown enormously in the last decade (Aleid et al., 2009). This astonishing growth can be seen, for example, in the online population (Wei et al., 2010) while, the United States, followed by Europe, represents the largest share with about 79% of the global e-commerce revenue, Africa and Middle East regions, on the other hand, have the smallest share with about 3% of the global e-commerce revenue (AlGhamdi et al., 2012a). Furthermore, Eid (2011) indicated in his study that Saudi Arabia e-commerce spending is 12 billion Saudi Riyal (SR) in 2010, however, at that time only 14.26% of the Saudi population were involved in e-commerce activities.

While the diffusion and utilization of e-commerce has proliferated in the developed countries, the growth of e-commerce in developing countries has fallen far below expectations (Petrazzini and Kibati, 1999; Travica, 2002; Molla and Licker, 2005a; Nir, 2007; Wei et al., 2010; Aleid et al., 2009). Studies indicate that businesses in developed countries differ from those in developing countries with respect to information technology and e-commerce (Molla and Licker, 2005b; Molla and Licker,

2005a). This difference is caused by the contextual impediments in managerial, environmental and organizational constraints. Furthermore, businesses implementing e-commerce in developing countries face substantially greater challenges than businesses in developed countries due to the unreliability of the internet connection, the poor availability of accessing it due to the poor infrastructure, the high cost of doing so, and also the low level of ICT penetration throughout the country (Molla and Licker, 2005b; Molla and Licker, 2005a). Aleid (2009) carried out an investigation of different e-commerce schemes in a number of countries with regard to culture, infrastructure and human behaviour. They found that there are a number of factors that may inhibit the diffusion of e-commerce into developing countries (e.g. infrastructure, security, e-commerce laws).

This study will focus on Saudi Arabia, which is considered to be a marketplace which is ripe for e-commerce activities in the Middle East (Eid, 2011). In their research Sait et al. (2004) also refer to the Saudi government's efforts and achievements in keeping pace with advanced technological developments and their adoption. "The effort is ongoing as the Kingdom further opens Internet access, exploring opportunities for the Internet in education, government and commerce. The Saudi government has shown increasing interest in pursuing e-commerce systems for promoting national and regional businesses, especially through the structuring of a legal framework for online transactions. Given the Kingdom's regional influence, such a move would very likely have an impact on business flow and commerce systems in the Middle East". An additional reason for selecting Saudi Arabia for this study is that "a high level of cultural and social homogeneity prevails there. Almost 100 per cent of the Saudi population, 20 million according to a 2006 statistic, speaks Arabic" (Eid, 2011). In summary, the rationale behind choosing Saudi Arabia for this study, in addition to the researcher's own interests, is for the following reasons (Eid, 2011; Sait et al., 2004):

- The Saudi market itself is growing rapidly
- The geographical location of Saudi Arabia creates great potential for exchanging commercial benefits with the expanding neighbouring markets
- The availability of liquidity of both Saudi Arabia and its neighbouring countries works in favour of investing in e-commerce-related requirements.
- This study is expected to contribute to the expansion of knowledge in the field, which will help many other developing countries

4.4 Data Analysis and Findings

Using the grounded theory umbrella, there were several stages in the process of gathering and analysing the data:

1. Conducting the interviews (taking notes and recording).
2. Transcribing the notes and recordings to electronic form. For the purpose of confidentiality and the anonymity of each participant, in the data analysis, the researcher gave the interviewees a number (i.e. 1 to 40) and these numbers are used in the study as a reference to each interviewee.
3. Sorting data collected from all interviewees per question.
4. Grouping or categorising statements per topic area.
5. Counting the frequency of each group or category

The researcher has further analysed the qualitative data by counting the number of individual who mentioned the same category (i.e. the factor) and use this statistics as quantitative data in order to enable its manipulation statistically using statistical packages such as IBM SPSS. For example, if a factor 'A' was mentioned by 4 different individuals, this means that %10 of the participants

mentioned 'A' factor (i.e. 4 out of the 40 users). After entering the converted data into the SPSS software package (version 19), correlations and cross-tabulations were generated. The results are shown in the following paragraphs. The following section outlines the analysis and study findings.

The extracted statements from the interviews were grouped into categories according to the interview questions. The 40 respondents expressed a total of 474 statements, however, the repeated statements were identified and merged. Therefore, 166 unique statements were found to be suitable for analysis and allocated to the relevant category. In cases where a respondent brought up more than one concept or issue, the statements were separated and each was put in its respective statement group. The analysis of data resulted in the creation of 17 categories containing different numbers of statements. However, categories with low number of statements such as category containing two or fewer statements, which represents less concern by the users, was discarded. This reduced the number of categories to 13. This then allows a conclusion to be drawn about the importance of the respective e-commerce features for customers. Thereafter, the researcher was able to arrange the different categories according to their importance as indicated by participants, which is shown in Table 4.1.

Table 4.1: Ranking of The Influential Factors in The Uptake of E-commerce According to Consumer Feedback.

Rank	Category	# Statements	# Users	(%)*
1	Postal Services	27	25	62.5
2	Security, Fraud and Hacking	18	17	42.5
3	Awareness & Perceived Usefulness	25	17	42.5
4	Trust	16	16	40.0
5	Cost	13	13	32.5
6	Telecommunication Infrastructures	13	12	30.0
7	Cyber-Law	10	10	25.0
8	Government E-Readiness	10	9	22.5
9	E-Commerce presence	9	9	22.5
10	Warranty	8	8	20.0
11	Trial and Experience	4	4	10.0
12	Tangibility	3	3	7.5
13	Resistance to Change	3	3	7.5
14	Religion	2	2	5.0
15	Visa Cards	2	2	5.0
16	Internet Abuse	2	2	5.0
17	IT Support Presence	1	1	2.5

The most frequent category was *postal services* with 27 answers (i.e. number of statements). This category consists of the following sub-categories: *postal services quality*, *postal services reachability*, and *postal services awareness*.

'Security, Fraud and Hacking' has 18 statements/answers, comprising some detailed statements concerning *fraud*, *hackers* and *security*.

The third category is Awareness and Perceived Usefulness with 25 answers. Awareness includes two sub-categories: general demand to increase awareness level and learning and lack of awareness or ignorance. *Perceived usefulness*: in this category the most stated statement was very *useful technique* and/ or *facilitating tool*.

The trust in e-commerce has 16 statements/answers. This category contains statements such as *e-commerce has to be trust worthy* and the lack of trust between parties can harm the spread of e-commerce.

Cost has 13 statements/answers. The statements are mainly complaints about the high cost of the internet subscription.

The quality of the Telecommunication infrastructure plays an important role in the adoption and development of e-commerce. This category contains 13 statements. The sub-categories are *Internet connection quality* and *Internet availability*.

The *cyber-law* category has 10 statements/answers, expressed as follows: the *absence of responsible organizations* and the *lack of laws and legislation*.

There are 10 statements/answers regarding the importance of the *government role.* All statements focus on the importance of the government's role in supporting, implementing, providing facilities for and adoption of e-commerce.

Nine statements focus on the category *e-commerce presence.* Statements here simply refer to the lack of online shops that sell/exchange products via the Internet and allow customers to fully interact with their website.

The *warranty* category has 8 statements/answers, all talking about the need for guarantees for purchased products.

The categories *resistance to change, tangibility* and *trial and experience are* expressed in 3, 3 and 4 statements respectively.

The categories *religion (2), visa cards (2), IT support* (1) and *internet abuse (2)* were excluded as they contain only 2 or fewer statements. The reason why the religion and visa cards were not stated as obstacles for e-commerce adoption is that nowadays there are many banks that provide visa cards in a way that complies with Sharia law. It is possible that not many people consider the availability of 'IT support' as an important factor because they assume that a high-quality 'Telecommunication infrastructure' is required before even starting to think about 'IT support'. The following Table 4.2 contains a summary of respondents' demographic data:

Table 4.2: Summary of Respondents' Demographic Data (*N=40*).

Characteristics	Freq.	Percent.	Characteristics	Freq.	Percent.
Age			**Computer Literacy**		
18-25	22	55	Advanced	10	25
26-35	8	20	Intermediate	14	35
36-45	6	15	Some Capability	11	27.5
46-55	4	10	Beginner	5	12.5
Gender			**E-commerce Use**		
Female	6	15	Yes	19	47.5
Male	34	85	No	21	52.5
Education			**Annual Income (*SAR*)***		
High School	24	60	Less 50,000	28	70
Undergraduate	5	12.5	51,000-100,000	1	2.5
Graduate	5	12.5	101,000-151,000	3	7.5
Postgraduate	6	15	151,000-200,000	7	17.5
			201,000-3000	1	2.5

Analysis of the data shows that there are more male respondents than females, with males accounting for 85%, and females, 15%; this is due to the special culturally conservative society of Saudi Arabia. This resulted in difficulty in approaching females and conducting interviews with them. 75% of the respondents are aged between 18 and 35 years. Only 27.5% of them have graduate or postgraduate certification. 47.5% of all the respondents are current users of e-commerce websites. 60% of the respondents rated themselves as having intermediate to advanced computer skills.

The following section provides an account of the study findings. It is organized as follows: for each factor, the discussion starts by highlighting the findings of other researchers followed by the findings in this research.

4.4.1 Postal Services

The findings of this study are consistent with the above-mentioned aspects, with a majority of the participants agreeing about the importance of postal services. 62.5% of the interviewees mentioned the significant role of the postal services and delivery. Interviewee 37 commented that "In Saudi there is little awareness of the importance of the postal services and this is one of the key problems …". Interviewee 26 agreed with the importance of postal services: "Yes, there should be a mail box for every house and appartment next to the door so I can buy stuff from the Internet". Interviewee 25 explained that one possible factor that can negatively affect e-commerce in Saudi is that, "the product delivery speed is very bad and it always comes late".

4.4.2 Security, Fraud and Hacking

It is widely acknowledged by both government and industrial organizations that, from a consumer point of view, issues of information security are a major obstacle in the growth of e-commerce. The perception of risk regarding Internet security has also been recognized as a concern for both experienced and inexperienced users of Internet technologies (Miyazaki and Fernandez, 2001). Furthermore, Miyazaki and Fernandez (2001) have identified the fraudulent behaviour by online retailers as a key concern for Internet users and, therefore, e-commerce users. Rose et al. (1999) identifies hackers as an obvious security threat to e-commerce. This happens because the online availability and accessibility of the stored data of many corporations gives any hacker on the Internet the chance to steal data from these corporate databases. These threats have been identified in several studies (Aleid et al., 2009; Al-Ghaith et al., 2010).

Concerning these critical issues, this study found that 42.5% of the respondents believed that these issues were crucial to the adoption and use of e-commerce in Saudi Arabia. Interviewee 20 commented that "there is a weakness in the censorship and control over e-commerce in Saudi Arabia which facilitates swindling and fraud between retailers and customers". Interviewee 23 pointed out that "some of the important things that can negatively affect e-commerce in Saudi Arabia are thefts and stealing your applications by using hacking software". Interviewee 28 was afraid of using e-commerce in Saudi Arabia because of the large amount of "…fraud and swindling…" from E-Commercial websites. As a result, the security standards and censorship activities should be maintained to a high professional level in order to aid the evolution of e-commerce.

4.4.3 Awareness and Perceived Usefulness

Within the context of the information systems (IS) domain, much research has outlined the significance of the influence of perceived usefulness on attitude towards the use of e-commerce. The real reason why customers would use e-commerce is that they find it a useful facility for conducting shopping online (Alghamdi, 2011). Furthermore, according to Sathye's (1999) research, the use of online banking services, which is a good example of e-commerce, is considered as new knowledge to many customers, and the lack of awareness of online banking is a crucial factor in preventing customers from adopting it. In his study of 500 Australian customers, he concluded that customers

were not aware of the potential benefits of online banking. This was supported by another study by Howcroft et al., (2002) in which they found that the issue of lack of awareness and knowledge of online banking services and their potential benefits are a sufficient cause for consumers' reluctance to use these services. Moreover, another study that surveyed 981 internet users in the U.S. found that there was usually a positive perception of using the web to purchase products, which will therefore result in the growth of online shopping (Li et al., 1999).

This has been confirmed by 42.5% of the respondents in this study. Interviewee 8 commented, "The Saudi citizens are still not aware of the importance of e-commerce and believe it is hard to use and can't be implemented…" Interviewee 31 explained the reason for e-commerce not being used widely is that "In Saudi society, there is insufficient awareness and understanding of e-commerce services…" and he further explained the usefulness of these services: "I believe implementing e-commerce in Saudi Arabia will contribute to serving consumers and facilitating or making it easy for them However, it is not implemented in the proper way and is facing problems…". Interviewee 24 agreed with this argument: "e-commerce is a very useful endeavour, which serves as an excellent tool for buying and selling".

4.4.4 Trust

"The absence of trust is identified as the main issue obstructing the development of EC" (Alshehri and Meziane, 2013). It is extremely difficult to construct trust in B2C e-commerce and this is because there are a high number of threats on the Internet (Ba and Pavlou, 2002). Trust is a complicated concept and has a multitude of sides to be addressed. There are a number of researchers who have continually approached the 'trust' issue from a technical side such as Internet and network security and even web interface design (Fernandes, 2001; Clifford et al., 1998; Pittayachawan, 2008). Nonetheless, according to Klang (2001) and Ratnasingham and Kumar (2000), considering just the technical perceptions will not guarantee trust in e-commerce.

However, this study considers the user's perception of trust. It found that 40% of the respondents believed these issues to be crucial aspects in the adoption of e-commerce in Saudi Arabia. Interviewee 31 commented "… people or clients don't trust e-commerce services and they prefer to go physically to buy goods …". Interviewee 2 said "… because the Saudi environment wasn't accustomed to these kinds of services, they can't trust them and there is no trust between dealers…". Interviewee 21 commented "…e-commerce is not used because money can be stolen and there is a lack of trust of commercial electronic websites".

4.4.5 Cost

It has been suggested that in order to facilitate the growth of e-commerce in developing countries a serious policy intervention is needed to reduce the cost of a number of essential charges, including Internet connection and subscription services and website-hosting with sufficient bandwidth (Andam, 2003). A recent study conducted by Lawrence and Tar (2010) emphasizes the effects created by the high cost of Internet access. They claim that internet access costs have prevented many users from using the Internet in developing countries and, as a result, slowed the development of e-commerce. In addition, putting in place the essential infrastructure and creating a legislative framework and a competitive environment and that support for affordable Internet access should be the preoccupation for most developing countries. Astonishingly, they state that the monthly subscription for an Internet connection far exceeds the average monthly income of a large portion of the population in many developing countries (Lawrence and Tar, 2010). They suggest that, to encourage more e-commerce amongst users, companies should provide a wide range of options for Internet connections and communication services at competitive prices so that users can choose from a range of different services to match their needs and expectations. Additionally, a high internet speed enhances the overall online experience for both businesses and individuals, motivating them to

browse more applications and to stay online for longer. Thus countries with lower access costs usually have a larger number of Internet users so that e-commerce has improved rapidly in these countries. Therefore, the cost of Internet access is a key determinant in the use of e-commerce (Lawrence and Tar, 2010).

A number of this study's respondents (i.e. 13) highlighted the concept of price and its effects on the customers' decision to use e-commerce. Interviewee 2 commented that to encourage the use of e-commerce in Saudi Arabia, companies should offer facilities and discount prices to people in order to tempt them away from the traditional marketplace. On the other hand, one of the barriers to adopting e-commerce in Saudi Arabia is, as Interviewee 15 commented, "the problem is the prohibitively high prices of Internet subscriptions offered by Internet Services Providers (ISP)".

4.4.6 Telecommunication Infrastructure

The Telecommunication infrastructure is considered to be a crucial element in the success of e-commerce. With regard to developing countries, several studies have highlighted the major influence that the quality of the infrastructure has as a determinant of e-commerce adoption (Molla and Licker, 2005a; Aleid et al., 2009; Al-Somali et al., 2009). Al-Ghaith et al. (2010) conducted a survey about the adoption of online services and e-commerce in Saudi Arabia and conducted an in-depth analysis of the 651 responses they received. They strongly recommend that the Saudi government should pay more attention to infrastructure and improve its quality in order to enhance the electronic services and e-commerce use and adoption amongst Saudi consumers.

This study found that 30% of the respondents emphasised the enormous importance of infrastructure. Interviewee 8 commented "There is no good infrastructure for many areas, especially the suburban areas and there is low availability for the essential technologies to for the e-commerce …". Interviewee 37 commented "There is no Internet connection in some villages"; also Interviewee 20 said that "the Internet should be available more broadly with more attention paid to it by government. Even if it is weak it should still be available". Therefore, the telecommunication and its infrastructure are considered very important factors of e-commerce and need be given more attention.

4.4.7 Cyber-Law

There is no doubt that clear legislation is a basic need for any commercial transaction systems to ensure that all parties involved in that system will act just amongst each other and their rights are protected, and misusing or losing those legislations will usually lead this system to be unsuccessful (AlGhamdi et al., 2011). Furthermore, it has been highlighted that with regards to the penetration of e-commerce within developing countries, laws, regulations and the excellence of telecommunications certainly have an effect on the degree of development of e-commerce activities within those countries (Travica, 2002). Thus lack of customer protection laws and legislation are considered as obstacles to the proliferation of e-commerce (Plant, 2000). Andam (2003) has highlighted that in order for an e-commerce transaction to be successful, government has to develop and maintain an official legal framework for e-transaction regulations and laws that can handle different types of electronic documents, and authorize a number of organizations to ensure the application of those regulations and laws to protect the rights and to prevent the fraud between all parties (consumers and businesses). Regulating e-commerce's different activities by special organizations is an essential element, however, currently there is a lack of those organizations in developing countries (Molla and Licker, 2005a).

The findings of this study correspond to the findings mentioned above. This study found that 25% of respondents confirmed the importance of cyber-law in e-commerce. Interviewee 33 commented that in order to adopt e-commerce in Saudi Arabia we need "Laws to apply and to be followed by the e-commerce company". On the other hand, Interviewee 31 explained the lack of using e-commerce in Saudi as "there are no specific organizations or institutes to protect the consumer's rights and to

enforce control and censorship over this type of business". Interviewee 13 said "there is no well-known company or government effort to penalize a dishonest company".

4.4.8 Government E-Readiness

In AlGhamdi et al. (2011), the authors refer to the government's role in Saudi Arabia as an important one. It facilitates the essential requirements for the development of e-commerce such as providing robust secure online payment options, ensuring a solid ICT infrastructure, providing educational programmes and building up awareness using different means such as media and education institutions. The results of their study show the significance of government promotion and support as a crucial factor (AlGhamdi et al., 2011). Furthermore, Molla and Licker (2005a) state that "The government demonstrates strong commitment to promoting e-commerce ". Government and industry's promotions are considered as a major enabler for e-commerce. This promotion takes different forms in different countries, the most frequent areas being the sponsorship of Information Technologies (IT) and e-commerce in businesses (e.g. Small and Medium Enterprises SMEs) by supporting them with technology, training and funding (Gibbs et al., 2002). For example, the government in Mexico is enabling e-commerce by promoting the IT industry and providing technical assistance to SMEs, and in Taiwan, by investment in up-to-date network-based business models (Gibbs et al., 2002). Regarding Saudi Arabia, Eid (2011) claimed in his study that the Saudi Government's support was recognized as an important element in the development and growth of local e-commerce (Eid, 2011).

According to this study, Saudi citizens believe in the importance of the government's role. Interviewee 8 commented on the diffusion of e-commerce "by government and private accreditation in providing the basic facilities such as a house address for every citizen, to be used online for accurate delivery of products and documents and special services.". Interviewee 3 believes that "the main reason for the delayed development of e-commerce is the lack of a role played by the government in making people aware of the benefits of e-commerce".

4.4.9 E-Commercial Presence

With reference to Saudi Arabia, in their research paper, Aleid et al. (2009) add that this country has not reached a sophisticated level of e-commerce. They point out that as the country still has only a very small number of electronic companies and shops, consumers are facing the problem of a lack of diversity and maturity in electronic business competition.

This has also been confirmed by the findings in this study. 22.5% of the respondents agreed with the above points. Interviewee 26 commented on why e-commerce is not widely used in Saudi Arabia "… it is a must that e-commerce should be used properly and that all companies and organizations should set up commercial electronic websites for buying goods via the Internet". Interviewee 12 said, "In order to make e-commerce work properly companies should put their visions, facilities and services online". Interviewee 7 commented that "the local electronic market is very weak and there is no real electronic commerce taking place in the country at the moment…".

4.4.10 Warranty

Product warranties have gained the interest of researchers from several different disciplines and the literature on warranties is substantial. A study conducted by Murthy and Djamaludin (2002) reviewed the literature that has been published in the last ten years. From an overall business perspective, this study emphasizes issues that interest manufacturers with regard to introducing new products. They stated that the warranty is a significant element for marketing new products and a better warranty usually refers to higher quality products and enables consumers to have greater faith in them. Providing a warranty usually adds additional cost to the product for the manufacturer. This cost, however, usually depends on the product's reliability and warranty terms. Product reliability is also

affected by decisions taken in the design and manufacturing stages of the products; thus, a warranty is deemed to be very significant in the context of new products (Murthy and Djamaludin, 2002).

Another study by Christozov and Mateev (2003) investigated the concept of 'warranty' as a factor for e-commerce success. They conducted an experiment on about 60 freshmen and sophomore students. They classified the factors that affect the success of e-commerce transactions into two categories. The first category is the environment in which the transaction takes place between buyer and seller (be it an 'IT', 'logistic', 'financial' or other infrastructure', or 'government regulations'). The second category concerns the nature of the transaction (i.e. the understanding between buyer and seller) which can enhance the trust between both parties (and particularly the buyer's trust). One important element of this understanding is the warranty statement, which plays a vital role as a risk-reducing strategy for both buyer and seller, as it is designed to covers both parties:

- Seller: Malfunctioning (e.g. the product is not operating as expected by the seller).
- Buyer: Misinforming (the product is not operating as expected by the buyer).

Their results show that the problem of misinformation is significant for every kind of business transaction, but they are especially critical for transactions performed via the Internet.

The warranty concept was given a good deal of attention by the interviewees in this study. 20% of the participants agreed on the importance of a warranty in the conduction of any e-commerce activity. Interviewee 36 commented, "The electronic website should be guaranteed and certified by the Ministry of Commerce and there should be a warranty to compensate for damaged products". Interviewee 34 also confirmed the importance of this issue: "The warranty is very important as insurance for damaged or lost products".

4.4.11 Trial and Experience

Chung and Lee (Chung and Lee, 2003) conducted research into the factors that influence repurchasing intentions via the Internet. In their study, participants all had experience of using the internet but not necessarily of purchasing services or products online. They studied 15 factors relating to overall consumer satisfaction and repurchasing intentions. The results show that the consumers who have had prior experience of buying online are more likely to buy goods online again.

Another study by Jarvenpaa and Todd (1997) was concerned with why consumers would purchase via the Internet. One of the main factors that they surveyed Internet users about, was their shopping experiences. They studied the correlation between the shopping experience and the intention to purchase online. Their findings show that there is a strong correlation between the shopping experience and the intention of purchasing online.

Research conducted by Monsuwé et al. (2004) aimed to increase researchers' understanding of consumer attitudes to online shopping and their intentions towards shopping on the Internet. Their framework was based on an extended version of the Technology Acceptance Model (TAM). They stated clearly that consumers' Internet shopping history influenced their intention to shop online. They confirmed their claim by pointing out that several earlier research results agreed that an Internet shopping experience has a direct effect on Internet shopping intention. In addition, their review highlighted the fact that attitudes and intentions for shopping online are not only influenced by 'ease of use', 'usefulness' and 'enjoyment', but also by external factors like 'consumer traits', 'situational factors', 'product characteristics', 'previous online shopping experiences', and 'trust in online shopping'. Furthermore, they proposed that any individual's reaction or response to any judgmental task is based on three facets: (1) the accumulated past experiences of that individual; (2) the background or context; and (3) the incentive (Monsuwé et al., 2004).

The prior experience of a customer was given attention by this study's interviewees. About 10% of the respondents mentioned the importance of having a past experience in order to adopt e-commerce in Saudi Arabia. Interviewee 39 commented about the lack of experience "…because of the shortage of commercial electronic websites Saudi citizens do not have any past experience of using them, I think if they are being used more widely it will support their implementation…". Interviewee 40 commented about the obstacles that can prevent the implementation of e-commerce in Saudi Arabia: "I have no prior successful experience in using e-commerce in Saudi".

4.4.12 Tangibility

The previous research has discussed the product characteristics and types and their impacts on consumers' decisions or intentions to use online shopping. Alshehri and Meziane (2013) have stated that the lack of not being able to view the goods in person could affect the Saudi user decision to purchase online. A study by Chung and Lee (2003) conducted an online survey to study the effects of 15 variables: *'product price', 'product quality', 'product variety', 'responsiveness', 'assurance', 'reliability', 'empathy', 'tangibility', 'perceived ease of use', 'site image', 'promotion', 'consumer risk', 'innovativeness', 'social interaction orientation' and 'preference of credit card use',* to test overall consumer satisfaction with internet shopping and the intention to repurchase online. There were 700 responses from Internet users out of 5,200 distributed questionnaires. The researchers aimed to bring to light the correlation between these variables and customer loyalty, this being deemed vital to the success of online shopping. Their results also show that the tangibility of products is found to be statistically significant, having, as it does, a positive effect on the level of overall consumer satisfaction (Chung and Lee, 2003).

Another study highlighted the fact that online stores attract customers of a specific orientation. Online shopping is preferred over in-store shopping by a number of Internet users owing to its time-saving and convenience. Nevertheless, this study found that an overwhelming 69% of surveyed Internet users agreed that shopping at stores allows them to see, touch, feel and try the products prior to buying them. These findings indicate that consumers who are convenience-orientated are more likely to buy online, while those who are experience-orientated are less likely to shop online (Li et al., 1999).

The research of Li et al. (1999) is consistent with the findings of this study. 7.5% of our respondents are concerned about the concept 'tangibility'. Interviewee 5 commented about how people differentiate and perceive product characteristics as "clients prefer to handle the item and recognize its specifications. With regard to clothes, people need to gain knowledge about the texture and quality of the fabric, the size and the actual colour". This has been confirmed by interviewees 40 and 39.

4.4.13 Resistance to Change

According to the literature, several studies have paid attention to customers' 'resistance to change' from traditional methods of conducting normal banking activities to electronic or online banking. Customers may not be willing to change from traditional ways of conducting banking activities to online banking unless there are some incentives to do so (Al-Somali et al., 2009). In a study of 25 organisations, the findings show that there is a noteworthy level of customer inertia to changing their traditional banking activities to online banking (Daniel, 1999). There are a range of potential barriers to small and medium-sized enterprises (SMEs) performing business on the Internet. Technical factors such as access to broadband (ADSL or ISDN) and the lack of suitable electronic business software could provide difficulties to some firms. However, Drew (2003) considers the resistance to change as an organizational barrier.

Ndou (2004) considers the employee's resistance to change as the biggest barrier to a successful transition. Generally employees fear change and ICT applications in particular, because they believe that ICT might replace them and thus cause job losses. In addition, it is usually very hard, in a short

period of time, to stop using traditional methods of processing and to start learning new ones. To successfully address resistance, it is necessary to make sure that there is a stimulus for employees to be trained, and that there are well-organized plans that encompass employee participation all the way through every stage of the process. This issue have been raised in this study. Interviewee 8 commented "… there is no acceptance among some employees to change the current processes" and interviewees 40 and 39 agrees on this opinion.

4.5 Discussion of Findings

The aim of this exploratory study was to identify the factors that encourage customers to adopt e-commerce in Saudi Arabia, which can be useful for e-commerce policy makers, government and industry in general, and e-commerce end-users in particular. The main strengths of this study are the derivation of its factors**,** which have supported those from different conceptual and empirical research projects in different countries. The applied measures used in this study were developed through an extensive study of literature reviews and grounded theory methodology. The importance of the factors in the success of e-commerce, according to consumer feedback, are shown in Figure 4.1.

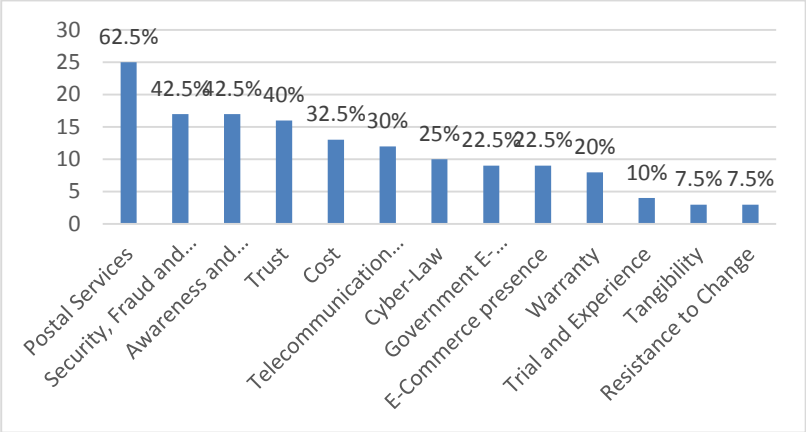

Figure 4.1: The Most Important Factors in The Success of E-commerce From Consumer's Feedback.

The findings of this study can be divided into three main categories that play a significant role, from a consumer perspective, in the adoption of e-commerce: (1) System-related, which comprise three factors, (2) user-related which contains three factors, and (3) organizatioinal-related which contains seven factors as listed in Figure 4.2, some of which need more improvement and expansion, supported by current technologies, and some of which need to be encouraged and widely applied using the best and most advanced technologies. What is required are reliable internet connections, good infrastructure; the understanding and implementation of cyber-law; efficient transportation for the delivery of products; trustworthy security systems; fair and effective warranty agreements; the perception of trust, and the promotion of it; comprehensive awareness and training programmes; and e-readiness and support from government. Others that need to be either managed, limited or prevented by: finding alternative ways of offering customers a trial or the equivalent of a tangible experience of the product; introducing competitive and affordable charges; promoting the potential benefits of e-commerce to eliminate the impact of resistance to change; and installing high quality security systems using strong encryption algorithms to prevent hacking and fraud.

After analysing the collected data, the researcher was able to construct a classification of categories of e-commerce influential factors that need to be considered by e-commerce policy makers, government, industry and, the end user (see Figure 4.2).

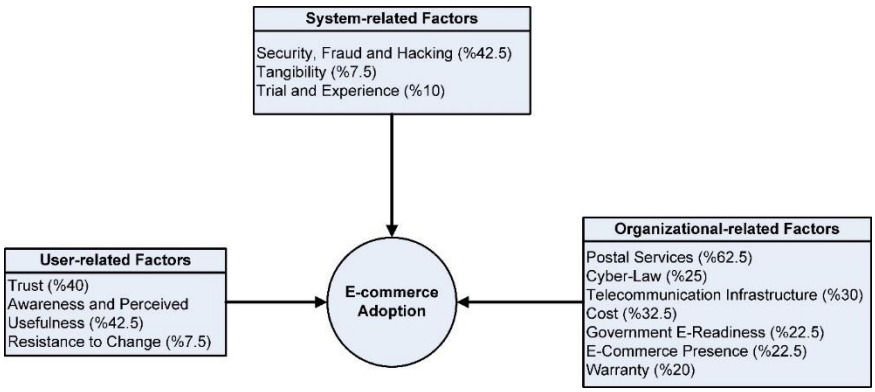

Figure 4.2: Categorization of Influential Factors of e-commerce in Saudi Arabia.

These factors and their categories agreed with the previous findings of studies that have been mentioned throughout this study. This indicates that e-commerce adoption is facing similar factors in other countries. Therefore, countries worldwide need to pay attention to all these factors, to look into the weak links in their infrastructure and transform them into positive ones in the quest for e-commerce expansion.

4.6 Recommendations

With regard to the *e-commerce developers and designers*, it is strongly recommended that they develop more user-friendly websites that can be easily used by those who lack Internet expertise and, since almost all Saudis speak Arabic, these websites should also have bi-lingual interfaces (Arabic and English) to insure that the website is understandable to those who have difficulty in dealing with the English language. It is recommended that the focus is on simplicity and appropriateness of the information as well as meeting the concerns on its accuracy, usefulness, and the suitability of fonts, colours, graphics and animation. Furthermore, companies may consider providing alternative solutions to compensate for the lack of tangibility of an electronic product. For example, providing user testimonies and feedback about their experience. This also applies to the lack of trial and experience of an e-service.

The analysis of the study's interview responses highlights different aspects that need careful attention by the relevant organization, government sector and stakeholder (e.g. telecom companies). For example, the importance of conducting intensive programmes to raise the awareness of the benefits of e-commerce in Saudi Arabian society. By making the Saudi user well-aware of the different potentials and usefulness of using e-commerce in Saudi Arabia, this could help to increase their perception of trust on these e-services. Usually the highest rate of adoption is achieved amongst those who recognize that e-commerce is able to meet their needs. Therefore, increasing awareness of e-commerce and its benefits is vital for increasing its rate of proliferation. Furthermore, being aware of the potential benefits could help to reduce the Saudi user's resistance to change. Consequently, it is highly recommended that the Saudi government pay serious attention to how to build up the awareness of e-commerce and the advantages of its use amongst Saudi citizens. This can be achieved by setting up campaigns on how to use it and, prior to that, widely promoting the Internet and its services. Another possible way of raising awareness is by using the media, such as television (TV) programmes, competitions and advertisements, educational and awareness campaigns, the distribution of brochures in shops and other public places, the daily newspapers and the TV news channels.

Alongside the above-mentioned methods, infrastructure plays a crucial role in the advancement and proliferation of e-commerce. The Saudi government should, therefore, do their best to accomplish new and high quality infrastructure standards at a national level. In addition, the existing postal system should be improved in such a way that each building should have a standardized, simple but

unique address. This will enable fast and efficient delivery of products and services to the identifiable shipping address. Subsequently, the citizens need to be made aware of these developments by the means mentioned above. Furthermore, the government should improve the Internet quality by increasing the investment in ICT infrastructure. Moreover, the government and the communications and information technology commission (the ICT regulatory body), should work hand in hand to issue more licenses for public communications network operators and ICT service providers. This would generate a competitive business environment which in turn should enhance quality and reduce the costs of e-commerce and Internet services. It will also help to provide affordable, high quality internet access at high speed which in turn would increase e-commerce adoption. Cyber-law and regulations in Saudi Arabia are major concerns of organizations, firms and consumers. They play an important role right from the beginning of any online transaction through to the aftersales-services and warranty of the online product or services purchased. The government need to make sure that these laws do not offend people from any walk of life; in particular it should comply with Shariah laws, as Islam is the religion practised in Saudi Arabia.

4.7 Summary

Under the guidance of grounded theory and through analysing and synthesising the gathered data, a classification of categories of e-commerce influential factors in Saudi Arabia was constructed. This study highlights the most important factors that need to be considered in order to support the spread and advancement of e-commerce in developing countries. Countries need to encourage and improve the e-commerce enablers as shown in Figure 5.1. Failure to do so could convert the enablers into disablers and vice versa. Therefore, this study represents a showcase for different factors preventing the proliferation and advancement of e-commerce in developing countries that are similar to Saudi Arabia. Furthermore, it highlights the driving factors that enable the progress and proliferation of e-commerce. The critical factors can be grouped as follows: 1) Telecom and IT infrastructure; 2) IT skills/literacy awareness); 3) the perception of usefulness and ease of use, and 4) transportation and postal services. The availability of these factors and their sub-factors will streamline the success of e-commerce in any country. These factors are interrelated; hence, achieving total success will normally take some time, even in countries that are willing to pay whatever it takes.

This research sheds light on the potential factors that may play a significant role in supporting the proliferation and advancement of electronic purchase (e-commerce) in Saudi Arabia. The outcomes of this study contributes to the market stakeholders' understanding of their potential customers' needs and concerns. Exploring the market, especially at this time while e-commerce is still in its development stage in the Middle East, is critical for industry stakeholders in order to ensure the success of this emerging market. The researcher recommend a number of practical suggestions in order to increase e-commerce adoption in Saudi Arabia. The efficiency of postal services were found to be the factor most affecting e-commerce adoption in Saudi Arabia.

The findings of this study helped the researcher to gain an understanding of the users' concerns with regards to electronic purchase (e-commerce) in Saudi Arabia. Yet, a more focused study on m-transaction is needed to narrow the scope with regards to m-transaction in Saudi Arabia. The next chapter answers this need by conducting a further study that focus on m-transaction with a larger sample size (*Chapter 5: Exploratory Study in Mobile Transaction – Interview*).

Chapter 5 Exploratory Study in Mobile Transaction – Interviews

5.1 Introduction

The previous chapter introduced the first study of the exploratory phase and highlighted its importance in order to place a first insight in understanding e-commerce in Saudi users' behaviour. In addition, it emphasized its findings factors and how they could help in building the knowledge in understanding the Saudi users' acceptance towards E-commerce. However, another study has to be conducted within the context of m-transaction, to give more focus on the research topic, and to provide more details about Saudi users' acceptance with regards to m-transaction. Furthermore, this study would need to be backed up (supported) with a solid theoretical background such as the well-known TAM or one of its versions. This chapter answers this need and provide in-depth details about the second study of the exploratory phase.

5.2 The Study Overview

Both the recent advances in mobile technologies and the high penetration rate of mobile communication services have had a profound impact on our daily lives, and are beginning to offer interesting and advantageous new services. In particular, the mobile transaction (m-transaction) system has emerged, enabling users to pay for physical and digital goods and services using their mobile devices whenever they want and wherever they are. It is anticipated that M-transaction will enjoy a bright future. However, apparently there is still a lack of acceptance of mobile transaction amongst users (Bamasak, 2011). This study empirically investigates what are the factors that make mobile subscribers reluctant, and which are the factors that make them keen to accept m-transaction within the context of Saudi Arabia. This study applies a modified model of the Unified Theory of Acceptance and use of Technology (UTAUT), a robust well-known model, as an approach to collect and analyse the data and, therefore, to develop a categorization of the important factors that play a role in accepting and using M-transaction in the studied country. Following a qualitative method, semi-structured interviews were conducted with Saudi residents to elicit their opinions and concerns about using m-transaction in Saudi Arabia. The findings of this study show that the factors that have the most significant influence on the acceptance and use of m-transaction in Saudi Arabia are: ease of use, navigational structure and availability, usefulness, telecommunications infrastructure, security, hacking and fraud, trust, payment gateway, awareness, cost, privacy, cyber-law, the postal services, government e-readiness, and Arabic language support.

5.3 The Study Problem and Motivation

While developed countries have harnessed and adopted electronic payments (electronic commerce), developing countries are not yet fully adapted to its adoption (Alqahtani et al., 2012). Considering users' opinion and reviews is crucial in developing any IT innovation (Liu et al., 2013a) as their needs, expectations and satisfaction should be met (Arastehfar et al., 2014). The importance of this study is accentuated by the fact that mobile commerce and its services are still in their infancy (Wei et al., 2011); that there is little research addressing the acceptance of m-transactions from the user's perspective (Alqahtani et al., 2014b; Huang et al., 2007; Dai and Palvia, 2009; Schierz et al., 2010; Dahlberg et al., 2008; Wei et al., 2011); that there has been even less investigation of this issue in Saudi Arabia (Bamasak, 2011); and the identification of factors that influence m-transaction adoption has significant value because m-transaction is likely to have a strong influence on business activities and consumer behaviour, as well as national and global markets (Dai and Palvia, 2009; Kim et al., 2010; Au and Kauffman, 2008). There is still an apparent lack of acceptance of m-transaction services amongst consumers (Schierz et al., 2010); and the success of m-transaction systems in Saudi

Arabia depends on its strong acceptance by mobile users and the interest to invest from both the public and private stakeholders of the mobile technology (Bamasak, 2011).

In light of the current state of the existing research on m-transaction, the objective of this study is to empirically assess the determinants of the intention to use m-transaction within Saudi Arabia.

5.4 The Study Theoretical Background

As mentioned before (Chapter 2, section 2.11) a large number of studies have highlighted the powerful capability, appropriately and usefulness of TAM to explain technology usage and implemented it to measure the acceptance/intention-to-use behaviour of information technology from different perspectives. As the issue being addressed by this study is relative to the acceptance and adoption of a new technology/innovation the author rooted the model and methods to a modified Unified Theory of Acceptance and Use of Technology (UTAUT) (Figure 5.1) which is an extension to TAM and TAM2.

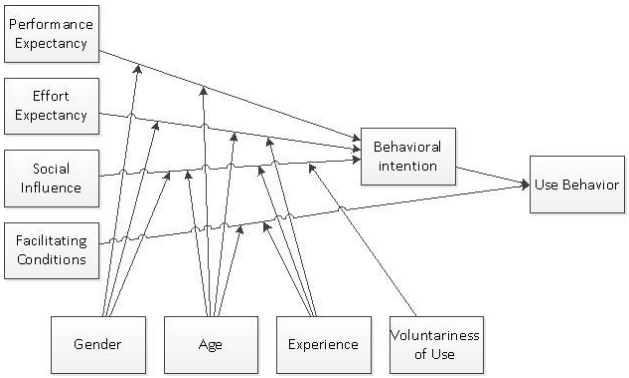

Figure 5.1: Unified Theory of Acceptance and Use of Technology (UTAUT).
Source: (Venkatesh et al., 2003a)

In the current study, the researcher adopted the model outlined in Figure 5.1; which was derived from UTAUT. As the researcher in this study examined the factors that promoted the intention to use mobile transaction on a voluntary basis, the use behaviour was discarded and the voluntary use was eliminated as a moderating construct (Al-Gahtani et al., 2007). Furthermore, the other moderating control factors such as: gender, age and experience were not considered in this stage, because they will be considered in a further study (Chapter 9: Quantitative Data Analysis).

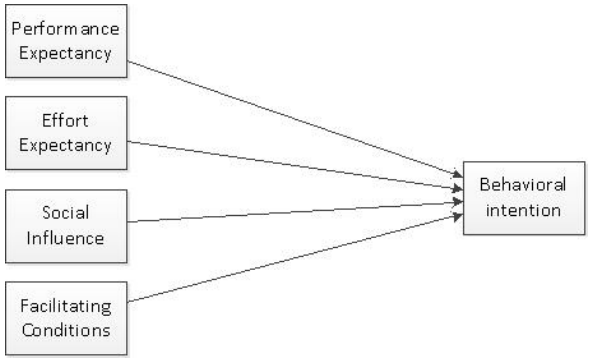

Figure 5.2: The Study Model.

As this study is to investigate and to identify the key factors with regards to the intention to use mobile transaction, the interview asked open questions to get as much information as possible from the respondents. The semi-structured interview instrument was developed in which all questions were based upon the study model (Figure 5.2), a model which was an adapted version of UTAUT. These questions and the constructs derived from the study model are shown in Appendix B. The research aims to elicit the consumers' perspective i.e. what people in Saudi Arabia think and believe about

adopting and using m-transaction. This information was gathered by asking general questions and recording notes and comments about the important ideas and concepts.

5.5 Data Analysis and Findings

After the data was collected it was analysed and segregated. Analysis of the data shows that there are more male respondents than females, with males accounting for 62.3%, and females, 37.7%; this, as mentioned in the previous study is due to the special culturally conservative society of Saudi Arabia. This resulted in difficulty in approaching females and conducting interviews with them.

Table 5.1: Summary of Respondents' Demographic Data.

Characteristics	Freq.	Percent.
Age		
20 or less	22	18
20 - 34	64	52.5
35 - 49	31	25.4
50 - 64	5	4.1
Education Level		
High School	27	22.1
Bachelor	79	64.8
Master	13	10.7
Post Graduate	3	2.5
Annual Income		
50,000 or less	60	49.2
50,000 - 100,000	29	23.8
100,000 - 150,000	19	15.6
150,000 - 200,000	2	1.6
200,000 - 250,000	3	2.5
300,000 or more	9	7.4

Characteristics	Freq.	Percent.
Computer Skill Level		
Beginner	4	3.3
Average	60	49.2
Advanced	58	47.5
Mobile Internet access enabled		
Yes	119	97.5
No	3	2.5
Gender		
Male	76	62.3
Female	46	37.7
Total	**122**	**100**

Similarly to the previous study, the grounded theory was applied in analysing the qualitative data: by (1) conducting the interviews (taking notes and recording); (2) transcribing the notes and recordings to electronic form. For the purpose of confidentiality and the anonymity of each participant, in the data analysis, the researcher gave the interviewees a number (i.e. 1 to 122) and these numbers are used in the study as a reference to each interviewee; (3) sorting data collected from all interviewees per question; (4) grouping or categorising statements per topic area; and finally (5) counting the frequency of each group or category.

The researcher has further analysed the qualitative data by counting the number of individuals who mentioned the same category (i.e. the factor) and using this statistics as a quantitative data in order to enable its manipulation statistically using statistical packages such as IBM SPSS. For example, if a factor 'A' is mentioned by 10 different individuals, this means that 8.2% of the participants mentioned 'A' factor (i.e. 8.2% out of the 122 users). After entering the converted data into the SPSS software package (version 19), correlations and cross-tabulations were generated. The results are shown in the following paragraphs. The following section outlines the analysis and study findings.

The extracted statements from the interviews were grouped into categories according to the interview questions. The 122 respondents expressed a total of 810 statements, however, the repeated statements were identified and merged. Therefore, 512 unique statements were found to be suitable for analysis and allocated to the relevant category. In cases where a respondent brought up more than one concept

or issue, the statements were separated and each was put in its respective statement group. The analysis of data resulted in the creation of 25 categories containing different numbers of statements. However, any category containing ten or fewer statements was discarded as this show that only very few people were concerned about the relevant category. This reduced the number of categories to 13. This then allows a conclusion to be drawn about the importance of the respective m-transaction features for customers. Thereafter, the researcher was able to arrange the different categories according to their importance as indicated by participants, which is as in Table 5.2:

Table 5.2: Ranking of The Influential Factors in The Uptake of m-transaction According to Consumer Feedback.

No	Category	# Statement	# Users	(%)
1	Usability	73	60	49.2
2	Telecommunication Infrastructure	54	54	44.3
3	Awareness	44	45	36.9
4	Perceived Usefulness	44	44	36.1
5	Security, Hacking and Fraud	55	41	33.6
6	Trust	40	40	32.8
7	Cost	37	37	30.3
8	Cyber Law	25	25	20.5
9	Payment Gateway	25	23	18.9
10	Postal Services	19	18	14.8
11	Privacy	12	11	9.0
12	Government E-readiness	11	11	9.0
13	Arabic Language support	12	11	9.0
14	Warranty	10	10	8.2
15	E-Commerce Presence	10	9	7.4
16	Provide Information/Rich	9	9	7.4
17	Reputation and feedback	7	7	5.7
18	Internet Abuse	6	6	4.9
19	Multi Options & products	5	5	4.1
20	Trialability/ Experiences	3	3	2.5
21	IT Support	3	3	2.5
22	After Sale Services	3	3	2.5
23	Break family social Activities	2	2	1.6
24	Resistance to Change	2	2	1.6
25	Health effects	1	1	0.8

Usability was the most important factor mentioned by the respondents and was the most frequent category with 73 answers (i.e. number of statements). This category consists of the following sub-categories: *ease of use*, *navigational structure*, and *availability*. This was followed by *'Telecommunication Infrastructure'* which has been mentioned in 54 statements/answers. The third category is '*Awareness*' and the fourth category is '*Perceived usefulness*' with 44 answers for each category. The security, hacking and fraud category has 55 statements/answers. Then trust (40), cost (37), cyber law (25), payment gateway (25), postal services (19), privacy (12), government e-readiness (11), and finally Arabic language support (12).

The categories *warranty (10)*, *e-commerce presence (10)*, *provide rich-information* (9), reputation (7), internet abuse (6), multi options (5), trialability (3), IT support (3), after sale services (3), break family social (2), resistance to change (2) and health effects (1) were excluded as they contain only 10 or fewer statements. It would be ideally to cover all extracted factors in this study, however, due to logistics and time restrictions the researcher decided to consider factors with >10% and this will help to focus on the most important factors to Saudi users (i.e. the top 13 factors). Omitting the other

factors could be considered as a limitation of this study and future work by other researcher could consider these factors in their research.

5.5.1 Usability

Usability is a term which usually refers to the ease of use and the ability to use the technology comfortably at any time. Usability, based on the results, is the most influential factor, playing a significant role in the intention to use m-transaction. It should be noted that the usability complies with the postulates of the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) in the construct 'ease of use'. Therefore, usability plays a significant role in terms of the decision of using m-transaction.

Perceived Ease of Use: It has been theoretically claimed by a number of well-known theories (e.g. TAM) and several researchers Davis et al. (1989) and Venkatesh and Davis (2000) who have implemented and empirically tested these theories that the more an individual believes that using a particular innovation (e.g. m-transaction) is free of physical and mental effort, the more they will adopt and use that technology innovation. As mentioned above, 'ease of use' has been found, in this study, to be the most influential factor in the uptake of m-transaction in Saudi Arabia.

A majority of interviewees agreed with this point and emphasised the importance of ease of conducting a transaction via mobile devices. Interviewee 9 said: "I consider the ease of use as being one of the most important factors that prompts me to conduct transactions via mobile, and especially the interface design of the website should be easy to use, read and understand". Interviewee 10 added: "The design of the user interface should not be complicated or having too many links. Also the fonts should be large enough so as not to strain the reader's eyes. The sequence of the processes of the transaction should be easy, clear and straightforward so that users don't get lost while conducting the transactions". Interviewee 18, interestingly, commented that "sometimes when I browse the internet I open a website that looks, to me, very hard to understand: how this website works, and how I can get what I need from it. Sometimes it even has important information for me but because of its 'user-unfriendliness I close the site and start looking somewhere else. What I want to say is that simplicity and freedom from difficulty are very important for me when browsing websites, and especially when conducting financial transactions".

Navigational Structure: This concern can be discussed as one of the ingredients of usability. In this study, the users were concerned about how easy it was to access and navigate through a website in the environment of a mobile device (*navigational structure)*. Website/application navigational structure is considered to be one of the major factors in the measurement of website usability and can significantly influence the evaluation of that website. In this regard, navigational structure refers to the ability to open a website on a mobile device platform in a way that: the website and all its functions are fully operational, fully interactive (if applicable), and fully readable and understandable.

Interviewee 6 stated: "A serious problem is that there are some errors or bugs in the links/URLs or sometimes they do not open at all when you try to open them through a mobile phone, and I believe this is because these websites are not supported or compatible with a mobile phone browser. This becomes a very serious problem when paying money because these incompatibility issues may lead to a big loss of money and no one can understand where the money went or how to retract the processes that have been done". Interviewee 22 agreed with this and added: "I recommend that all commercial and organizational websites design a special version for mobile devices like eBay.com and Amazon.com. I also suggest that the developers of websites consider the size of the mobile phone screen and make the website loading time shorter by reducing the size of images and all downloadable materials or contents". Interviewee 46 complained: "The only problem that impedes

me in browsing the internet via my mobile device is that some websites display their content using *flash player* which is not supported on my mobile and, therefore, forces me to use the personal computer. All websites should be compatible with all or at least the most common mobile devices such as Blackberry, Samsung, HTC and iPhone".

Availability (or accessibility) can be considered as one of the basic aspects of a technology to be usable. Almost everyone would agree that mobility per se is considered to be one of the most significant qualities of mobile technology, permitting, as it does, access to electronic services ubiquitously, with round-the-clock availability, via wireless networks and a diversity of mobile devices (e.g. smart mobile phones, PDAs and iPads).

Interviewee 6 commented: "In contrast to normal electronic commerce in which transactions are usually conducted via wired-Internet, mobile devices provide users with more freedom and, therefore, more value, allowing them to access time-critical information and services without limitations of place and time". Interviewee 15 agreed about the valuable benefits of mobile technology: "Mobile devices are usually lightweight and small in size, which allows me to take mine with me anytime and everywhere I go and use a variety of services. For example, nowadays most coffee shops provide a wireless service for free and I usually surf the news and read my email replying to friends while I'm sitting in my favourite coffee shop". Interviewee 46 adds: "Using m-transaction can sometimes save your life; I remember once I was travelling to Riyadh for an important appointment. I was late and I had to go immediately to the airport. The only way to save my trip was by paying the ticket via my mobile phone while I was in the taxi. Another example is that I could top-up my young brothers' mobile phones, in order to make important calls, while I was sitting in the airport departure lounge, there being no time or place restrictions. I believe that to have a service that is accessible and available anytime anywhere is a very valuable thing for everyone and especially for those who are always busy with business or the pressures of everyday life".

The three previous aspects (i.e. ease of use, navigational structure and availability) can form one called "usability". Therefore, the term usability will be used in data analysis when refereeing to all of these three aspects.

5.5.2 Telecommunication infrastructure

More than 44% of the interviewees highlighted and worried about the wireless telecommunication infrastructure while conducting m-transactions for one reason or another. Interviewee 3 said: "To conduct m-transactions the infrastructure is important and it should be of a very high standard. If the connection is not fast I will not use it because I'll be worried about my data and the money would be lost because of the low speed or the poor quality of the connection". Interviewee 11 highlighted the risk of having poor Information Communication Technology (ICT) infrastructure by commenting: "One of the reasons that can inhibit people from using m-transactions is that they fear that the transaction may not be completed because of a network error which sometimes results in a huge loss". Interviewees 18 commented: "There is a remarkable advance in mobile device technologies to support internet/web browsing and to benefit from the 3G network; however, there are a number of problems in using m-transaction in Saudi Arabia, for example, the poor 3G network infrastructure in some places and the complete lack of availability in some areas. There are some areas that have a very bad network reception of 3G via mobile devices. So, the strength of 3G network reception and wide coverage are very important for people in using m-transaction". Interviewee 32 provided richer thoughts: "The infrastructure for wireless communication should be armed with up-to-date devices and technologies and should be supported by the biggest service providers in the use of m-transaction in Saudi". Furthermore, she suggested that "The combination of mobile devices of a high standard

and the high speed wireless connection are positive factors in accelerating the adoption of m-transaction and vice versa".

5.5.3 Awareness

Almost 37% of the interviewees mentioned that awareness is important and that it facilitates the uptake of m-transaction. Interviewee 4 said: "Before asking people to use m-transaction or any new technology we need to increase the awareness of this technology to the people. Also we should include the new technology innovations in our education programmes to help consumers keep up with the latest on the market. I also recommend that competent authorities and even private companies should market/promote this technology by using the media and street advertisements". Interviewee 14 added: "Let's speak frankly; there is a great ignorance throughout Saudi society regarding m-transaction. There is also ignorance, to some extent, of electronic commerce as the majority of Saudi's citizens do not know the real meaning of the term 'electronic commerce' and, therefore, prefer not to venture to use it. As with any technology, an ignorance of it will breed fear, which will in turn breed a lack of desire to use that technology". Interviewee 35 believed that "there is a misconception and misuse of the Internet in the Saudi community which gives a bad impression even to attendees of internet cafes or at people's houses. Parents, for example, by virtue of their lack of knowledge of the internet due to not having entered this world, may have negative ideas and impressions of it (e.g. wasting time, being distracted from studying, and social aversion) and therefore prevent their children from using it". Interviewee 43 further explained: "I think the lack of knowledge and the lack of confidence are relatively interrelated. Whenever there is a lack of knowledge of a technology there is less confidence in that technology. People should know about the many benefits and huge potential of using online payment (e.g. saving time and effort, its possible use in any place and at any time, direct connection to your bank account) whether via portable or fixed devices. They also need to know about the disadvantages (e.g. security, hacking and online fraud) so that they can make an informed decision about what is best for them".

5.5.4 Usefulness

More than 35% of the interviewees considered 'usefulness' as key in making the decision as to whether or not to use m-transaction. Interviewee 5 commented: "M-transaction is a new technology that should be very useful for people. The using of this service will make life easy and more convenient and will save me, for example, from going to offices and financial organizations and having to wait in a long queue. One other great advantage is that you can even use it on the weekend, or anytime, anywhere, and what is even more powerful with m-transaction is that you do not need anything apart from your mobile device and credit card details, both of which you already carry with you most of time". Interviewee 23 further added: "Firstly, all government procedures should be electronic in terms of execution and payment (e.g. issuing and renewal of passports, recruitment, renewal of car registration. Secondly, all educational organizations should enable mobile payments (e.g. admission fees, registration and paying for parking). Thirdly, all private organizations should also move into the electronic/cyber market (e.g. buying and selling). Once everything switches to electronic, this will benefit all parties involved because it will reduce the time, effort, resources and cost of moving money around; increase efficiency, production and accuracy; and provide the possibility of greater monitoring, control and advice and guidance".

5.5.5 Security, Hacking and Fraud

No one would disagree that security provision is important in almost all business fields and financial transactions. This becomes even more critical when it comes to electronic transactions and, in particular, m-transactions. Since the beginning of the era of electronic commerce it has been announced via the media that several companies, and even some military organizations, have experienced huge losses because of security penetration. Furthermore, fraud and theft are also major reasons for keeping customers away from using electronic and m-transactions. Consumers need to believe that the system they are using is highly protected to prevent hacking and fraud.

More than 33.5% of the interviewees worried about security issues and many of them brought up the hacking and fraud issues. Interviewee 16 declared: "The most important factor for me is electronic security, and the credibility/honestly of the website comes second. These days the penetration/hacking of a website and applications have become easy. Hackers can easily find some clear gaps because of the use of weak security programmes or companies that provide unreliable security services". Interviewee 43 commented about the importance of security by saying: "The security should support to the maximum the browsing of websites, storing data in servers and the conduction of any transaction in order to secure private and personal information and critical financial data from spying and being hacked". Interviewee 73 considered another dimension: "Paying via electronic transactions (i.e. wired connections) is useful and convenient and is secured to some extent. However, for me, paying via m-transaction is not preferable and especially not via a mobile phone because the mobile phone will save my passwords and bank account numbers and if I lose my mobile phone or someone stole it then they could easily take this information and misuse it. I have also heard that even if I delete all my data (e.g. passwords, pin numbers and pictures) from my phone some people can recover it again and maybe improperly use them." From the same perspective, interviewee 75 added: "Mobile phones should be armed with up-to-date security and encryption methods and techniques. The communication between mobile phones and the user's bank should be secured and protected from any penetration or eavesdropper". Interviewee 88 said: "From my point of view the negative factors that prevent people from using mobile commerce and transactions can be summarized in (1) the fake commercial websites, (2) imposing fees on the customer unduly, and (3) the lack of credibility/reliability of the services provided".

5.5.6 Trust

Upon subscribing to a mobile payment system, users are expected to place inherent trust in the system. Providing access to a cheque or savings account by a software company is not the same thing, in most users' minds, as a bank having access to their financial details. Unless the basis for electronic payment systems is based on trusted and secured banking practices, it is unlikely that users will adopt it.

Almost 33% of interviewees have concerns about trust when paying via mobile devices. Interviewee 16 believes that trust is an important factor when paying via mobile devices: "I believe that the lack of trust on websites is a strong concern amongst Saudi people and I'm sure it is a general problem whether to pay via a mobile device or a personal computer because you cannot see or talk to the seller (face to face) and everything is conducted remotely". Interviewee 36 agreed and commented: "When dealing with a commercial website, it has to be trustworthy and secure. No one would pay money or put their credit card details on a commercial website unless they have a great deal of confidence that the website is 100% trustworthy". Interviewee 79 added: "Nowadays, there are a number of fake websites which look very professional but once you give them the money they will never reply to you after that". He continued: "I had an experience in the past with a fake website that looked professional, with professional functions (e.g. a basket). They were offering their product at

a very competitive price, and promising customer support, but once they got the money everything stopped. I don't usually like to use commercial website if I don't find them trustworthy; however, I tried this website because it was recommended by a faculty member of my university".

5.5.7 Cost

The cost for the users of having the service can play an important role in the decision of whether or not to use/subscribe to the service. To encourage the use of m-transaction, the Saudi telecom and internet service providers should offer these services at affordable prices to the public in order to tempt the customers.

Over 30% of the interviewees believed that the prices of subscriptions for services such as Digital Subscriber Line (DSL) are important to consumers. Interviewee 58 agreed that cost can play a significant role in internet use and, therefore, m-transaction. The interviewee commented: "The current prices for internet subscriptions are not cheap, and the more speed you request the more you have to pay, and it can be up to SAR800 (≈ £133.3) per month. This is just for a DSL connection and maybe there are other hidden charges that you are not aware of until the invoice comes, so you can imagine how much the mobile internet subscription for 3G and 4G will be. As you can see, these high charges will make it difficult for an ordinary person to afford". Interviewee 95, similarly, agreed with this point, and especially on the high cost for wireless connections. Interviewee 74 further commented: "in Saudi, we have a very limited number of telecom companies. We used to have one company and from few years back we had Mobily and then recently 'Zain', and this limitation gives these companies the ability to offer their services at high prices because the public have no other choice. Although these companies do offer a few different types of contracts the prices are still high, bearing little relationship to the quality of service". Interviewee 97 added "I know some people, and I'm one of them, that go to internet cafes whenever they need to access the internet because they cannot afford the high internet subscriptions fees".

5.5.8 Cyber-Law

Laws, legislation and regulations are normally a basic need for any system to guarantee the continuity of that system and especially when that system involves commercial transaction, monetary values and human rights.

Above 20% of interviewees mentioned the issue of cyber-law and agreed about its importance. Interviewee 16 commented: "I believe that the infrastructure of cyber-law in Saudi is still fragile and doesn't match the user's expectations. It needs to be more stringent, secure and to protect the rights of users. There are still some gaps in the current law and there are millions of users who have had the rights ignored/abused due to the use of electronic business processes that have been misused in Saudi by cheats and fraudsters. In order for the m-transaction to be accepted and used, the existence of enforceable international law to protect the rights of sellers and buyers is crucial". This was confirmed by Interviewee 33: "The electronic commerce law and payment gateways are two of the most important infrastructures that support m-transaction". Interviewee 86 added: "I can't trust the cyber-law in Saudi because it is not mature enough and is not fully activated. Even if it somehow exists, it is not widespread. Another issue is that there is no a specific well-known authority which can be contacted when a disagreement happens. Me personally, I'm afraid about purchasing online because I may not be able to claim my rights back from any organization". Interviewee 98 was considering some possible solutions with regard to this matter: "I recommend the government to put specialized authorities in place to solve any disagreements and they should have a website with contact details. This authority should have many branches to cover the whole area of Saudi Arabia

and be able to solve any problem or dispute remotely or in person. It should also be able to handle international transactions as well".

5.5.9 Payment Gateway

A payment gateway, here, refers to an electronic commercial application service that authorizes payment for electronic businesses and online retailers. In other words, it is the equivalent of a physical point-of-sale terminal located in most retails shops. A payment gateway is supposed to protect credit card details by encrypting this sensitive information (e.g. credit card numbers) and to guarantee that the information passes securely between the customers and the merchants and also between the merchants and the payment processor.

About 19% of the interviewees argued about the need to have a variety of payment methods/options in order to facilitate the acceptance and use of m-transaction. Interviewee 41 commented: "Having a limited number of online payment gateways methods/options to pay via mobile devices will restrict the number of people using these services (i.e. m-transaction). Therefore, I strongly urge the government, financial institutions (e.g. Banks) and organizations (e.g. service providers) to provide a variety of online payment gateway options to the consumers so that each individual can pay by a method that is best for him, and that suits his situation". Interviewee 112 added "In Saudi I don't really see any other option than using a credit card in order to purchase online, an option which I don't think everyone would like to use. For me, as an example, I use some overseas websites, like *eBay* and *Amazon*, and they provide options (methods of payment) other than credit cards. I use a *PayPal* personal account to purchase any product I like and it is very safe because you don't need to put any credit card numbers or even bank account details on the commercial website in order to purchase anything. Then, the product will be shipped to you by any international carrier such as *DHL* or *Aramex*. Doing it this way is maybe a bit more expensive but it is a lot safer". Interviewee 116 explained further, "One reason that not many people like using credit cards to purchase online is that they feel they are somehow inconsistent with the instruction of the religion, (as some banks will take interest from you, which is not allowed in Islam) and although many Saudi banks offer credit cards that comply with the Sharia laws, there is still a need for different ways of paying money through the Internet".

5.5.10 Postal Services

The provision of appropriate Postal Services is almost an essential part of any business system that involves purchasing and selling activities. Especially when buying online, customers would like their product to be conveniently delivered to their address. Moreover, the more professional, fast and high quality is the delivering of the purchased product, the more it gives a better impression about how good is that electronic business and how customers would like to deal with it in the feature.

Interviewee 30 declared: "I don't really see the point of having good electronic commerce without the presences of an efficient transportation and postal system. Actually, electronic shopping and goods delivery are strongly interdependent and complementary. What I mean is that just having a postal service in place is not enough; it should be very powerful and advanced to meet the users' expectations". Interviewee 36 said "The ideal would be that you purchase online and the parcel comes to your door in a reasonable time. However, in Saudi, this does not happen. In order to get your deliveries you need to go to the post office yourself. Recently the post office has started a service called *Wasel* which provides private boxes for each household to receive its post, but it is not free as you have to pay annually for this service, while in other countries, and especially the developed ones, it is totally free". Interviewee 91 further added: "Also it's hard to purchase online because we don't have a fast and reliable postal service to deliver goods purchased online. It's also harder to purchase

online from abroad, for example, to purchase from the USA you need to have an address in that country and then you are obliged to use shipping companies to deliver the goods to Saudi, which will cost large sums of money".

5.5.11 Privacy

Privacy is an essential human right recognized in the UN Declaration of Human Rights. Privacy supports human dignity and other important values such as freedom of association and freedom of speech. It has become one of the most important human rights concerns of the modern age (Privacy International, 2002).

Interviewee 37 commented on the criticality of privacy as "the possible negative factors can be seen into the lack of privacy owing to the proliferation of hacking activities and the exposure of information and data". Interviewee 38 highlighted that the "Credit card details, addresses and other private information are critical and some people may be very sensitive about who will have the access to this information. For example, in medical records where I work there is so much information about the patients, which, for sure, they don't want any other party to have access to apart from the doctors, and I believe it's their right to have their data protected (we can call this the privacy right)". Interviewee 74 maintains that "nowadays you can see that you receive SPAMs to your mobile, email and house and you don't know from where or how they got your information and I consider this to be a violation of privacy. I believe that there are some companies that sell a list of some people's information (e.g. email addresses, mobile phone numbers and house addresses) without the permission of the owners of that information. It is totally unacceptable, in terms of human rights, that someone uses your private information for commercial purposes without your permission".

5.5.12 Government E-Readiness

The government has an important role to play in affecting market decisions. It can facilitate the provision of the essential requirements for the development of electronic commerce such as providing robust secure online payment options, ensuring a solid ICT infrastructure, providing educational programmes and building up awareness using different means such as media and education institutions.

Interviewee 36 commented about the support of government: "The government should play a supportive role to encourage the use of m-transaction and support the websites that are adopting it. The government itself should no longer ask customers to come personally to its buildings (e.g. ministries) for handling the applications but should facilitate the provision of websites that can handle everything for citizens. This policy should also be applied to banks and private companies, and some extra fees should be imposed for those who don't practice m-transaction". Interviewee 44 declared: "The general reason for the delay in adopting electronic and m-transaction is that the government doesn't take any real initiative. Firstly, it should make it possible for all the government-related applications and procedures to be done electronically. This will support private companies and help them to compete against each other, so providing better quality electronic services".

5.5.13 Arabic Language Support

There is no doubt that language is one of the basic means of communication, delivering information, thoughts and ideas and, more specifically, doing business. Language can be presented in several different ways such as text, picture or audio. In relation to internet technology, these can be combined together to create a new format which is 'multimedia'. The language used to present and display the

content of a website can have a significant impact on its audience, especially when their first language is not the one on that website.

Interviewee 94 commented: "It goes without saying that the websites in Saudi or those who are targeting Saudi customers should fully support the Arabic language because it is the dominant language. For me, to completely understand the website's content and to interact correctly with all its functions and respond to its requirements I need to fully understand its language, which in my case should be Arabic". Interviewee 112 further commented that "a professional commercial website should support at least two languages: English and, if applicable, the local language. The problem is that there are some websites that tend to just translate the English version into, for example, an Arabic version, which may lead to errors in translation. Sometimes I find the English version of a website to be much better and more understandable than the Arabic version, even though Arabic is my native language. This is considered to be a shortcoming of that website and may lead to serious consequences. Fully supporting the Arabic language is important so that all levels of Saudi society can benefit from that website".

5.6 Discussion and Recommendation

The aim of this study was to identify the factors that encourage customers to adopt m-transactions in Saudi Arabia, this information being useful for policy makers, government, industry, and end-users. The main strengths of this study are the derivation of its factors**,** which have gained the attention of different conceptual and empirical research projects in different countries. The measures applied in this study were developed through an extensive study of literature reviews and grounded theory methodology. The importance of the factors in the success of m-transactions, according to users' feedback, is shown in Figure 5.3. The findings of this study showed that there are 25 issues that are influential in the success of m-transactions from users' point of view. However, in the discussion above the researcher highlighted only the factors that are ranked by more than 10 people as being important factors to them. Other factors such as warranty, reputation, internet abuse, it support, after-sales services, trialability/experiences, and resistance to change were discarded as they have low concerns by respondents.

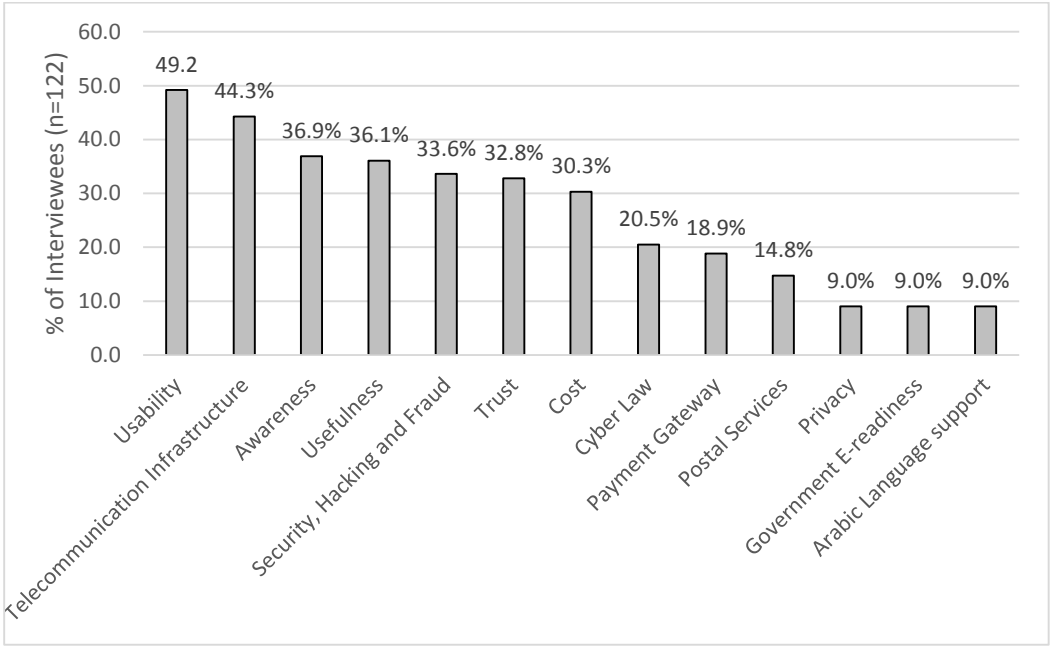

Figure 5.3: The Most Influential Factors in the Success of M-Transactions from Users' Point of View.

Based on the literature and the collected consumers' feedback, the researcher has divided the different items (factors) into four main categories that play a significant role in the acceptance or using of m-transaction,: (1) 'Design and language support', which includes 2 factors: 'usability (ease of use, navigational structure and availability)' and 'Arabic language support', all of which need to be encouraged, improved and widely applied using the best and most advanced technologies. What is required here is that the mobile websites should be very user-friendly when navigating them, and that there are reliable internet and wireless connections and a very wide coverage for the reception of new mobile technologies (e.g. 3G and 4G); websites should be fully supported by a reasonable range of different mobile devices; and they should fully support the Arabic language, especially for conducting financial transactions. (2) "User-related Factors", which encompasses two factors: 'trust' and 'awareness'. Trust needs to be fostered and the signs used that can encourage more trust (e.g. trusted third party sign); and comprehensive awareness and training programmes to increase the level of awareness amongst Saudi people. (3) "Organizational-related Factors" which include six factors: 'telecommunication infrastructure', 'postal services', government e-readiness, cyber-law, cost and payment gateways, which requires a sophisticated and reliable wireless telecommunication infrastructure, the understanding and implementation of cyber-law; efficient transportation for the delivery of products and e-readiness and support from government, introducing competitive and affordable charges, and providing a variety of different payment methods. (4) "System-related Factors", which contains 'security, hacking and fraud', 'usefulness' and 'privacy'. This category requires the installation of high quality, trustworthy security systems that use strong encryption algorithms to prevent hacking and fraud and, therefore, increase privacy.

After analyzing the collected data, the researcher was able to construct a classification of categories of the intention to use of m-transaction from a user perspective (see Figure 5.4).

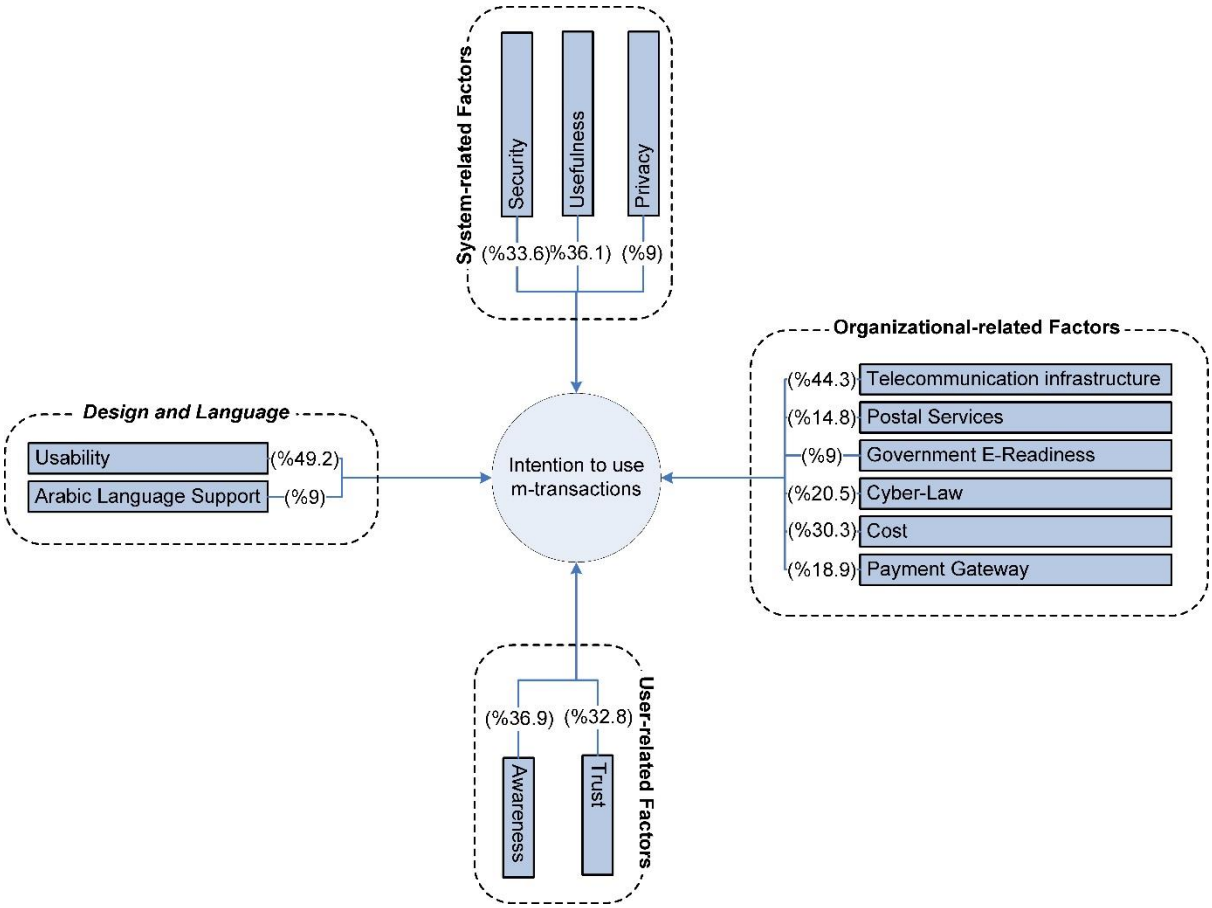

Figure 5.4: Categorization of Factors That Influence the Users' Intention to Use M-Transaction.

5.7 Summary

With reference to the results of the interviews, and under the guidance of several well-known theories (i.e. TAM and DOI) and several previous studies, this study was able to generate a classification and a categorization of the factors of the intention to use m-transaction in Saudi Arabia, which summarizes the factors that should have a significant impact in the adoption and use of m-transaction from a consumer's perspective. Countries need to pay real attention to the m-transaction categorized factors shown in Figure 5.4. Failure to do so could convert these factors into disablers. The results of this study could be further validated using other instruments (e.g. focus group) and also might be applied to a larger number of Saudi users or to different locations of the kingdom to confirm the current results.

This research sheds some light on mobile devices with respect to m-transaction in Saudi Arabia. The outcomes of this study contribute to the market stakeholders' understanding of their potential customers' needs and concerns. Exploring the market, especially at this time while m-transaction is still in its infancy in most countries around the globe, is critical for industry stakeholders so as to ensure the success of this emerging market. Therefore, this research highlights the most important factors that need to be considered in order to support the proliferation and advancement of m-transaction in developing countries, and especially in Saudi Arabia.

At this point the researcher was able to gain more in depth understanding of the topic and a draft version of the conceptual framework was built, which contains all the results from this study and the previous study. However, in order to gain a greater appreciation of the underlying topic, it was decided to carry out another study to discuss the results (this study and the study before) to identify the most important factors to affect The Saudi user's intention to use m-transaction. This study will be explained in the next chapter.

Chapter 6 Exploratory Study in Mobile Transaction – Focus Group

6.1 Introduction

The previous two exploratory studies (in the previous two chapters) and their findings helped the researcher to gain information and understanding of the underlying phenomenon (i.e. m-transaction). They, furthermore, helped to generate an initial version of the conceptual framework, which mainly contains the findings from each study. However, a further exploratory study was needed to discuss the previous findings, to confirm the most important factors of them and possibly add any further important dimensions to the research is conceptual framework. This chapter answers this need and details the third study of the exploratory phase.

6.2 The Study Overview

By analysing and discussing the researcher's prior findings, this study aims to understand and specify the most important factors that are expected to influence the intention and acceptance of mobile transaction (m-transaction), and to build a refined and robust conceptual framework of the intention to use m-transaction in Saudi Arabia. It also summarizes the factors that are expected to have a significant impact on the intention to use and the use of m-transaction from a consumer's perspective. The results show that there are 11 factors that have the most significant influence on the intention to use m-transaction in Saudi Arabia, including ease of use, navigational structure, visual appeal, usefulness, telecommunication infrastructure, security, trust, culture, cost, government E-readiness, and social influence.

6.3 The Study Problem and Motivation

The recent literature highlights the fact that m-transaction is one of the most critical incentives for successful m-commerce (Yang et al., 2012; Bamasak, 2011; Kim et al., 2010). Moreover, the success of m-transaction systems in Saudi Arabia requires strong acceptance by consumers and relevant stakeholders, including private and public organizations (Bamasak, 2011). However, the penetration and adoption in Saudi Arabia of electronic purchasing and payment is still a significantly smaller market compared to other regional markets (Orloff, 2012; AlGhamdi et al., 2011; Aleid et al., 2009) and this study aims to investigate this gap. Developing countries encounter cultural and social obstacles when transferring technology into practice (Hill et al., 1998). This research considers the influence of culture when assessing the acceptance and usage of m-transaction in Saudi Arabia. On the other hand, the literature review has revealed that there is a notable shortage of research exploring and investigating the factors influencing the intention/use of m-transaction in general (Wei et al., 2011; Schierz et al., 2010), and especially in Saudi Arabia (Bamasak, 2011; Alqahtani et al., 2014a). This study therefore aims to contribute to closing this gap.

Furthermore, m-transaction is an important emerging application of m-commerce which facilitates m-commerce transactions by providing the mobile customer with a convenient means to pay (Yang et al., 2012; Petrova and Mehra, 2010a). Mobile payments are a relatively new field for research (Mallat, 2007; Wei et al., 2011). A qualitative approach using focus group interviews was chosen to discuss and explore the critical factors affecting the use of m-transaction in Saudi Arabia from a user's perspective. This study aims to discuss the results of the researcher's prior studies (*Chapters 4 and 5*) and to confirm the proposed conceptual framework.

6.4 The Study Protocol

All the results from the previous studies by the researcher (i.e. Chapter 4 and 5) were examined in this study. In order to guarantee the best outcome in this study, a number of procedures were adopted: to ensure anonymity in the reporting and to meet Ethics Committee requirements, the participants were named F1, F2 … F8; the way the focus group was designed and conducted was based on Krueger (Krueger and Casey, 2002; Krueger and Casey, 2009) guidance which includes building the questions (Appendix D), choosing the moderator, running the focus group and analysing the results; and to ensure clarity and ease of understanding, the interview questions were piloted with three Saudi users and three experts in conducting exploratory studies and interviewing. Simple modifications were highlighted and the focus group documents where updated accordingly. The focus group lasted for about 1 hour and 15 minutes; refreshments were offered to the participants as a mark of appreciation. The Table 6.1 summarizes the participants' characteristics.

Table 6.1: Summary of Respondents' Demographic Data.

Characteristics	Freq.	Percent.	Characteristics	Freq.	Percent.
Education Level			**Experience of M-Transaction**		
Masters	8	100	Yes	6	75
Years of Online Purchasing Use			No	2	25
4-6	5	62.5	**Years of M-Transaction Use**		
10+	3	37.5	None	2	25
Years of Mobile Use			1-3	4	50
1-3	2	25	4-6	2	25
7-9	1	12.5	**Total**	8	100
10+	5	62.5			

6.5 Data Analysis and Findings

By analysing the focus group's discussion the researcher was able to identify the important factors that can be considered for the revised research conceptual framework. For example, if the participants in the focus group discussion agreed to the importance of a factor, then this factor considered as an important factors. Most of the times the participants unanimously agreed to the important of the factors. In other cases, if one or two participants disagreed and the rest agreed of its important, the moderator let them further discuss and finally those who disagreed were convinced and retreated from their decision. At the end of each discussion, there were no partial disagreement between participants and they all always agree or disagree about the importance of a factor. The results that emerged from the discussion in this group are organised into 11 key factors which are: ease of use, visual appeal, navigational structure, telecommunication infrastructure, usefulness, cost, government E-readiness, social influence, security, trust, and culture. Other aspects were mentioned in the discussion, such as: awareness, payment gateway, m-commerce diffusion, etc., but these concepts were considered as insignificant or irrelevant by the participants during the discussion. The Table 6.2 shows the findings from the three studies of the exploratory phase.

Table 6.2: Summary of Research's Findings and Developing The Conceptual Framework.

(Study 1) E-commerce (Interview)	(Study 2) M-transaction (Interview)	(Study 3) M-transaction (Focus Group)	"Conceptual Framework"
Trust	Trust	Trust	Study 1, 2 and 3
Cost	Cost	Cost	Study 1, 2 and 3
Security, fraud and hacking	Security, hacking and fraud	Security	Study 1, 2 and 3
Government E-readiness	Government E-readiness	Government E-readiness	Study 1, 2 and 3
Telecommunication Infrastructure	Telecommunication Infrastructure	Telecommunication Infrastructure	Study 1, 2 and 3
Awareness and Perceived Usefulness	Usefulness	Usefulness	Study 1, 2 and 3
Warranty	Ease of Use	Ease of Use	Study 2 and 3
Trial and Experience	Navigational Structure	Navigational Structure	Study 2 and 3
Cyber-Law	Cyber-Law	Social Influence	Study 3
Postal services	Postal services	Culture	Study 3
E-commerce Presence	Payment gateway	Visual Appeal	Study 3
Resistance to change	Availability		
Tangibility	Arabic language support		
	Privacy		
	Awareness		

6.6 Considered Factors

Based on the focus group's discussion, follows is a brief description of the 11 factors that the participants in the focus group believed to be important and could significantly influence the decision to use m-transaction in a country such as Saudi Arabia.

6.6.1 Ease of Use

In their discussions for this study, the participants emphasized the significance of ease of use for any transaction being conducted via a mobile device, highlighting this as an important incentive to using m-transaction. In contrast, any difficulty or complexity may lead users to avoid using m-transaction. Some of the participants' statements supporting the above summary are: *"*People nowadays have access to mobile devices more than PCs and the ease of use is important to use mobile transaction, whether a mobile website or a mobile application, this will play as a real incentive." [F1]. [F5] commented that "Making m-transactions easy to use is a bit challenging as the mobile's screen is usually small and companies need to pay careful attention in developing user friendly interfaces that suits the users". This is in line with the research findings (Venkatesh and Bala, 2008; Vance et al., 2008).

6.6.2 Visual Appeal

Aspects like the visual appeal of the medium, such as the look, attractiveness and the graphics and even the layout of the mobile website or application plays a significant role in the decision of using m-transaction, the participants believed. A summary of the comments: "There are companies that have problems in their website while using a transaction, it doesn't look right in their website via a mobile device as it always meant for the normal PC's screens" [F3]. "in mobile devices you usually find the design or the layout is not well designed and unattractive and even the graphics you find them bigger than the screen itself." [F4]. "designing a professional-look for a mobile website/application is not an easy task, and most of them look basic and not that attractive. I believe having a well-designed interface is important for the decision of using it" [F3].

6.6.3 Navigational Structure

The navigational structure and whether the information presentation is logical are also important for conducting an m-transaction. Another issue, for example, is filling the forms that originally designed for a normal screen and not for the limited screen space such as the ones in smart phones. As per the participants' arguments it was clear that, the way the information is arranged on a mobile website/application, can significantly affect the decision to use m-transaction by the Saudi users. This has been shown in the comment, "One of the common problem you find when surfing a mobile, is the difficulty while navigating, sometimes you can't find what you looking for because the layout is not well-designed" [F7]. Another comment was, "There are problems in browsing websites that were developed for normal PC screens, these websites are hard to deal with and to interact with, you can see the layout is not logical and navigation is very confusing" [F6]. This complies with Vance et al. (2008) and Venkatesh et al. (2003b).

6.6.4 Telecommunication infrastructure

The participants were concerned about the quality of the telecommunication infrastructure and its ability to keep pace with the revolution in handheld device technology. They criticized the absence of the network reception/coverage in some places (e.g. small towns and villages). Some of the participants expressed their view that poor infrastructure can easily prevent the use of m-transactions in Saudi Arabia. Others showed that telecommunication infrastructure is considered to be a crucial element in the success of electronic transactions. Some of the participants' statements supporting the summary above are: "Regrettably, there is poor infrastructure for mobile technology in Saudi Arabia. In some places there is completely no reception/coverage and even other places don't have a landline service" [F5]. "In our city "Bisha" there is no 3G coverage." [F4]. "We do have a good coverage in our city, I think in the main cities there is no real problem with networks, however, other cities and villages may have a serious problem with network infrastructure." [F6]. This is in line with the research outcomes in the context of developing countries, where several studies have highlighted the major influence of the quality of the infrastructure as a determinant of electronic transactions adoption (Molla and Licker, 2005a; Aleid et al., 2009; Al-Somali et al., 2009).

6.6.5 Usefulness

Participants recognised that the added value of using m-transaction is important and noteworthy. The distinctive characteristics and capabilities of handheld devices give them some unique advantages compared to a normal PC. Mobile devices have qualities such as ubiquity, convenient access and round-the-clock availability. Participants also highlighted that the usefulness of using m-transaction is especially clear in a country such as Saudi Arabia, for example, because of its wide geographic area. From the analysis of this focus group, there is evidence to illustrate that usefulness can affect users' intention to use m-transaction. Some of the participants' statements support the above summary: "In a country like Saudi Arabia, the value and the advantage of using M-transaction have greater importance. It costs you a whole day just to visit a shop and purchase something you need. I'm willing to pay a slightly higher price in order to avoid traveling such a distance." [F2]. "With regards to Saudi Arabia, using M-transaction has great benefits, for example avoiding the crowded traffic from the first place." [F4]. "Using M-transaction will save me money, instead of going to the physical shops, I just purchase online and it comes to my door the next day, also I'll have more choice online." [F7]. This factor complies with the Technology Acceptance Model (TAM) (i.e. perceived usefulness) (Venkatesh et al., 2003a) and Diffusion of Innovation (DOI) (i.e. relative advantage) (Rogers, 2003).

6.6.6 Cost

The participants agreed that cost plays a significant role in determining the use of m-transaction. To encourage the use of m-transaction, the Saudi telecom and internet service providers should offer

their services at reasonable prices in order to tempt the customers. The cost of the service to users can play an important role in their decision as to whether or not to use/subscribe to the service. Statements from the participating individuals: "certainly it's not cheap, because you need first to subscribe to service provider to get the internet whether at home or via the mobile devices, usually the internet services are expensive and I assume it will be more expensive via mobile devices, so I rather avoid it." [F1]. "I'm thinking about relatives and my family, I remember one of my close relatives who bought dresses online, there are differences in price between Saudi and overseas, the clothes with global brand are more expensive in Saudi" [F5]. "From my experience, the price level to access the internet via mobile devices is very high, especially when you are using a Pay as You Go SIM card." [F5]. This is in line with the research findings, that it is essential to offer the services of a technology innovation at reasonable level, in order to be accepted or used (Escobar-Rodríguez and Carvajal-Trujillo, 2014; Andam, 2003).

6.6.7 Government E-readiness

The participants similarly explained that the government will always play a significant role in the take-up of m-transaction and how widely that take-up spreads over the country. They highlighted the role the government can play even in providing strong motivation for people to learn and accept new technologies. Furthermore, the participants have pointed out the important role played by the Saudi government. This role includes providing high standard and secure online payment options, and a robust infrastructure for ICT. Moreover, government can increase the awareness amongst Saudi society (e.g. educational TV programmes, informative brochures and different media means, free public lectures and seminars) and support the institutions in providing courses for the public.

Interpreting the above responses, it is clear that according to the focus group discussion, government E-readiness affects the intention of consumers in Saudi Arabia to use m-transactions. A number of the participants' statements: "If the government would support it, I believe this support will be considered as one of the important factors to help the diffusion of M-transaction, because all the organizations and institutions will always follow the government." [F4]. "With the support of the government, the use of M-transaction will be better and more secure and more people will be aware of it." [F5]. "One example is "Hafiz" programme, which is a national programme to support unemployed people by the government, I knew people who only learned how to use the internet just to apply for "Hafiz"." [F6]. This is in line with a finding of a recent study conducted in Saudi Arabia investigating the acceptance of electronic transactions (AlGhamdi et al., 2012b).

6.6.8 Social influence

The participants highlighted clearly that social influence can play a dominant role in the acceptance and usage of m-transaction in Saudi Arabia. They agreed that social influence has a positively direct effect on intention to use mobile services. This relationship is in line with the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB), and the argument for the direct effect on intention to use is that consumers can use a technology on the basis of social pressure alone (even though their attitude toward using the technology can be neutral or negative) (Nysveen et al., 2005). Some of the participants' statements are: "Our society is evolving quickly; it is easy for people to adopt a technology innovation once they know that a group of people is already using it. We don't like to discover by ourselves, we always learn it from other people." [F7]. "For example the social network, we ranked on the top of the world percentage of adopting social networks because people have strong relationships amongst each other and will be always influenced by others." [F6]. "In order to trust a website we rely on the word of mouth." [F4].

6.6.9 Security

The participants agreed unanimously that security provision is important in almost all business fields and financial transactions. This becomes even more critical when it comes to electronic transactions

and, in particular, m-transactions. Furthermore, fraud and theft are major factors that discourage customers from using electronic and m-transactions. The participants agreed that consumers need to believe that the system they are using is highly protected from hacking and fraud. According to the analysis of this group, secure connection and security are critical in electronic transactions. Security is a strong enough reason for a user to shop or conduct a transaction elsewhere if they are not confident of having a secure connection. Some of the participants' statements: "Security is always a concern and not all companies are secure. I would rather conduct transaction with companies like PayPal and Amazon just because I'm sure they are secure enough." [F1]. "It seems that Transaction via a normal PC is considered more secure, yet we don't use it because of the security fear, so M-transaction is out of the question." [F5]. "Security in conducting M-transaction is more worrying than the normal PCs, because M-transaction is via wireless and it can be easily hacked from anyone." [F6]. This factor is consistent with Goeke and Pousttchi (2010) who found security is a significant factor for using mobile payment.

6.6.10 Trust

The participants in this focus group expressed a concern that the buyer must be able to trust the seller in order to deal with them. They explained that, if trusted companies offer the services through m-transaction, then they would happily use their services. However, when they feel that a company is not fully trustworthy they would prefer to turn to another company. In addition, these companies should show that they are trustworthy and gain the Saudi users' trust, and this should be enough motivation to use their services. A number of the participants' statements: "Even if we were convinced of the idea of m-transaction, there is still a lack of trust issue in m-transaction; there are no companies that I'm aware of, that I really can trust." [F7]. "Once good trusted companies, which provide services, existed, then it will be spread easily." [F4]. "The problem in our society is that there is no trust, we are always afraid that the seller may deceive you as a buyer." [F3]. This is in line with research that found trust has an affect on the use of mobile payments (Lu et al., 2011).

6.6.11 Culture

The participants agreed that culture is a powerful determined factor in a uniquely cultural country like Saudi Arabia. They showed that culture can greatly impact a Saudi user's decision to accept a technological innovation. This was confirmed through other research findings showing that much of the technology designed and produced in industrialized countries is culturally biased in favour of their social and cultural systems; consequently, developing countries encounter cultural and social obstacles when transferring technology into practice (Hill et al., 1998). Some of the participants' statements: "Culture is a concern in a country like Saudi Arabia, for example I don't want the postman to knock on my house door while I'm away." [F4]. "I think the culture of our community/society dominates or controls the way we deal with any new technology innovation." [F2]. "The matter is the social impact, it is the culture we have, in our culture we need to be sure that we can trust the seller so we can conduct a transaction." [F1]. This was confirmed with other research findings, that much of the technology designed and produced in industrialized countries is culturally-biased in favour of their social and cultural systems; consequently, developing countries encounter cultural and social obstacles when transferring technology into practice (Hill et al., 1998).

6.7 Unconsidered Factors

The unconsidered factors from the previous two exploratory studies were identified based on the focus group discussion. A factor will be considered as not important only if all the focus group members agreed on its insignificant or irrelevant to the research topic. For all those factors (i.e. not important) the participants agreed that they are not important and continue to the next factor. For example, the moderator starts the discussion about one factor and one member said it is not important and all other members unanimously agreed to his opinion. There were 12 factors that the focus group

discussion and analysis revealed to be insignificant for the time being with regard to the use of m-transaction in Saudi Arabia. These factors are: cyber-law, postal services, payment gateway, awareness, Arabic language, E-commerce presence, warranty, privacy, trial and experience, resistance to change, availability and tangibility. Most of the time the participants disagreed about the importance of the factor under discussion. For example, the participants agreed that there is no need to worry about awareness, payment gateway, cyber-law, availability, e-commerce presence and resistance to change, as Saudi has an extraordinarily high level of mobile device penetration compared to the rest of the world. Furthermore, there is a payment gateway solution that already available in Saudi Arabia, SADAD, and people are aware of it. In addition, SADAD is bilingual (Arabic and English); it provides privacy and people have already tried and experienced it. Furthermore, SADAD provides a reference number for each transaction which can be used as a warranty for later requests. Tangibility is not a real problem in Saudi Arabia, because it can be solved by providing testimonies, product details and high quality pictures of the product. On postal services, participants showed that this was not a problem because it is already available and it is a matter of culture: once people agreed to have it, companies will be very quick to develop the services required. However, other research has given weight to some of these factors. See discussions on: cyber-law, awareness (Alghamdi, 2011; Al-Somali et al., 2009); e-commerce presence (Andam, 2003); postal services (Al-maghrabi et al., 2009); privacy, warranty, Arabic language and payment gateway (AlGhamdi et al., 2011); resistance to change (Al-Somali et al., 2009); trial and experience and tangibility (Chung and Lee, 2003) and availability (Palmer, 2002).

6.8 Building the Conceptual Framework

As mentioned earlier one of the aims of this study is to help to build a conceptual framework for m-transaction acceptance in Saudi Arabia from a user perspective. This conceptual framework is introduced via various stages of research as follows:

- In the early stage of the research, the researcher aimed to review the relevant literature to build a proper background and a robust ground from which the research could be started. This included human behaviour, technology acceptance theories, e-commerce and m-transaction, and the vision of scholars and industry representatives envisioning e-commerce as the first wave of mobile commerce (Kourouthanassis and Giaglis, 2012; Wei et al., 2011; Shih et al., 2010; Huang et al., 2007). Furthermore, while the diffusion and utilization of e-commerce has grown dramatically in the developed countries, the proliferation of e-commerce in developing countries has fallen far below expectations.

- Exploratory Phase – part 1: In this phase, an exploratory study in e-commerce was conducted in Saudi Arabia. The main aim of this study was to investigate the main factors that play a role in the adoption of e-commerce from a consumer's perceptive. A 'grounded theory' methodology was used to collect and analyse the data. Semi-structured interviews were generated and conducted with Saudi residents to elicit their opinions about e-commerce enablers and disablers in Saudi Arabia. The reason for using a qualitative method in this research was that it enabled the researcher to reach deeper into the experience of the participants, and to find out how opinions and habits were shaped culturally in order to discover the relevant variables. The results of this study are summarized in Table 6.2. In this phase of the research, a prototype of the conceptual framework was developed. However, this prototype needed to be mature, robust and more focused on m-transaction.

- Exploratory Phase – part 2: In the third stage a similar study was therefore conducted, using a method similar to phase 2 but focusing more specifically on the use of mobile services and particularly of m-transaction. Moreover, this study has reinforced by applying an adapted version of the UTAUT theory while generating the interview's questions The overall aim of this phase was to investigate the key factors that affect the adoption and intention of using

m-transaction from the consumer's perspective, and thus to enhance and improve the developed framework that encompasses and categorizes the influential factors of m-transaction. The results of this study are presented in Table 6.2. This stage was to be followed by another qualitative study (phase 4), which is a Focus Group (FG) method.

- Exploratory Phase – part 3: The phase described in this chapter is the work with the focus group. Briefly, it aimed to discuss and analyse the results of the previous studies and identify the most important elements to be considered in the framework for the final stage of the study. The result of this phase is the focus of this chapter. The final version of the research conceptual framework is illustrated in the next chapter.

6.9 Discussion

As mentioned above, the factors from previous studies were discussed in this study and, furthermore, two new factors were introduced by this study (i.e. culture and social influence). The Table 6.3 summarizes the factors that discussed in this study.

Table 6.3: A Summary of the Discussed Factors.

Discussed Factors	Supported
Security	Yes
Trust	Yes
Cyber-Law	No
Postal Services	No
Telecommunication infrastructure	Yes
Payment Gateway	No
Cost	Yes
Awareness	No
Usefulness	Yes
Ease of Use	Yes
Navigational Structure	Yes
Visual Appeal	Yes
Availability	No
Privacy	No
Government E-Readiness	Yes
Arabic Language Support	No
Postal Services	No
E-Commercial presence	No
Warranty	No
Trial and Experience	No
Tangibility	No
Resistance to Change	No
Social Influence	Yes
Culture	Yes

This can conclude the most important factors which expected to influence the Saudi user's decision in using m-transaction. These factors contributed in formulating the final version of the research conceptual framework, which will be illustrated in next chapter. Although the number of participants in this study (i.e. focus group) is relatively less than the previous two exploratory studies (i.e. Chapter 4 and 5), this study helped to limit the factors that can be considered more important than the others. However, the other factors may still important, yet due to logistics and time restrictions, it was focussed on the factors that identified in this study (i.e. focus group). In the future, the researcher may consider the other factors in further research.

6.10 Summary

The results and the analysis in this study have helped to develop the research conceptual framework of the intention to use m-transaction in Saudi Arabia. The study has also helped by contributing to filling in the gap in investigations into m-transaction in Saudi Arabia. By discussing the factors of the previous studies, the research conceptual framework becomes more sophisticated and contains only the factors that expected to influence the Saudi user's intention to use m-transaction.

The next chapter will further address the developments of the research conceptual framework. It will, furthermore, discuss in details each construct of the developed conceptual framework and its hypotheses.

Chapter 7 Research Conceptual Framework

7.1 Introduction

The previous chapters (i.e. *Chapters 4, 5 and 6*) have introduced and detailed the different stages in developing the research conceptual framework and its components. They briefly discussed the different studies in the exploratory phase and how their results were integrated in order to build a comprehensive conceptual framework. More specifically, besides analysing the literature, the researcher has conducted three empirical studies to develop a robust comprehensive framework that encompasses the key factors which expected to affect Saudi users' intentions to use m-transactions. This chapter summarises and discusses the results of these studies, and shows how they have evolved in several stages, aiming to reach a satisfactory level of maturity. The main purpose of this chapter is to describe in more detail the individual constituents of the developed research framework that is to be used for data collection. In other words, it introduces the conceptual framework used as a basis for understanding and validating the factors influencing the intention to use m-transactions, as well as the proposed propositions/hypotheses.

7.2 The Research and Framework Development

This section briefly discuses the research's studies' findings which have a significant contribution for the framework and the research development. The first three exploratory studies serve the formation of the research framework and the second two studies serve as testing for the framework and as a validation for the results. These discussions (i.e. the first three studies) focuses on each study's results, which identify the framework constructs (factors).

7.2.1 The Results of Exploration of E-commerce in Saudi Arabia - Interviews

The findings of this study can be divided into two main categories that both play a significant role, from a consumer perspective, in the adoption of e-commerce. The first is 'Enablers', which is comprised of 10 factors and the second is 'Disablers', which is comprised of five factors. These categories were discussed earlier in Section 4.5.

Those factors and results of this study helped the researcher to direct the research path and gain a proper understanding of issues affecting electronic purchasing (first generation of m-commerce). It helped to build the essential knowledge about the Saudi users' concerns regards conducting electronic purchase. The concerns includes different aspects with regards to technology concern (e.g. security) and human behaviour concern (e.g. trust) and organizational concern (e.g. government role). The diversity of these concepts and concerns gives the research and the researcher a better appreciation and understanding of the underlying problem and helped to build a first draft of the research conceptual framework, which includes the factors resulted from this study. For further discussion on this study, please refer to the fourth chapter (*Chapter 4: Exploratory study in Electronic Commerce – Interviews*).

7.2.2 The Results of Exploration of M-transaction in Saudi Arabia - Interviews

The results of this study, which focused on m-transaction can be divided into four main categories, as discussed in Section 5.6 these factors are expected to play a significant role in the acceptance or

use of m-transactions. Those categories are: "Design and language support", "User-related Factors", "Organisational-related Factors", "System-related Factors".

Although the previous ecommerce study shed light on the underlying topic, this study helped the researcher to enrich the knowledge field and sharpen the understanding with regards to factors affecting the use of m-transaction. It provided more understanding of the electronic purchasing, however, the focus here is in m-transaction. This study helped the research conceptual framework to include factors and the Saudi users' concerns about the use of m-transaction. Therefore, the research conceptual framework is more accurate and can predict the Saudi users' intention to use m-transaction. However, there is a great number of factors included in the framework and due to logistics and time restrictions, the researcher has to limit the number of factors and focus in the most important factors that has the highest expectation to affect the intention to use m-transaction. Therefore, another study has to be conducted which will be discussed in the next section. For further details with regards the m-transaction study, please see *Chapter 5: Exploratory Study in Mobile Transaction – Interviews*.

7.2.3 The Results of Exploration of M-transaction in Saudi Arabia - Focus Group

As discussed above, all the results from the previous research exploratory studies (i.e. exploratory study in e-commerce and exploratory study in m-transaction) were further discussed in another study (focus group). This study discuss all factors by a representative sample and the discussion was rich and only focusing on the importance of each factor with regards using m-transaction in Saudi Arabia by the Saudi users. Furthermore, the group members introduced even two more important factors (i.e. culture and social influence). The results that emerged from the discussions in the group were organised into 11 key factors (please see Section 6.6). These factors formulate the research conceptual framework. Other aspects were mentioned in the discussion, such as: awareness, payment gateway, postal services…etc., but these concepts were considered as insignificant or irrelevant by the participants during the discussion. For full details on this study please refer to *Chapter 6: Exploratory Study in Mobile Transaction – Focus Group*.

At this point, the final enhanced version of the research conceptual framework was developed, and, needes to be tested with a large representative sample. The next section provides a brief discussion about two studies, the first one aimed to test the framework and the second one aimed to validate the results.

7.3 Research Framework

This research aims to develop a consolidated framework for the intention to use m-transactions, combined with a set of recommendations for mobile websites and application developers, designers, governments, and organisations which intend to extend their business into the mobile commerce area, and eventually for the users themselves. In order to achieve this goal, this study evolved in several stages aiming to reach a satisfactory level of maturity. These stages can be divided into three main phases: three exploratory studies, the first of which (1) shed light on e-commerce as the first generation of m-commerce, while the other two studies focused on m-transactions. These studies helped the researcher to then include the cultural qualities and the social influence as further dimensions, as they play a significant role in such a unique cultural region. Consequently, a holistic framework was created that includes the key factors affecting the intention to use m-transactions. This framework was empirically validated in a further study (2) using a statistically representative sample size of more than 1000 Saudi users from different demographic backgrounds. Ease of use was the most influential for the intention to use m-transactions. Therefore, this lead to another study (3) the aims of which were to empirically investigate the level of ease of use (usability) of conducting m-transactions within the Saudi context. In total, this research went through five different empirical

studies to extend our understanding of the phenomenon of m-transactions. Please see Figure 7.1, which summarises all the different stages and their results.

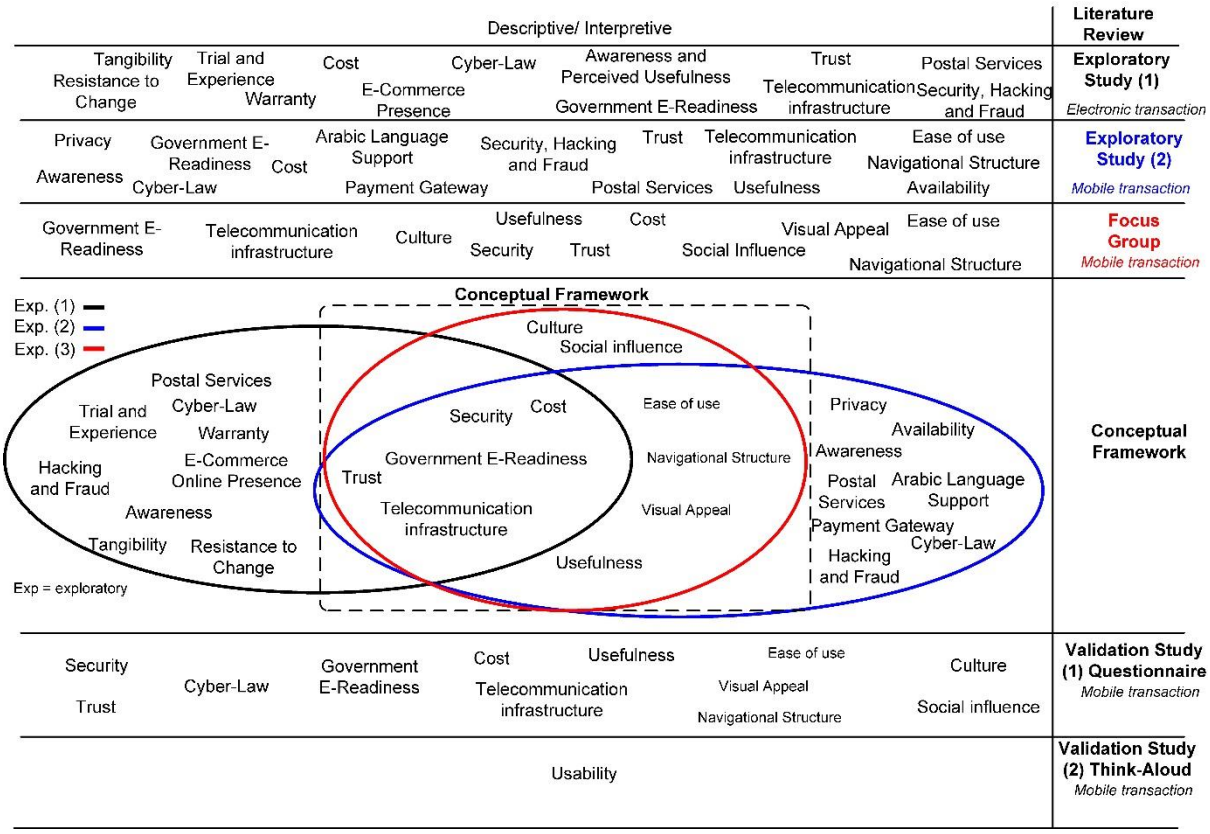

Figure 7.1: A summary of the Studies' Results and the Developed Conceptual Framework.

The factors and their relationships, which depict/form the research framework, can be seen in Figure 7.2.

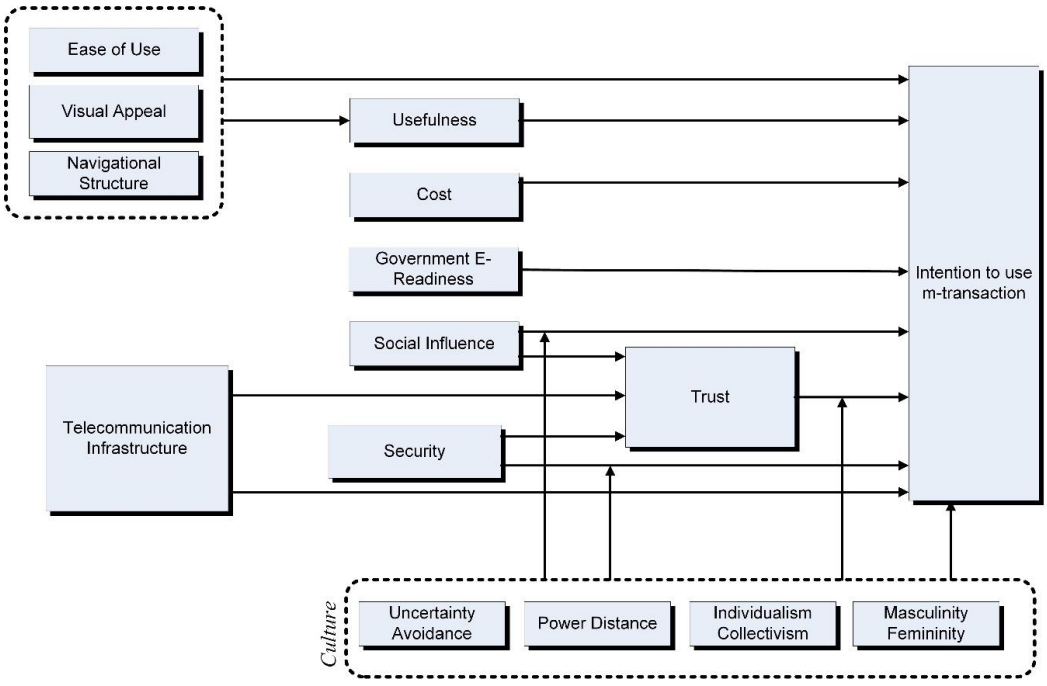

Figure 7.2: A Conceptual Framework of the Intention to Use M-Transactions.

7.4 Components of the Research Framework

As shown in Figure 7.2, this conceptual framework consists of fifteen factors (i.e. *intention to use, trust, security, telecommunication infrastructure, social influence, government E-readiness, cost, usefulness, ease of use, visual appeal, navigational structure, uncertainty avoidance, power distance, individualism/collectivism, and masculinity/femininity*). A discussion and the rationale for considering each factor are outlined in the following sections. Furthermore, the factors' operationalizing (items), reliability (Cronbach's Alpha) as performed by the resource (i.e. literature review), and the source will be presented. Moreover, the propositions/hypotheses of the hypothesised research constructs are illustrated as well.

7.4.1 Intention to Use Mobile Transactions

Researchers have long been studying individuals adopting new information technology through several streams of research. One stream focuses on individual acceptance of new technology, using *intention to use* as a dependent variable (Venkatesh et al., 2003a; Davis et al., 1989; Compeau and Higgins, 1995a). This stream should make unique contributions to the knowledge and to the literature on users' acceptance of new technology (Venkatesh and Bala, 2008; Venkatesh et al., 2003a). Furthermore, taking into account the competing models, which resulted from the research on information technology (IT) acceptance, Venkatesh et al. (2003a) reviewed eight prominent models: "the theory of reasoned action", "the technology acceptance model", "the motivational model", "the theory of planned behaviour", "a model combining the technology acceptance model and the theory of planned behaviour", "the model of PC utilization", "the innovation diffusion theory" and "the social cognitive theory", to formulate a unified model that integrates elements across these eight models and which also uses *intention to use* as a dependent variable (Venkatesh et al., 2003a). On the other hand, scholars have also used *intention to use* as a dependent variable to determine the acceptance of mobile applications and transactions (Kim et al., 2010; Yang et al., 2012; Nysveen et al., 2005; Wu and Wang, 2005). The role of intention as a predictor of behaviour has a great impact and is well-established within research. Therefore, this research employs the *Intention to Use Mobile Transaction* as a key dependent variable in the theoretical models to capture (conceptualise) the acceptance of using mobile transactions. The Table 7.1 shows the items used to measure this construct with its reliability (Cronbach's Alpha). Also it summarises the construct's operationalised items (measurements), source, and their reliability (Cronbach's Alpha).

Table 7.1: Intention to Use Measurements, Sources and Reliability.

	Items (measurements)	**Cronbach's Alpha**
IU1	*Assuming I have access to the mobile transaction, I intend to use it.*	0.820
IU2	*Given that I have access to the mobile transaction, I predict that I would use it.*	
IU3	*I am likely to use mobile transaction in the near future.*	
Sources: (Venkatesh and Davis, 2000; Yang et al., 2012).		

7.4.2 Ease of Use

Davis (1986) defined the *perceived ease of use* as "the degree to which an individual believes that using a particular system would be free of physical and mental effort." Another definition in a later study was "the degree to which the prospective user expects the target system to be free of effort."(Davis et al., 1989). Perceived *ease of use* plays an important role in the user's *intention to use* of mobile technologies. Its importance relies on the fact that, in addition to its high ability to have an impact on the *intention to use*, it has a significant direct effect on perceived *usefulness* as well (Davis, 1986; Kim et al., 2010). Likewise, the construct *complexity* of Diffusion of Innovation (DOI) theory has a similar role and effect on the perceived *ease of use* from the Technology Acceptance

Model (TAM) theory. Rogers (2003) defined complexity as "the degree to which an innovation is perceived as difficult to understand and use". This definition, similarly to perceived *ease of use*, refers to the individual's perception of whether using the new technology is cognitively and physically easy and requires a low level of effort. Consequently, perceived *ease of use* of TAM is similar to the complexity of DOI (Wu and Wang, 2005; Mallat et al., 2009; Chen and Adams, 2005). Kim et al. (2010) stated in their study, within the context of perceived *ease of use*, that to avoid the underutilisation of m-payment systems, m-payments must be both easy to learn and easy to use. Therefore, this study included the perceived *ease of use* as one of the measurements of m-transactions intention to use.

From the IT perspective, ease of use reflects a user's overall perception of the usability of interacting with an IT artefact (Vance et al., 2008). Despite the growing interest in m-commerce platforms, the poor usability of mobile sites and applications for commercial activities is a prominent major obstacle to the adoption of mobile solutions. "Such difficulty discourages users from accessing mobile Internet sites," (Matthew, 2014). Furthermore, Min and Li (2009) highlighted the importance of usability as a factor for adopting mobile commerce; their study in China confirmed that usability is crucial to consumers' use of mobile transactions. Buranatrived and Vickers (2002) revealed that usability acts as a second barrier, after security, to the acceptance of m-commerce. Venkatesh et al. (2003b) in the USA also investigated the usability of mobile sites, identifying it as a significant requirement for successful m-commerce applications. Furthermore, they emphasised that the usability of Internet-based commercial sites on the traditional Personal Computer (PC) should not necessarily be equated directly with m-commerce and thus, special attention should be paid to m-commerce usability. Their study, based on surveys of mobile Internet users, concluded that usability is the biggest source of frustration for consumers. The important aspects are "Simplicity and Usability: The m-payment application must be user friendly with little or no learning curve to the customer" (Goyal et al., 2012). Therefore, it is anticipated that ease of use should have an effect on the perceptions of usefulness and intention to use of m-transactions in Saudi Arabia, and thus, the alternative hypotheses can be formulated as below. The construct ease of use operationalizing items (measurements), source and reliability are illustrated in Table 7.2.

H_a1: There is a significant relationship between *ease of use* and *usefulness* of *m-transactions*.

H_a2: There is a significant relationship between *ease of use* and *intention to use* m-transactions in Saudi Arabia.

Table 7.2: Ease of Use Measurements, Sources and Reliability.

	Items (measurements)	Cronbach's Alpha
EU1	*Interacting with the mobile transaction does not require a lot of my mental effort.*	0.800
EU2	*I find the mobile transaction to be easy to use.*	
EU3	*I find it easy to get the mobile transaction to do what I want it to do.*	
Source: (Venkatesh and Davis, 2000; Venkatesh and Bala, 2008).		

7.4.3 Navigational Structure

The quality, accessibility, design reliability and browser compatibility have always been major concerns in developing websites, especially commercial websites, which usually play a significant role in targeting and aiming to entice a large number of customers to conduct a financial transaction on the site. Tsygankov (2004) classifies these factors as web-resource determined successful factors. Moreover, Hossain (2012) refers in his study to the fact that, when there are problems with browsing a commercial website, 28% of people discontinue with that particular purchase from that website,

23% take the decision to stop buying from that website altogether, and 6% were unhappy or upset about their experience. As a result, websites that are qualified to deal with financial transactions and have problems with their browsing will be likely to lose more than half of their customers. In terms of mobile web browsing, these issues become more important and may lead to serious consequences. For instance, when browsing a website through a mobile device, there are unique features or characteristics for mobile devices, which can create problems for users when they are deciding to use m-transactions. These characteristics are, for example, the small screen, low connection and transmission speeds, a short battery life, low input/out solutions, moving context and filling in forms …etc. (Min and Li, 2009). All the above mentioned underlies the importance of a navigational structure whenever a mobile transaction is conducted via a mobile device. The navigational structure involves all the relative efforts made by a user to traverse an IT artefact user interface. Montoya-Weiss et al. (2003) define navigational structure as "the organisation and hierarchical layout of the content and pages in a Website". With regards to the mobile environment, Vance et al. (2008) refer to navigational structure as to how logically or intuitively information is organised within a mobile commerce web/application interface. They also highlight the fact that navigational structure has a great potential impact on ease of use (EOU). In addition, a recent study conducted by Alqahtani et al. (2014a) investigated the critical factors that concern users when deciding to use m-transactions. Their findings show that the support of browsing via mobile devices is essential to the success of that website/to decision to use m-transactions. This should also lead to the conclusion that the quality of the navigational structure may also affect the usefulness of using m-transaction. Therefore, it is anticipated that *navigational structure* should have an effect on the perceptions of *usefulness* and *intention to use* of m-transactions in Saudi Arabia, and thus, the alternative hypotheses can be formulated as below. The construct *navigational structure* operationalizing items (measurements), source and reliability are illustrated in Table 7.3.

H_b1: There is a significant relationship between *navigational structure* and *usefulness* of m-transactions.

H_b2: There is a significant relationship between *navigational structure* and *intention to use* of m-transactions in Saudi Arabia.

Table 7.3: Navigational Structure Measurements, Sources and Reliability.

	Items (measurements)	Cronbach's Alpha
NVS 1	*It is easy to find what I am looking for on the mobile transaction site/application.*	0.800
NVS 2	*It is easy to move around online using the mobile transaction site/application.*	
NVS 3	*The mobile transaction site/application offers a logical layout that is easy to follow.*	

Sources: (Venkatesh and Davis, 2000; Venkatesh and Bala, 2008; Vance et al., 2008).

7.4.4 Visual Appeal Perceptions

Aspects like the visual appeal of the medium, such as the look, the attractiveness, the graphics and even the layout of the mobile website or application may play a significant role in the decision to using m-transactions. Montoya-Weiss et al. (2003) define visual appeal as "the tangible aspect of the online environment that reflects the 'look and feel' or perceived attractiveness of a Website". Visual appeal implies the attractiveness of the web site/application, which includes graphics, colour and

even fonts. These aesthetics can be a crucial determinant of "surface credibility" – people "judging a book by its cover". With regards to surface credibility, Tseng and Fogg (1999) cited that "In the world of human relationships, we make credibility judgments of this type nearly automatically. The way people dress or the language they use immediately influences our perception of their credibility. The same holds true for computer systems and applications. For example, a Web page may appear credible just because of its visual design". Furthermore, research has found that visual appeal has a remarkable effect on the users' perception of ease of use (EOU) and, moreover, their trust in an IT artefact (Vance et al., 2008; Kim and Moon, 1998). Alqahtani et al. (2014a) found in their study that users consider the visual appeal of a website via a mobile device to be important and its importance increases if the website provides a transaction service. This indicates that the website of a mobile device with a poor visual appeal would, thus, be perceived as less useful by the customers. Therefore, it can be anticipated that *visual appeal* expected to have an effect on the perceptions of *usefulness* and *intention to use* of m-transaction in Saudi Arabia, and thus, the alternative hypotheses can be formulated as below. The construct *visual appeal* operationalizing items (measurements), source and reliability are illustrated in Table 7.4.

H_c1: There is a significant relationship between *visual appeal* and *usefulness* of m-transactions.

H_c2: There is a significant relationship between *visual appeal* and *intention to use* m-transactions in Saudi Arabia.

Table 7.4: Visual Appeal Measurements, Sources and Reliability.

Items (measurements)	**Cronbach's Alpha**
VA1 I like the look and feel of the mobile transaction site/application.	
VA2 The mobile transaction site/application is attractive.	0.800
VA3 I like the graphics on the mobile transaction site/application.	
Sources: (Venkatesh and Davis, 2000; Venkatesh and Bala, 2008; Vance et al., 2008).	

7.4.5 Usefulness

According to Davis (1986) perceived *usefulness* can be defined as "the degree to which an individual believes that using a particular system would enhance his or her job performance" and "as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organisational context" (Davis et al., 1989). With regards to the intention to use any technology-based device, software or concept, research has highlighted the importance of perceived *usefulness* to adopting or accepting that technology. Furthermore, the user's intention to use an information technology is predicated, to a large degree, on his/her perceived *usefulness* of the system (Davis et al., 1989; Kim et al., 2010).

Furthermore, the theory of Diffusion of Innovation possesses a construct which corresponds with the perceived *usefulness* of TAM. This construct is *relative advantage* which can be defined as "the degree to which an innovation is perceived as better than the idea it supersedes" (Rogers, 2003). In other words, the degree to which an individual perceives that using a new idea/technology will be better and will result in a more beneficial performance. Accordingly, the definition of *relative advantage* of DOI is applicable to the definition of perceived *usefulness* of TAM (Wu and Wang, 2005; Mallat et al., 2009; Chen and Adams, 2005). Users will use m-transaction when they find the system to be useful for his/her transaction needs or financial issues. Therefore, *usefulness* can be

expected to have an effect on the perceptions of *intention to use* of m-transaction in Saudi Arabia, and thus, the alternative hypothesis can be formulated as below. The construct *usefulness* operationalizing items (measurements), sources and reliability are illustrated in Table 7.5.

H_d: There is a significant relationship between *usefulness* and *intention to use* m-transactions in Saudi Arabia.

Table 7.5: Usefulness Measurements, Sources and Reliability.

	Items (measurements)	**Cronbach' s Alpha**
USF1	*Mobile transaction has more advantages than internet or off-line payment because services are not limited by location.*	0.846
USF2	*Mobile transaction is more convenient than internet or offline payment.*	
USF3	*Mobile transaction is more efficient than internet or off-line payment.*	
USF4	*Mobile transaction is more effective than internet or offline payment in managing a payment account.*	

Source: (Yang et al., 2012; Kim et al., 2009)

7.4.6 Cost

It has been suggested that in order to facilitate the growth of electronic purchasing in developing countries, serious policy intervention is needed, to reduce the cost of a number of essential aspects, including Internet access, communication, connection services and website hosting with adequate bandwidth load (Andam, 2003). Another recent study conducted by Lawrence and Tar (2010) emphasised the effects of the infrastructure and high cost access to the Internet. They claimed that the infrastructure and Internet access costs have prevented many users from using the Internet in developing countries and, as a result, hindered the development of electronic shopping. In addition, putting in place the essential infrastructure, competitive environment and legislative framework necessary to support affordable Internet access, should be a major concern of most developing countries. Astonishingly, this study (Lawrence and Tar, 2010) stated that the monthly subscription for Internet connection far exceeds the average monthly income of a large proportion of such a country's population. The researchers suggested that to encourage more electronic purchasing amongst users, companies should provide a wide range of options for Internet connections and communication services at competitive prices, so that users can choose different and suitable services according to their expectations and needs. This is in agreement with Cheong and Lei (2007), who mentioned that there are four main criteria for successful and acceptable mobile payment systems: security, cost, convenience and universality (Cheong et al., 2007). Accordingly, countries with lower access costs usually have a larger number of Internet users, and thus, the number of m-transactions will increase rapidly in these countries. In addition, "The m-payments should not be costlier than existing payment mechanisms to the extent possible. An m-payment solution should compete with other modes of payment in terms of cost and convenience" (Goyal et al., 2012). Therefore, the *cost* of using m-transactions can be anticipated to have an effect on the perceptions of *intention to use* of m-transactions in Saudi Arabia, and thus, the alternative hypothesis can be formulated as below. The construct *cost* operationalizing items (measurements), source and reliability are illustrated in Table 7.6.

H_e: There is a significant relationship between *cost* and *intention to use* m-transactions in Saudi Arabia.

Table 7.6: Cost Measurements, Source and Reliability.

	Items (measurements)	Cronbach's Alpha
COT1	*I think that using mobile transaction is expensive overall.*	0.936
COT2	*I think that the price level of using mobile transaction is a burden to me.*	
COT3	*I think that the price level of using special (privileged) service or information through mobile transaction is expensive to use.*	

Source: (Cheong and Park, 2005).

7.4.7 Trust

Along with DOI and TAM variables that impact on citizens' intention to use m-transactions; perceived trustworthiness is also an important variable. Trust can be defined as "The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Kim and Prabhakar, 2004). Trust also has another definition from the previous studies; the belief that vendors will perform some activity in accordance with customers' expectations (Gefen and Straub, 2004; Pavlou and Gefen, 2004). To consumers, trust is considered to be a vital factor in business (Business to Consumer (B2C)). It gives consumers confidence to buy products or services even if an electronic trader is unknown, thus encouraging greater use of online technologies, making the electronic transaction process easier, and enhancing the level of acceptance and adoption of electronic shopping activities. This in turn leads to the improvement of consumer commitment, boosts customer satisfaction, institutes the concept of loyalty, sustains long-term relationships with customers, and assists the acquisition of a competitive benefit. This will motivate further purchases in the future, increasing prices will be more easily tolerated, customers will become less worried about information privacy, and customers will tolerate the occasional mistakes made by an electronic trader (Pittayachawan, 2008). Upon subscribing to a mobile payment system, users are expected to place their inherent trust in the system. Giving access to a checking or savings account to a software company is not the same thing, in most users' minds, as giving these to a bank. Unless the basis for electronic payment systems is based on trusted and secured banking practices, it is unlikely that users will adopt it. Several studies realised the importance of trust in accepting or adopting new technologies. More specifically, Misra and Wickamasinghe (2004) referred in their research to the increasing importance of trust in mobile commerce (Misra and Wickamasinghe, 2004), and Khodawandi et al. (2003) stated that trust in mobile payment systems is a vital security feature. Mobile customers often feel more uncertain about mobile vendors and the outcomes of mobile transactions (Siau and Shen, 2003). This is because there are a high number of threats on the Internet (Ba and Pavlou, 2002). Mobile vendors, therefore, should act to help customers overcome uncertainty by building trust in vendors' web sites and in the Internet as a medium for transactions (Liu et al., 2004; Njite and Parsa, 2005). When it comes to mobile transactions, trust is even more critical, given the possible risks of being hacked. The growth of mobile payments has a very patchy record (Shin, 2009a). One possible major concern is that the fear of the risk of financial loss acts as an impediment to the acceptance/adoption of mobile payments. The reason for this may be the widespread knowledge of actual losses, or reports of vulnerabilities, or may just be because of uninformed concerns and the risk-averse nature of some consumers. In order to understand the substance and consequences of the issue, it is necessary that the payment schemes intended for use in mobile contexts be subjected to risk assessment. On the other hand, the society and surrounding culture may have a significant effect on trust formation by the users for any technology innovation. For example, the unique Saudi culture could significantly predict the extent to which Saudi users will place trust in m-transactions. A study by Vance et al. (2008) investigated the effect of culture on building users' trust in mobile commerce technologies, "We found that not only does culture directly

affect user trust in IT artefacts but it also moderates the extent to which navigational structure affects this form of trust. These findings show that system quality and culture significantly affect trust in the IT artefact and point to rich possibilities for future research in these areas". According to Hofstede (2001), there are five culture dimensions (i.e. power distance, uncertainty avoidance, individualism/collectivism, masculinity/femininity and long-/short-term orientation). With regards to Saudi Arabia, the first four dimensions will be considered as the fifth concept (long-/short-term orientation) was mainly developed based on a Chinese culture (Shin et al., 2007; Srite and Karahanna, 2006) (please see Section 7.4.12, for further discussion in Culture). Accordingly, *trust* in the service provider could significantly impact the users' intention to use m-transactions in Saudi Arabia, and therefore, the alternative hypotheses can be formulated as below. The construct *trust* operationalizing items (measurements), source and reliability are illustrated in Table 7.7.

H_f1: There is a significant relationship between *trust* and *intention to use* m-transactions.

H_f2: *Uncertainty avoidance* should significantly moderate the relationship between *trust* and *intention to use* m-transactions in Saudi Arabia.

H_f3: *Power distance* should significantly moderate the relationship between *trust* and *intention to use* m-transactions in Saudi Arabia.

H_f4: *Individualism-collectivism* should significantly moderate the relationship between *trust* and *intention to use* m-transactions in Saudi Arabia.

H_f5: *Masculinity-femininity* should significantly moderate the relationship between *trust* and *intention to use* m-transactions in Saudi Arabia.

Table 7.7: Trust Measurements, Source and Reliability.

	Items (measurements)	Cronbach's Alpha
TSP1	*In Saudi Arabia, the service provider has the necessary skills and ability to fulfil its tasks.*	0.908
TSP2	*In Saudi Arabia, the service provider keeps its promises.*	
TSP3	*In Saudi Arabia, the service provider keeps customer interests in mind.*	
Source: (Zhou and Lu, 2011).		

7.4.8 Telecommunication Infrastructure

The importance of maintaining stability in the telecommunication infrastructure is essential for the adoption and use of internet or wireless technology. This issue becomes even more critical when it comes to financial transactions and payments. With regard to m-transactions, consumers are aware of the importance of this issue and they demand not only the presence of a mobile infrastructure, but they are also requesting more sophisticated infrastructures (e.g. speed, bandwidth load, availability and error-free) (Alqahtani et al., 2014a; Kurnia; Odedra-Straub, 2003). This is in line with the findings of Al-Somali (2011) and Al-Somali et al. (2009) who paid attention to the internet connection with regards to online transactions and highlighted that "Without a proper Internet connection the use of online banking is not possible". Moreover, the internet connection (infrastructure) has been considered in the research as a main factor to predict the use and acceptance of m-transactions (Lawrence and Tar, 2010), and it can be concluded that the absence of an adequate basic infrastructural can create a significant barrier to the adoption and growth of online transactions in developing countries. Within the context of mobile commerce, San Martín et al. (2012) identified that firms with a proper telecommunication infrastructure, IT staff and support (especially in mobile commerce activities [e.g. m-transactions]), should be expected to outperform companies that are not endowed with such characteristics. Jennex et al. (2004) added that infrastructure, which is the

underlying foundation of networks, hardware, software, skills, processes, and resources, is a must before building any online purchasing application. This complies with Alqahtani et al. (2014a) findings that the telecommunication infrastructure was the third most influential factor in the success of m-transactions from users' perspectives. On the other hand, the quality of the infrastructure can be a determiner for building trust on such a technology (i.e. m-transactions). Vance et al. (2008) pinpoint that formation of trust in technology is similar to building trust between people; when users first experience a new technology (e.g. m-transactions), signals/signs of the reliability, dependability and quality of the system infrastructure are important in building trust in that technology. Furthermore, any uncertainty about the telecommunication infrastructure can put the users' trust at risk when they are conducting online transactions (Pavlou, 2003). Therefore, it can be anticipated that *telecommunication infrastructure* will have an effect on the perceptions of *trust* and *intention to use* of m-transactions in Saudi Arabia, and thus, the alternative hypotheses can be formulated as below. The construct *telecommunication infrastructure* operationalizing items (measurements), source and reliability are illustrated in Table 7.8.

H_g1: There is a significant relationship between *telecommunication infrastructure* and *trust* of m-transactions.

H_g2: There is a significant relationship between *telecommunication infrastructure* and *intention to use* m-transactions.

Table 7.8: Telecommunication Infrastructure Measurements, Source and Reliability.

	Items (measurements)	**Cronbach's Alpha**
IFR1	*In Saudi Arabia, the telecommunication infrastructure is reliable and efficient to support mobile transaction.*	0.750
IFR2	*In Saudi Arabia, the technology infrastructure of commercial and financial institutions is capable of supporting mobile transactions.*	
IFR3	*In Saudi Arabia, I feel that there is efficient and affordable support from the local IT industry to support the move on the mobile transaction.*	

Source: (Molla and Licker, 2005a).

7.4.9 Security

The emergence of m-transactions has raised various issues, amongst which is security. This is one of the technical barriers to m-transaction diffusion (Pousttchi and Wiedemann, 2007). The perception of security is considered as a significant antecedent of mobile payment acceptance (Pousttchi and Wiedemann, 2007). According to several studies investigating perceived security in terms of using and adopting mobile payments, the concept of security can be categorised as either objective or subjective security. The former (i.e. objective security), which is a solid technical characteristic, is perceived as being in place when a certain technological solution responds to all of five security objectives: authentication, confidentiality, authorization, integrity and non-repudiation. It is a significant antecedent of mobile payment acceptance. The latter (i.e. subjective security), which can be seen as the degree to which an individual believes that using a particular mobile payment procedure is secure, is the most frequently named reason for a refusal to adopt mobile payment (Pousttchi, 2003; Pousttchi and Wiedemann, 2007; Linck et al., 2006; Kreyer et al., 2002b; Pousttchi and Zenker, 2003; Kreyer et al., 2002a). This is consistent with Cheong et al. (2007), who declared that security is amongst the main four criteria (security, cost, convenience and universality) of accepting mobile payment systems (Cheong et al., 2007).

In addition, a study which targeted the Gulf Cooperation Council Countries (GCC) area, to investigate mobile phone users' attitudes towards mobile commerce and services, stated that, in spite

of the availability and convenience of some recent advanced wireless technologies (e.g. wi-fi, bluetooth, and wi-max) mobile purchasing and shopping would not be successful if the mobile application enablers and service providers were not available and if the infrastructure was lacking in security (Manochehri and AlHinai, 2008). More specifically, a more recent study by Bamasak (2011), exploring consumers' acceptance of mobile payments within the Saudi society, found that security of mobile payment transactions and the unauthorised use of mobile phones to make a payment, are of great concern to mobile phone users (Bamasak, 2011). These findings indicate that perceived security could play a critical role in adoption of m-transactions. Furthermore, wireless networks are vulnerable when compared to wired networks, because they use public airwaves to send signals that allow outsiders to intercept and steal significant data as well as tamper with files. Therefore, in order to encourage users to use m-transactions, it must be protected and it must ensure that all included procedures are secure. This in line with Goyal et al. (2012) who highlighted that in order to become acceptable in the market, mobile payment systems (e.g. m-transactions) must be secure and impenetrable to any potential risks (e.g. hackers). On the other hand, culture could have a significant effect on security perception with regards to adopting new technologies. Harby et al. (2012) conducted a study focusing on users' acceptance of secure electronic purchases within the context of Saudi culture, and concluded that the cultural background and disposition should be taken into consideration when applying IT technology. This in line with Rambo and Liu (2010) (Rambo and Liu, 2010) who stated that when considering electronic payments in Saudi Arabia "then it is vital to keep in mind that consumers' behaviour is bound by their cultures". Furthermore, Gibbs et al. (2003) stated in their study that in many countries, corporate culture is an inhibitor to electronic purchasing and IT more broadly. For example, in countries with an Asian culture, security does not form a real concern when accepting a new IT, whereas in countries with a different culture (Europe for example) security is a concern. On this basis, *security* can be anticipated to have an effect on the perceptions of *intention to use* of m-transactions in Saudi Arabia, and thus, the alternative hypotheses can be formulated as below. The construct *security* operationalizing items (measurements), source and reliability are illustrated in Table 7.9.

H_h1: There is a significant relationship between *security* and *trust* of m-transactions.

H_h2: There is a significant relationship between *security* and *intention to use* m-transactions.

H_h3: *Uncertainty avoidance* should significantly moderate the relationship between *security* and *intention to use* m-transactions in Saudi Arabia.

H_h4: *Power distance* should significantly moderate the relationship between *security* and *intention to use* m-transactions in Saudi Arabia.

H_h5: *Individualism-collectivism* should significantly moderate the relationship between *security* and *intention to use* m-transactions in Saudi Arabia.

H_h6: *Masculinity-femininity* should significantly moderate the relationship between *security* and *intention to use* m-transactions in Saudi Arabia.

Table 7.9: Security Measurements, Source and Reliability.

	Items (measurements)	**Cronbach's Alpha**
SEC1	*In general, I feel secure in using mobile transaction in Saudi Arabia.*	0.910
SEC2	*In Saudi Arabia, I feel safe in transaction, downloading contents, and accessing sites via mobile devices.*	
SEC3	*In Saudi Arabia, mobile transaction is well built against security-related concerns such as hacking, unauthorised uses, theft of data, interception of transmission, and virus.*	
SEC4	*In Saudi Arabia, the risk of an unauthorised third party overseeing the payment process is low.*	
SEC5	*In Saudi Arabia, the risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile transaction services.*	

Source: (Shin, 2009b).

7.4.10 Government E-Readiness

Molla and Licker (2005a) state that with regards to developing countries "The government demonstrates strong commitment to promoting E-Commerce". Government and industry's promotions are considered to be major enablers for electronic purchasing. This promotion takes different forms in different countries, the most frequent areas being the sponsorship of Information Technologies (IT) and E-Commerce in businesses (e.g. Small and Medium Enterprises SMEs) by supporting them with technology, training and funding (Gibbs et al., 2002). For example, the government in Mexico is enabling E-Commerce by promoting the IT industry and providing technical assistance to SMEs, and in Taiwan, the government is investing in up-to-date network-based business models (Gibbs et al., 2002). In AlGhamdi et al. (2011), the authors refer to the government's role in Saudi Arabia as an important influential factor. It facilitates the essential requirements for the development of E-Commerce such as providing robust secure online payment options, ensuring a solid ICT infrastructure, providing educational programs and increasing awareness using different means such as media and educational institutions. The results of their study show the significance of government promotion and support as a crucial factor. Furthermore, Eid (2011) claimed in his study that the Saudi Government's support was recognised as an important element in the development and growth of local E-Commerce (Eid, 2011). A recent report by Orloff (2012) reiterated the importance of the Saudi government in supporting electronic purchasing "Government support and enabling infrastructure is also an impediment to the adoption and diffusion of the online business model. Despite the government taking significant strides to implementing e-government tools to provide citizen services, the opportunity to capture the 'e-boom' has not sufficiently been harnessed by commerce and private sector." (Orloff, 2012). With Saudi culture, which is characterised as having a high power distance (Hofstede, 1980), people are expected to accept and believe in the superior role and the level of power that the government can possess, and therefore this will affect the acceptance and use of m-transactions. It can be concluded that *government E-readiness* can be anticipated to have an effect on the perceptions of *intention to use* of m-transactions in Saudi Arabia, and thus, the alternative hypotheses can be formulated as below. The construct *government E-readiness* operationalizing items (measurements), source and reliability are illustrated in Table 7.10.

> H_i: There is a significant relationship between *government E-readiness* and *intention to use* m-transactions in Saudi Arabia.

Table 7.10: Government E-readiness Measurements, Source and Reliability.

	Items (measurements)	Cronbach's Alpha
GEC1	*In Saudi Arabia, I believe that there are effective laws to protect consumer privacy.*	0.770
GEC2	*In Saudi Arabia, I believe that there are effective laws to combat cyber-crime.*	
GEC3	*In Saudi Arabia, I believe that the legal environment is conducive to conduct business on the Internet via mobile devices.*	
GEC4	*In Saudi Arabia, the government demonstrates strong commitment to promote mobile transaction.*	

Source: (Molla and Licker, 2005a).

7.4.11 Social Influence

Several IS researchers have noted that TAM is incomplete in one key respect; it does not account for social influences on the utilization and adoption of new technologies (Brown and Venkatesh, 2005; Davis, 1989; Hsu and Lu, 2007). Social influence, which is equivalent to subjective norm and normative pressure (Taylor and Todd, 1995a; Al-Somali et al., 2009; Shin, 2009a; Venkatesh and Morris, 2000), can be defined as "the person's perception that most people who are important to him think he should or should not perform the behaviour in question" (Fishbein and Ajzen, 1975). Davis et al. (1989) believed that in some conditions people might use a technology innovation to comply with others' mandates rather than their own feelings and beliefs (Davis et al., 1989). Venkatesh and Morris (2000) emphasise that social influence plays a significant role in determining the acceptance and usage behaviour of adopters of new ITs.

Social influence is postulated to have a positively direct effect on the intention to use mobile services. This relationship is in line with the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB), and the argument for the direct effect on intention to use, is that consumers can use a technology on the basis of social pressure alone (even though their attitude toward using the technology can be neutral or negative) (Nysveen et al., 2005). Within the context of a social construction such as a mobile telephone, a study conducted by Campbell and Russo (2003) contributed to building a social influence model of perceptions and uses of mobile phones within personal communication networks. Their findings illuminate how social interaction contributes to perceptions and uses in four key areas: mobile phone adoption, perceptions of non-normative use, attitudes about products and services, and collective use. They concluded that perceptions and uses of communication technologies are, at least in part, constructed socially amongst close personal contacts (Campbell and Russo, 2003). Therefore, customers may have unfavourable or favourable perceptions towards the use of m-transactions based on the perceptions of a family member, acquaintance or because of peer influence. The social context is usually an important characteristic and can motivate the Saudi user to purchase online (Alshehri and Meziane, 2013). Certainly, trust is typically formed gradually through extensive ongoing social interactions that enable individuals to build reliable expectations of what other people or organisations may do (Gefen and Straub, 2004). With regards to culture, Saudi Arabia possesses a unique culture as mentioned earlier (see section 7.4.12), and this could affect an individual's perceptions and values through social influence. Loch et al. (2003) stated that "Briefly, culture specific beliefs (CB) and values are thought to be surrogates of culture that have a downstream effect on the use of information systems". Furthermore, culture is demonstrated through social actions and becomes crystallised in social institutions, via the creation of social norms (SN) (Ajzen and Fishbein, 1980). Therefore, it can be anticipated that *social influence* should have an effect on the perceptions of *trust* and *intention to use* of m-transactions in Saudi Arabia. Also, it can be predicted that Saudi's cultural dimensions could significantly moderate the prediction of social influence on intention to use m-transactions. Thus, the alternative hypotheses can

be formulated as below. The construct *social influence* operationalizing items (measurements), sources and reliability are illustrated in Table 7.11.

H_j1: There is a significant relationship between *social influence* and *trust* of m-transactions.

H_j2: There is a significant relationship between *social influence* and *intention to use* m-transactions.

H_j3: *Uncertainty avoidance* should significantly moderate the relationship between *social influence* and *intention to use* m-transactions in Saudi Arabia.

H_j4: *Power distance* should significantly moderate the relationship between *social influence* and *intention to use* m-transactions in Saudi Arabia.

H_j5: *Individualism-collectivism* should significantly moderate the relationship between *social influence* and *intention to use* m-transactions in Saudi Arabia.

H_a: *Masculinity-femininity* should significantly moderate the relationship between *social influence* and *intention to use* m-transactions in Saudi Arabia.

Table 7.11: Social Influence Measurements, Source and Reliability.

	Items (measurements)	**Cronbach's Alpha**
SIF1	*People who influence my behaviour think that I should use mobile transaction.*	0.880
SIF2	*My friends think that I should use mobile transaction.*	
SIF3	*People around me who use mobile transaction have more prestige than those who do not.*	
SIF4	*People who use mobile transaction have a high profile.*	
SIF5	*Using mobile transaction is considered a status symbol amongst my friends.*	
Source: (Yang et al., 2012; Lu et al., 2005).		

7.4.12 Culture

Kluckhohn (1951) referred to culture as "consists in patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievements of human groups, including their embodiments in artefacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values" (cCited in Hofstede (2001). In addition, Hofstede (2001) introduced a shorthand definition as "the collective programming of the mind that distinguishes the members of one group or category of people from another".

Cultural differences have become an important issue in the evaluation of technological products. In order for a research model to be valid for comparisons, it has to be robust across cultures (Al-Gahtani et al., 2007). Culture effects (Hofstede's cultural dimensions) have been considered in research to understand user's acceptance of new technology. McCoy et al. (2007) studied applying TAM across different cultures with a sample size of 4000 students around the world (24 countries). Their results revealed that TAM may not be suitable for certain cultural orientations. Surprisingly, they found that cultural qualities (i.e. low uncertainty avoidance, high masculinity, high power distance, and high collectivism) have significant moderating effects on the perceived ease of use and/or perceived usefulness. This is in line with Srite (2006), who examined TAM across two cultures (US vs China). They concluded that caution needs to be employed when applying TAM in cultures other than the US. Furthermore, in Saudi Arabia "a high level of cultural and social homogeneity prevails" (Eid,

2011) and "as in other nations, Arab managers do not exist in an economic or social vacuum. They are heavily influenced by society's social structure and by the values, norms and expectations of its people." (Bjerke and Al-Meer, 1993). Loch et al. (2003) studied the culture specific inducements and impediments to using the Internet in the Arab world (Egypt, Kuwait, Lebanon and Saudi Arabai); their findings highlighted the fact that culture can both inhibit and encourage technological innovations in the Arab world. Therefore, this research will draw on Hofstede's dimensions to describe the Saudi Arabian cultural implications of m-transaction users' acceptance. Hofstede's cultural dimensions scores for the US, UK and Saudi Arabia are shown in Table 7.12.

Table 7.12: Hofstede's Country Scores for USA, UK and KSA (Saudi Arabia).

Cultural Dimension	United States		United Kingdom		Saudi Arabia	
	Index	Rank	Index	Rank	Index	Rank
Power Distance	40	38	35	42-44	80	7
Uncertainty Avoidance	46	43	35	47-48	68	27
Individualism/Collectivism	91	1	89	3	38	26-27
Masculinity/Femininity	62	15	66	9-10	53	23
Long-/Short-Term Orientation	29	27	25	28-29	N/A	N/A

Source: (Hofstede, 2001).

With regards to the fifth cultural dimension (i.e. long-/short-term orientation), there are no values/scores for Saudi Arabia. This dimension which also known as "Confucian dynamism" is mainly based on the Chinese Culture (Shin et al., 2007; Srite and Karahanna, 2006). Furthermore, another study by Erumban and Jong (2006) who attempted to explain the differences in ICT adoption rates across 42 countries by using Hofstede's cultural dimensions, had not considered this category in their analysis due its inapplicability in many countries. This in line with (McCoy et al., 2007; Srite, 2006). Therefore, this research will drop this dimension from the conceptual framework. Further discussion of each dimension will presented below:

Power distance: This dimension refers to the fact that everyone is not equal, and examines how people react to the differences in power between different individuals. Power distance is defined "as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally" (Hofstede, 2001). Saudi Arabia's score is high (80). Although the country has a hierarchical structure, this is generally accepted by the population, who do not feel that it needs any further justification. The hierarchy within a group is considered to reflect the inherent qualities of the group members, centralization is widespread, subordinates expect to be told what to do and the ideal boss is a benevolent autocrat (Hofstede et al., 2010).

Individualism-collectivism: This dimension addresses "the degree of interdependence a society maintains among its members" (Hofstede, 2001). In individualist societies, people are concerned only about themselves and their families, while in collectivist societies, their concern is for the group they see themselves as belonging to. Saudi Arabia is considered to be a collectivist society (score 38), which means that it is characterised by a strong commitment to others, be that family, extended family or extended relationships. Because of this strong commitment to a group, loyalty is paramount, and takes precedence over most other rules and regulations. Responsibility for other members of the group is also important. In business, managers manage groups rather than individuals, and the employer-employee relationship is more like a family link; when hiring and firing, managers keep in mind who is within their own 'group' (Hofstede et al., 2010).

Masculinity-femininity: If a society scores high in this dimension, it is dominated by masculine attributes such as competition, achievement and success. The concept of success begins early on in life at school, with winners and losers, and awards for being the best, and this continues into adulthood and professional life. If on the other hand a society scores low in this dimension, feminine traits are more dominant, such as caring for others and consideration for the quality of life. Instead of wishing to stand out for being the best, individuals value a high quality of life. The "fundamental issue here is what motivates people, wanting to be the best (masculine) or liking what you do (feminine)" (Hofstede, 2001). Saudi Arabia scores 53 on this dimension and is thus a masculine society. Work is therefore highly valued, managers are decisive, and there is a high level of competition, with an emphasis on equity and performance. Any conflicts that arise are solved by 'fighting them out', rather than with diplomacy (Hofstede et al., 2010).

Uncertainty avoidance: this dimension is concerned with the uncertainty of the future and how societies cope with this, whether they try to control future events or just let them happen. Uncertainty over the future can bring anxiety and fear. "The extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these is reflected in the UAI score" (Hofstede, 2001). Saudi Arabia's score is 68, meaning that it prefers to avoid uncertainty. In societies with a high score in this dimension, orthodox behaviour and ideas are expected and people are supposed to conform to rigid codes of conduct and beliefs; even if the rules and regulations do not seem to work, people feel an emotional attachment and need for them. Hard work, punctuality and precision are valued, while innovation may be inhibited. Security is a very important motivator. Therefore, it can be anticipated that the Saudi's cultural dimensions (i.e. *masculinity*-femininity, *individualism*-collectivism, power *distance* and *uncertainty avoidance*) should have an effect on the *intention to use* of m-transactions in Saudi Arabia. Thus, the alternative hypotheses can be formulated as below. The Saudi's cultural dimensions operationalizing items (measurements), sources and reliability are illustrated in Table 7.13.

H_k1: There is a significant relationship between *masculinity-femininity* and *intention to use* m-transactions in Saudi Arabia.

H_k2: There is a significant relationship between *individualism-collectivism* and *intention to use* m-transactions in Saudi Arabia.

H_k3: There is a significant relationship between *power distance* and *intention to use* m-transactions in Saudi Arabia.

H_k4: There is a significant relationship between *uncertainty avoidance* and *intention to use* m-transactions in Saudi Arabia.

Table 7.13: Hofstede's Country Scores for USA, UK and KSA (Saudi Arabia).

Cultural dimensions		**Items (measurements)**	**Cronbach 's Alpha**
Masculinity -Femininity	*MF1*	*In Saudi Arabia, there are some jobs which a man can always do better than a woman.*	0.876
	MF2	*In Saudi Arabia, It is more important for men to have a professional career than it is for women to have a professional career.*	
	MF3	*It is preferable to have a man in high level position rather than a woman in Saudi Arabia.*	
Individualism-	*IDC1*	*In Saudi Arabia, being accepted as a member of a group is more important than having autonomy and independence.*	0.841
	IDC2	*In Saudi Arabia, being loyal to a group is more important than individual gain.*	

Collectivism			
	IDC3	*Group success is more important than individual success in Saudi Arabia.*	
Power Distance	*PWD 1*	*In Saudi Arabia, employees should not question their manager's decisions.*	0.797
	PWD 2	*In Saudi Arabia, managers should not ask subordinates for advice, because they might appear less powerful.*	
	PWD 3	*Managers should be careful not to ask the opinions of subordinates too frequently, otherwise the manager might appear to be weak and incompetent in Saudi Arabia.*	
Uncertainty Avoidance	*UAV1*	*In Saudi Arabia, rules and regulations are important because they inform workers what the organisation expects of them.*	0.790
	UAV2	*In Saudi Arabia, order and structure are very important in a work environment.*	
	UAV3	*In Saudi Arabia, it is important to have job requirements and instructions spelled out in detail so that people always know what they are expected to do.*	
	UAV4	*It is better to have a bad situation that you know about, than to have an uncertain situation which might be better in Saudi Arabia.*	
	UAV5	*In Saudi Arabia, providing opportunities to be innovative is more important than requiring standardised work procedures.*	

Sources: (Srite, 2006; Srite and Karahanna, 2006)

7.5 Summary

This chapter introduced the conceptual framework that will be used as the basis for the instruments that were implemented in this research. It first shed light on the research exploratory phase (i.e. three studies), with regards to methodologies and results, also provided a brief discussion and showed the integration of these studies and how they evolved in different stages to help ensure the maturity of the research framework development. Then, it discussed the research constructs and gave emphasis to elaborating the construct conceptualizations, reliability and measurement scales.

However, the developed conceptual framework needs to be tested against Saudi users with a large sample size in order to test the conceptualized research factors and to generalize the findings. These needs are addressed in the next study and through the next two chapters (*Chapter 8: The Empirical Settings and Data Validation (Validation Study (1))* and *Chapter 9: Quantitative Data Analysis (Validation Study (1)*).

Chapter 8 The Empirical Settings and Data Validation (Validation Study (1))

8.1 Introduction

This chapter begins with a summary of the research constructs, which are the results of previous studies. Then there is a discussion of the methodology used, with justifications for the methods chosen, followed by details of the survey design, the pilot stage, and the distribution and collection of the questionnaire. There is an explanation of how the survey data was screened for missing or invalid data, and finally this chapter provides a descriptive analysis of the research variables.

8.2 The Research Measurements

Table 8.1 illustrates each construct and its measurements (indicators). Each of the indicators was measured using a 7-point Likert-scale. These interval scales ranged from strongly disagree, disagree, disagree somewhat, not applicable, agree somewhat, agree, to strongly agree. The survey data with regards to the demographics and descriptive data was primarily measured using nominal scales. There are 11 factors in this research, however, according to Hofstede (2001) the culture consists of 4 factors (i.e. masculinity/femininity, individualism/collectivism, power distance, and uncertainty avoidance). Therefore, this research will test these four dimensions to understand the cultural effect on the decision of using m-transaction in Saudi Arabia. In addition, there are 10 questions to gather demographic/characteristics about the participants. Other items were later added to the data set to facilitate the analysis (e.g. IDs). The Table 8.1 summarises the research's constructs and their operationalizing (measurements), the measurements references and the references' cronbach's alpha.

Table 8.1: Summary of the Research Constructs and Their Measurements.

Constructs	Measurements	References	Cronbach's alpha
Intention to Use	• *Assuming I have access to the mobile transaction, I intend to use it.* • *Given that I have access to the mobile transaction, I predict that I would use it.* • *I am likely to use mobile payment services in the near future.*	(Venkatesh and Davis, 2000) & (Yang et al., 2012)	0.820
Ease of Use	• *Interacting with the mobile transaction does not require a lot of my mental effort.* • *I find the mobile transaction to be easy to use.* • *I find it easy to get the mobile transaction to do what I want it to do.*	(Venkatesh and Davis, 2000) (Venkatesh and Bala, 2008)	0.800
Visual Appeal	• *I like the look and feel of the mobile transaction site/application.* • *The mobile transaction site/application is attractive.* • *I like the graphics on the mobile transaction site/application.*	(Venkatesh and Davis, 2000) (Venkatesh and Bala, 2008)	0.800
Navigational structure perceptions	• *It is easy to find what I am looking for on the mobile transaction site/application.* • *It is easy to move around online using the mobile transaction site/application.* • *The mobile transaction site/application offers a logical layout that is easy to follow.*	(Venkatesh and Davis, 2000) (Venkatesh and Bala, 2008)	0.800
Cost	• *I think that using mobile transaction is expensive overall.* • *I think that the price level of using mobile transaction is a burden to me.* • *I think that the price level of using special (privileged) service or information through mobile transaction is expensive to use.*	(Cheong and Park, 2005)	0.936

Telecommunication Infrastructure	• *In Saudi Arabia, the telecommunication infrastructure is reliable and efficient to support mobile transaction.* • *In Saudi Arabia, the technology infrastructure of commercial and financial institutions is capable of supporting mobile transactions.* • *In Saudi Arabia, I feel that there is efficient and affordable support from the local IT industry to support the move on the mobile transaction.*	(Molla and Licker, 2005a)	0.750
Usefulness	• *Mobile transaction has more advantages than internet or off-line payment because services are not limited by location.* • *Mobile transaction is more convenient than internet or offline payment.* • *Mobile transaction is more efficient than internet or off-line payment.* • *Mobile transaction is more effective than internet or offline payment in managing a payment account.*	(Yang et al., 2012) & (Kim et al., 2009)	0.846
Government e-readiness	• *In Saudi Arabia, I believe that there are effective laws to protect consumer privacy.* • *In Saudi Arabia, I believe that there are effective laws to combat cyber crime.* • *In Saudi Arabia, I believe that the legal environment is conducive to conduct business on the Internet via mobile devices.* • *In Saudi Arabia, the government demonstrates strong commitment to promote mobile transaction.*	(Molla and Licker, 2005a)	0.770
Social influence	• *People who influence my behaviour think that I should use mobile transaction.* • *My friends think that I should use mobile transaction.* • *People around me who use mobile transaction have more prestige than those who do not.* • *People who use mobile transaction have a high profile.* • *Using mobile transaction is considered a status symbol amongst my friends.*	(Yang et al., 2012) & (Lu et al., 2005)	0.880
Security	• *In general, I feel secure in using mobile transaction in Saudi Arabia.* • *In Saudi Arabia, I feel safe in transaction, downloading contents, and accessing sites via mobile devices.* • *In Saudi Arabia, mobile transaction is well built against security-related concerns such as hacking, unauthorized uses, theft of data, interception of transmission, and virus.* • *In Saudi Arabia, the risk of an unauthorized third party overseeing the payment process is low.* • *In Saudi Arabia, the risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile transaction services.*	(Shin, 2009b)	0.910
Trust	• *In Saudi Arabia, the service provider has the necessary skills and ability to fulfil its tasks.* • *In Saudi Arabia, the service provider keeps its promises.* • *In Saudi Arabia, the service provider keeps customer interests in mind.*	(Zhou and Lu, 2011)	0.908
Masculinity/Femininity	• *In Saudi Arabia, there are some jobs which a man can always do better than a woman.* • *In Saudi Arabia, It is more important for men to have a professional career than it is for women to have a professional career.* • *It is preferable to have a man in high level position rather than a woman in Saudi Arabia.*	(Srite, 2006) (Srite and Karahanna, 2006)	0.876
Individualism/ Collectivism	• *In Saudi Arabia, being accepted as a member of a group is more important than having autonomy and independence.* • *In Saudi Arabia, being loyal to a group is more important than individual gain.* • *Group success is more important than individual success in Saudi Arabia.*	(Srite, 2006) (Srite and Karahanna, 2006)	0.841
Power Distance	• *In Saudi Arabia, employees should not question their manager's decisions.* • *In Saudi Arabia, managers should not ask subordinates for advice, because they might appear less powerful.* • *Managers should be careful not to ask the opinions of subordinates too frequently, otherwise the manager might appear to be weak and incompetent in Saudi Arabia.*	(Srite, 2006) (Srite and Karahanna, 2006)	0.797

Uncertainty Avoidance	• *In Saudi Arabia, rules and regulations are important because they inform workers what the organization expects of them.* • *In Saudi Arabia, order and structure are very important in a work environment.* • *In Saudi Arabia, it is important to have job requirements and instructions spelled out in detail so that people always know what they are expected to do.* • *It is better to have a bad situation that you know about, than to have an uncertain situation which might be better in Saudi Arabia.* • *In Saudi Arabia, providing opportunities to be innovative is more important than requiring standardized work procedures.*	(Srite, 2006) (Srite and Karahanna, 2006)	0.790

These factors in Table 8.1 form the research is unique conceptual framework and its structural path model. This framework formulates a unique combinations of factors and relationships that have not been studied before in the literature review. Furthermore, this framework was tested against a different environment and population from where these factors originated. This gives this research a different and interesting contribution in investigation the underlying research problem (i.e. intention to use m-transaction). In addition, this research can be considered as exploratory and confirmatory. This is because finding these factors was by using exploratory methods (e.g. interviews and focus groups). However, testing these factors was using confirmatory methods (e.g. questionnaires and usability test studies). Therefore, this research uses a novel methodology that not many researchers have applied. In addition, this research has recruited a large sample size (i.e. 1208 Saudi users) in order to generalize the research findings and provide more reliable suggestions or recommendations.

8.3 Study Methodology

The quantitative approach is applied using the survey strategy to assess the research propositions. Since the current research is to examine the intention to use m-transactions amongst Saudi users, the best source of primary data is the public users. Respondents were asked to participate by filling out a questionnaire. Therefore, the researcher approached Saudi users in universities, institutions, malls and shops (e.g. coffee shops). The sample process involved selecting Saudi users from different locations in different public and private organizations located in Saudi major cities (e.g. Riyadh, Jeddah, Dammam and Khobar) as well as hosting the questionnaire online. The questionnaires were distributed personally using purposive (judgement) sampling in association with response-driven sampling via social network applications (e.g. LinkedIn, Twitter and Hangouts), please see Section 3.10 for further details on 3.10 sample size and sampling technique. Furthermore, in order to maximize the sample size, the researchers sought the help of one of the national electronic newspapers in Saudi Arabia (i.e. Sabq.org). Later, the questionnaire was published online at the URL: "http://sabq.org/IWHfde" on the newspaper's server.

8.4 Survey Design

The survey has been adopted as a research strategy at this explanatory phase, in which a close-ended questionnaire was designed and used as a data collection technique. The survey was firstly developed with Microsoft Word to focus on carefully creating each question. Most of the survey items are rating questions with a few closed questions for demographic characteristics. As discussed previously, the survey items were adopted (where available) from reliable literature to ensure reliability and validity. The questionnaire consists of two parts. The demographic part is designed to collect the characteristics of the respondents as follows: five items that collect data about the respondent's education level, age, gender, annual income (in Saudi Riyals) and geographical location. A further eight items collected data about the respondents' computer and mobile literacy, online purchasing experience, frequency of online purchasing, possession of a mobile device and internet accessibility. The other section of the survey was designed to gather data for the research constructs as follows: three items for the constructs *cost*, *ease of use*, *individualism-collectivism; telecommunication*

infrastructure, *intention to use*, *masculinity-femininity*, *navigational structure*, *power distance*, *trust;* and *visual appeal*; four items for the constructs: *government E-readiness* and *usefulness*; and five items for the constructs: *security*, *social influence*, *uncertainty avoidance*.

As English is not the first language in Saudi Arabia and the majority of Saudi citizens do not use English fluently, the research instrument had to be translated from English into the local language, i.e. Arabic. Almost 100 percent of the Saudi population, 20 million according to a 2006 statistic, speak Arabic (Eid, 2011). In such a case, it is important to undertake "the translation of the research instrument into another language so that it can be understood by respondents in different countries, and has the same meaning in each research context" (Buil et al., 2012). Usually, translating the research instrument into a different language generates an additional challenge to ensure that the questioins have the equivalent meaning in all the languages in which the survey or interview is conducted. 'Direct translation' is a common translation technique in which a research questionnaire's questions are professionally translated from the source language to the target language of the respondents (Malhotra and Birks, 2007). To overcome the problems of direct translation in which a bilingual translator simply translates an instrument from one language to another, the researcher should employ more sophisticated methods, and the most commonly suggested is the procedure 'back-translation' (Buil et al., 2012). In this iterative method, the research instrument was translated by a profesional bilingual translator into Arabic. Then the questionnaire was translated back into its original language (English) by a second independent bilingual translator. If discrepancies are noticed in this process, corrections are made accordingly. This process can be repeated until equivalence is achieved. Furthermore, the two versions of the questionnaire were assessed by two academic experts to ensure accuracy (both of them speak English and Arabic fluently). The two versions of the survey in English and Arabic are illustrated in Appendix E and F, respectively.

8.5 Piloting the Survey

Prior to the final distribution of the questionnaires, it is important that they are pre-tested (through a pilot study) on a small population of the target sample "pilot studies are a crucial element of a good study design. Conducting a pilot study does not guarantee success in the main study, but it does increase the likelihood" (van Teijlingen and Hundley, 2002). Once the questionnaire was designed and had been checked by professionals and academics, a pilot study was conducted to test and highlight any difficulties that the participants may encounter with the questionnaire's structure or understanding of the survey items/questions. Therefore, the survey was piloted with a small sample of participants in Saudi Arabia (Dammam) in December 2013.

The participants (i.e. pilot study) were recruited via social network applications and a response-driven sampling technique through social networks. The participants completed the questionnaire according to their preferred form and language, i.e. paper or online based, Arabic or English language. Forty five questionnaires were distributed through networking in two forms: paper and online versions via personal visits and e-mails. The questionnaires were sent to participants with a cover letter/introductory page that introduced the research purpose, confirmed the confidentiality and provided the researcher's contacts details. Participants in the pilot stage were asked to fill out the questionnaire and to provide their feedback on the questionnaire items and structure. The participants were reminded every week to complete the survey and were encouraged to provide their feedback. Within a month, the researcher collected the completed surveys and comments. The response was 12 responses paper based, and 10 responses online based. According to the comments, the researcher then improved the design, reworded a number of statements, changed colour and font size, and reduced the number of pages. The researcher, in order to encourage people to participate in the survey, had put an option at the end of the survey for entering a draw for eleven prizes (The main winner was rewarded with 500SAR and another 10 winners with 50SAR).

Furthermore, as per the users' feedback, one item was dropped "*Secure electronic transaction and/or secure electronic mobile commerce environment services are easily available and affordable.*" from the construct *telecommunication infrastructure* as it seems not measuring the relevant factor and may cause confusing to the users. That left the construct with three items which seemed to be sufficient to measure the latent construct variable (Hair Jr et al., 2014). Likewise, the item "*In Saudi Arabia, being accepted as a member of a group is more important than being independent in Saudi Arabia*" was dropped from the construct *individualism-collectivism* as it caused confusion with the other item from the same construct (i.e. "*in Saudi Arabia, being accepted as a member of a group is more important than having autonomy and independence.*") because they are very similar.

8.6 Survey Administration

Once the final version of the questionnaire was developed and carefully examined, the next step was to distribute the copies of the survey to the maximum sample size. Using the postal mail for distributing the paper-based questionnaire was not a practical option as the Saudi postal mail is still not mature or sophisticated enough and cannot be considered as a suitable channel for distribution. "Difficulties associated with mail distribution suggest the use of alternative options, such as personal distribution and online survey." (Aldwsry, 2012) Abanumy (2006) stated in his study that the postal system in Saudi Arabia is a weak system, as there is no effective delivery system for mail and users need to collect it in person from the small number of distributed post offices in Saudi Arabia. Another difficulty was collecting back the questionnaires from the respondents, as there is no postal service where the sender pays the charges for delivery (Saudi Post, 2013). Therefore, the researcher had to utilize alternative options for distribution, such as personal distribution and online surveys. As stated by previous studies, Saudi society members tend to refuse to participate in questionnaires as a matter of policy, and personal distribution is therefore suggested in order to overcome this difficulty (Al-Maliki, 2005; Aldwsry, 2012). In order to facilitate the sampling procedure, the population can be divided into three major administrative regions. These regions are the eastern region, western region and the capital city region (Aldwsry, 2012). Cities located within these regions are the most developed areas in the country within which the majority of companies are located, they are highly populated and have a high business potential, representing 90% of the whole population (Central Department of Statistics & Information, 2010; Ministry of Foreign Affairs, 2013). The researcher, therefore, visited at least one city in each region i.e. in the eastern region: Dammam and Khobar; the western region: Jeddah; and the capital city region: Riyadh. These cities can be considered as representative of Saudi society as people from different parts of the Kingdom join together there for work and a better lifestyle (Aldwsry, 2012; Alqahtani et al., 2014a). Furthermore, as far as was possible, different locations in which organizations, institutes/institutions, malls and different shops could be found, were identified to facilitate the data collection procedure (e.g. Saudi Post Corporation, Al-Bassam institutes, Alhussan education & Training, Alothaim Malls and coffee shops). People walking in open areas were also approached (King Abdullah Road Walking area). Moreover, there are twenty-five Saudi universities across all Saudi Arabian cities (Ministry of Higher Education, 2012). Therefore, the researcher communicated with all the Saudi universities by email. However, the researcher had no response from any university, therefore, it was decided to visit in person three of the main universities in different locations/regions in Saudi Arabia i.e. King Saud University (Riyadh), Dammam University (eastern region), and King Abdulaziz University (western region). The administration was asked for their help in distributing the questionnaire copies to all the university's members. A week later, the researcher did a reminder call for each university. Within thirty days, only two universities (King Saud University and Dammam University) had responded and had started distributing the questionnaires. The researcher visited each university later and collected all the returned copies and showed great gratitude to the university administration staff.

On the other hand, with regards to the online survey, the researcher approached by email the main three regional electronic newspapers in Saudi Arabia (i.e. Alyaum, Alriyadh and Sabq newspapers).

Only one electronic newspaper (Sabg.org) showed support and enthusiasm for helping to distribute the online survey on their website at http://sabq.org/IWHfde. The researcher later gave sincere thanks to the reporter who assisted with the publishing processes. Moreover, the researcher utilized a number of professional and social networks and applications (i.e. LinkedIn, Twitter and Hangouts). All of the researcher's contact list were messaged and asked to participate in the online survey, and they were asked if they kindly could forward the message to those in their contact list. The researcher received several confirmations of participation and some did forward the message to their own contact list. The researcher thanked each responder for their great help. Moreover, the researcher put the online survey link onto a small piece of paper and asked the participants to deliver this link to their female relatives to encourage them to participate. The main data collection process commenced in December 2013, when most of the questionnaires were distributed and the researcher was able to collect the completed questionnaires (both paper and online).

With regards to difficulties in the distributing process, the researcher faced a number of challenges and obstacles. The researcher had to travel long distances during the distribution process. Most of the time, there was a need for a repeated visit or call to encourage the participants to take part. Disregard or a lack of interest in the research topic from participants occurred many times. Several questionnaires (paper and online) were left empty and/or with irrelevant comments or drawings. Some people replied that they were too busy and others just simply refused to participate.

During the distribution process, there were about 1,500 paper-based questionnaires distributed and about 7,000 online questionnaires – this is an estimation, because just the number of views of the online survey (published in the electronic newspaper website) exceeded 6,555 views (http://sabq.org/IWHfde). This indicates that the questionnaire reached all of those who viewed the news (i.e. survey link) and were able to participate in the survey, some of the participants did confirm their participation by leaving a comments (18 comments) on the newspaper website. Furthermore, the researcher distributed the questionnaire online to more than 500 people via the contact list, who were then asked to participate and forward the message to their own contact list. Moreover, the researcher distributed the questionnaire's online link via Twitter and asked those who have a high number of followers (some users have more than 100,000 followers, e.g. @MohammedAlarefe a Saudi user who has more than 10 million followers) to retweet the survey link in their Twitter account. It was always mentioned that the survey was only meant for Saudi users, and that therefore other nationalities could not participate. The non-usable replies were omitted (such as empty questionnaires or questionnaires with only a single answer). As this study only considers mobile users, non-mobile users were also removed. The response rate is illustrated in Table 8.2:

Table 8.2: A Summary of the Surveys Response Rate.

		Paper-Based	**Online-Based**
	Distributed	1500	7000
Returne	**Completed Cases**	524	433
	Incomplete Cases	49	2
	Not Returned Cases	951	6563

The Figure 8.1 shows (in percentages) a comparison between the paper-based and online-based surveys. The comparison shows that about 35% of the total number of paper-based questionnaires were completed, about 3.3% were incomplete and more than 63% were not returned. On the other hand, 6.20% of the total number of online-based questionnaires were completed by the users, two

online questioners were incomplete (0.02%), and more than 93.5% were not returned. Clearly the response rate for the online-based questionnaires was significantly lower than for the paper-based questionnaires. This is in line with (Nulty, 2008) who pointed out that usually paper-based surveys get a higher rate response "The data clearly shows that face-to-face administration results in higher response rates" although the researcher repeated the reminder emails and provided incentives to the users in the form of prizes, which was suggested by Nulty (2008).

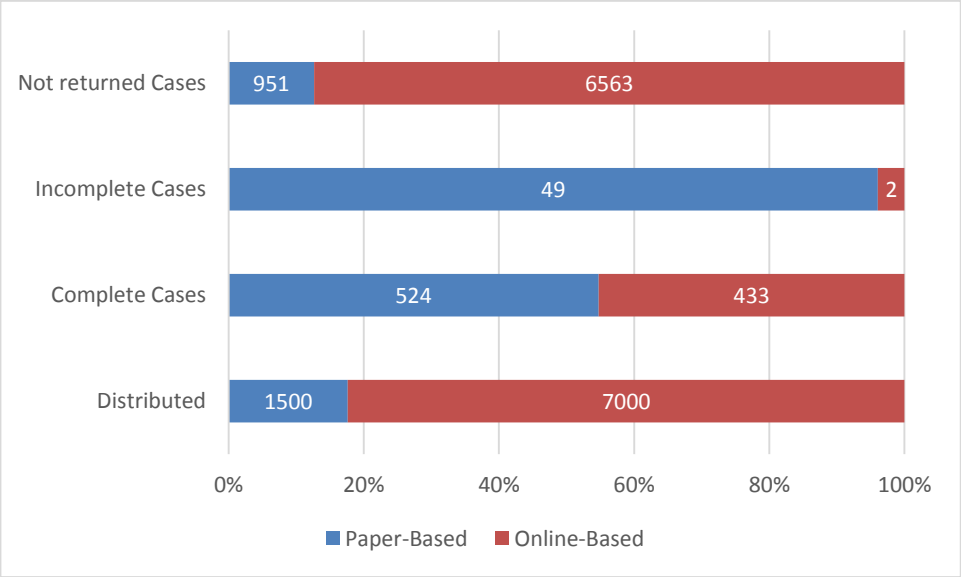

Figure 8.1: Comparison Between Completion of Paper and Online Based Questionnaires.

8.7 Data Preparation

In order to prepare the data for the analysis, the guidelines by Lowry and Gaskin (2014) and Gaskin (2012) were followed. First, all paper-based questionnaires were carefully entered into the software IBM SPSS Statistics (v. 19). Next, all the online-based questionnaires were integrated with paper-based questionnaires in one SPSS file. However, a new variable was added to the data set, "Distribution_Method", to identify each group for further analysis. With regards to data preparation, the data can be checked at two levels (i.e. case screening and variable screening). Each level will be discussed in details in the following sections.

8.7.1 Case Screening

This section will discuss missing data, and unengaged responses. There are 77 variables in the data set (i.e. 10 demographic variables, 66 variables (constructs indicators), one variable for grouping the distribution method (online & paper groups). After entering the data into the SPSS software, the data set was transferred into Excel 2010 format for further inspection. First the missing value percentage was calculated for each case, then sorted in descending order. The results reveal that there were about 20 cases missing more than 50% of the total number of variables, excluding ID and the added variables (e.g. distribution methods). Deleting these cases from the data set can be justifiable in order to reduce the impact of missing data (Hair et al., 2010). Furthermore, unengaged cases refer to when a user puts a similar answer for all the questionnaire items (e.g. a user responds with the same value for all the questionnaire's questions). In order to investigate the unengaged cases, the Standard Deviation (SD) function was applied in Excel. These results showed that there were 9 cases with 0 value of standard deviation, indicating that there was no variance in their answers at all. Although there were a few cases with low SD values, only cases with a zero SD value were omitted. Furthermore, there were 55 participants who had no mobile device and they were omitted from the sample, as the research is centred on mobile devices. The graph below shows the omitted cases (i.e.

missing more than 50% of answers, or having a zero SD value, or not possessing a mobile device) compared to the total number of cases.

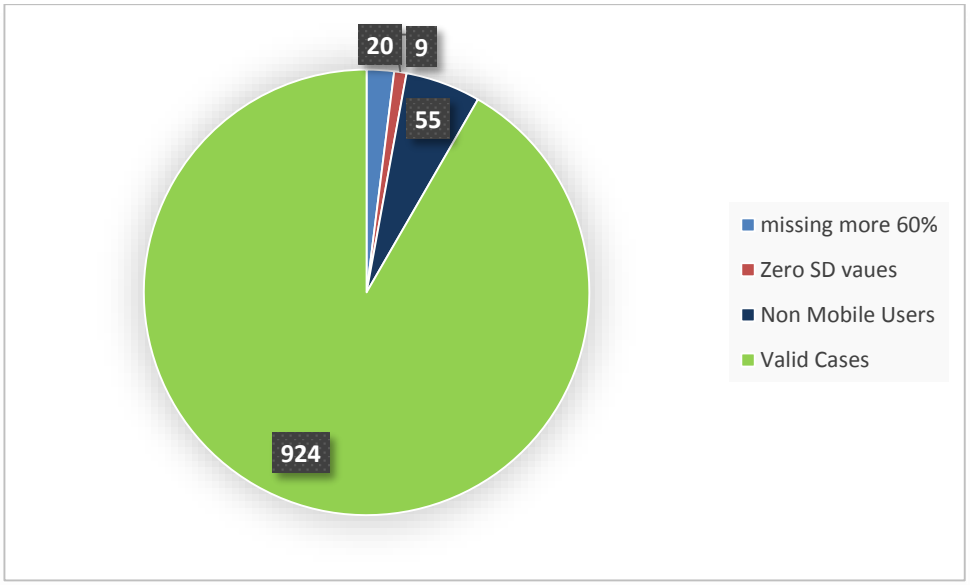

Figure 8.2: Summary of the Omitted Cases.

8.7.2 Variables Screening

Further investigation was conducted to detect missing values amongst the variables, by using IBM SPSS statistical software (Table 8.3).

Table 8.3: Summary Statistics of the research variables (N = 924).

	Case Statistics			Missing		Range		Normality Test			
Items	**N**	**Mean**	**Std. Dev.**	**Freq.**	**%**	**Low**	**High**	**Skewness**	**Std. Err.**	**Kurtosis**	**Std. Err.**
IU1	924	5.070	1.720	0	0.00	1	7	-0.411	0.080	-0.856	0.161
IU2	924	4.939	1.833	0	0.00	1	7	-0.390	0.080	-0.997	0.161
IU3	924	4.837	1.905	0	0.00	1	7	-0.221	0.080	-1.330	0.161
EU1	924	4.280	2.011	0	0.00	1	7	-0.093	0.080	-1.371	0.161
EU2	923	4.407	2.056	1	0.11	1	7	-0.169	0.080	-1.344	0.161
EU3	924	4.679	1.880	0	0.00	1	7	-0.306	0.080	-1.170	0.161
WS1	924	3.746	1.793	0	0.00	1	7	0.149	0.080	-1.126	0.161
WS2	924	3.492	1.797	0	0.00	1	7	0.267	0.080	-1.056	0.161
WS3	924	3.381	1.783	0	0.00	1	7	0.394	0.080	-0.997	0.161
NVS1	924	3.795	1.896	0	0.00	1	7	0.176	0.080	-1.195	0.161
NVS2	924	3.785	1.881	0	0.00	1	7	0.205	0.080	-1.180	0.161
NVS3	924	3.658	1.837	0	0.00	1	7	0.291	0.080	-1.133	0.161
USF1	924	4.350	2.139	0	0.00	1	7	-0.080	0.080	-1.491	0.161
USF2	922	3.870	2.099	2	0.22	1	7	0.153	0.081	-1.365	0.161
USF3	922	3.489	1.827	2	0.22	1	7	0.452	0.081	-0.839	0.161
USF4	924	3.146	1.823	0	0.00	1	7	0.676	0.080	-0.600	0.161
GEC1	922	3.871	1.634	2	0.22	1	7	0.175	0.081	-0.770	0.161
GEC2	924	3.669	1.739	0	0.00	1	7	0.297	0.080	-0.830	0.161
GEC3	923	3.143	1.817	1	0.11	1	7	0.515	0.080	-0.712	0.161
GEC4	924	3.097	1.748	0	0.00	1	7	0.593	0.080	-0.508	0.161
SIF1	924	3.707	1.789	0	0.00	1	7	0.209	0.080	-1.012	0.161
SIF2	924	3.802	1.799	0	0.00	1	7	0.138	0.080	-1.049	0.161
SIF3	924	3.465	1.841	0	0.00	1	7	0.280	0.080	-0.923	0.161
SIF4	924	3.563	1.629	0	0.00	1	7	0.181	0.080	-0.821	0.161
SIF5	924	3.837	1.869	0	0.00	1	7	-0.039	0.080	-1.081	0.161
SEC1	924	3.906	1.691	0	0.00	1	7	-0.061	0.080	-0.897	0.161
SEC2	924	3.642	1.756	0	0.00	1	7	0.063	0.080	-0.995	0.161
SEC3	924	3.368	1.728	0	0.00	1	7	0.262	0.080	-0.920	0.161
SEC4	924	3.477	1.652	0	0.00	1	7	0.251	0.080	-0.780	0.161
SEC5	924	3.451	1.572	0	0.00	1	7	0.229	0.080	-0.488	0.161

	Case Statistics			Missing		Range		Normality Test			
Items	**N**	**Mean**	**Std. Dev.**	**Freq.**	**%**	**Low**	**High**	**Skewness**	**Std. Err.**	**Kurtosis**	**Std. Err.**
IFR1	924	3.459	1.675	0	0.00	1	7	0.250	0.080	-0.846	0.161
IFR2	924	3.221	1.746	0	0.00	1	7	0.527	0.080	-0.741	0.161
IFR3	924	3.412	1.703	0	0.00	1	7	0.307	0.080	-0.805	0.161
COT1	924	3.878	1.961	0	0.00	1	7	0.171	0.080	-1.199	0.161
COT2	924	3.351	1.787	0	0.00	1	7	0.521	0.080	-0.793	0.161
COT3	923	3.606	1.958	1	0.11	1	7	0.391	0.080	-1.100	0.161
MF1	924	4.281	1.945	0	0.00	1	7	-0.037	0.080	-1.225	0.161
MF2	924	4.028	1.913	0	0.00	1	7	0.038	0.080	-1.122	0.161
MF3	924	3.812	2.044	0	0.00	1	7	0.198	0.080	-1.248	0.161
IDC1	922	4.137	1.712	2	0.22	1	7	-0.053	0.081	-0.891	0.161
IDC2	923	3.992	1.803	1	0.11	1	7	-0.038	0.080	-0.995	0.161
IDC3	924	4.034	1.910	0	0.00	1	7	0.160	0.080	-1.176	0.161
PWD1	924	3.689	1.910	0	0.00	1	7	0.284	0.080	-1.056	0.161
PWD2	924	3.846	2.029	0	0.00	1	7	0.126	0.080	-1.253	0.161
PWD3	922	3.317	1.873	2	0.22	1	7	0.599	0.081	-0.793	0.161
UAV1	924	4.176	1.928	0	0.00	1	7	-0.043	0.080	-1.194	0.161
UAV2	924	4.031	1.961	0	0.00	1	7	0.052	0.080	-1.241	0.161
UAV3	922	4.346	2.078	2	0.22	1	7	-0.052	0.081	-1.439	0.161
UAV4	923	4.518	1.850	1	0.11	1	7	-0.191	0.080	-1.027	0.161
UAV5	923	3.794	1.871	1	0.11	1	7	0.140	0.080	-0.992	0.161
TSP1	924	4.013	1.497	0	0.00	1	7	-0.238	0.080	-0.501	0.161
TSP2	924	3.593	1.576	0	0.00	1	7	-0.049	0.080	-0.721	0.161
TSP3	924	3.434	1.570	0	0.00	1	7	0.185	0.080	-0.612	0.161
Gender	924	1.208	0.406	0	0.00	0	1	1.443	0.080	0.082	0.161
Age	920	1.662	0.739	4	0.43	1	4	0.955	0.081	0.548	0.161
Qualif	923	1.882	1.092	1	0.11	1	5	1.221	0.080	0.466	0.161
Income	919	1.742	1.277	5	0.54	1	6	1.826	0.081	2.564	0.161
Location	920	1.196	0.518	4	0.43	1	3	2.619	0.081	5.714	0.161
Com_Skil	918	3.231	0.768	6	0.65	1	4	-0.666	0.081	-0.256	0.161
Inter_ Pur	916	1.318	0.466	8	0.87	1	2	0.784	0.081	-1.388	0.161
Int_Pur_Freq	920	2.748	1.032	4	0.43	1	4	-0.379	0.081	-0.998	0.161
Int_Pur_Loc	921	2.799	0.919	3	0.32	1	4	-0.391	0.081	-0.651	0.161
Mob_Skil	921	3.195	1.028	3	0.32	1	4	-1.011	0.081	-0.273	0.161
Mob_Int	904	1.100	0.300	20	2.16	1	2	2.679	0.081	5.190	0.162
Mob_Trans	922	1.110	0.312	2	0.22	1	2	2.504	0.081	4.281	0.161

From the Table 8.3, is illustrated that the missing values for the research's variables range from 0.1% to 2.16%. Further details such as means, Standard Deviation (SD), frequency and normality test are presented in Table 8.3. Furthermore, mean substitution is used to replace missing values, this method is one of the most widely used imputation method used to replace missing values (Gaskin, 2012).

8.8 Sample Profile (Demographic Analysis)

The sample size for this study contains 924 respondents in Saudi Arabia, as indicated in Table 8.4. The participants were recruited via two main means: paper-based, which represented 52.2% of the total number of participants, and online-based, which counts for 47.8% of the whole sample size. Participants' characteristics are described in this research through the following 10 aspects: gender, age, latest qualification, annual income in Saudi Arabia Riyal (SAR) (1 SAR = 0.266 USD), geographical location, level of computer and mobile skills, electronic purchasing (on a normal PC) experience, electronic purchase (PC) frequency and access to the internet via a mobile device. In addition, a further variable was added to determine the distribution method (online vs paper-based). The results demonstrate that there were 732 (79.2%) men, and 192 (20.8%) women in the total sample. Although there was a considerable female contribution in this study, there is a higher percentage of males due to the conservative nature of the Saudi society. 47.5% of respondents are aged 20 years or less, 40.8% are in the age group 21 - 34 years, 9.5% are in the age group 35-49 years and 2.2% are in the age group 50-64 years. Almost 47% have a secondary qualification, 35.3% bachelor, 3.0% higher diploma, 13.1% master and 2.1% had a PhD as their latest qualifications. Further characteristics can be seen in the Table 8.4.

Table 8.4: Summary Statistics of Demographic Characteristics of Participants.

Characteristics	Freq.	Percent
Distribution Method		
Paper	482	52.2
Online	442	47.8
Gender		
Male	732	79.2
Female	192	20.8
Age		
20 or under	439	47.5
21 - 34	377	40.8
35 - 49	88	9.5
50 – 64	20	2.2
Qualification		
Secondary	433	46.9
Bachelor	326	35.3
Higher Diploma	25	2.7
Master	121	13.1
PhD/Doctor	19	2.1
Income		
Less than 50,000	607	65.7
50,000 – 100,000	130	14.1
100,001 – 150,000	84	9.1
Location		
City	795	86
Town	78	8.4
Village	51	5.5

Characteristics	Freq.	Percent
Computer Skills		
No Skills	17	1.8
Beginner	138	14.9
Intermediate	385	41.7
Advanced	384	41.6
Internet Electronic Purchase		
Yes	672	72.7
No	252	27.3
Internet Electronic Purchase Frequency		
Frequently (5 to 10 times a month)	151	16.3
Average (3 to 4 times a month)	182	19.7
Rarely (1 to 2 times a month)	339	36.7
None	252	27.3
Mobile Skills		
No Skills	102	11
Beginner	108	11.7
Intermediate	222	24
Advanced	492	53.2
Mobile Internet Access		
Yes	822	89
No	102	11

8.9 Summary

This chapter set out the empirical setting of the study and provided a description of the research constructs, including the measurement scales and construct conceptualisations. It showed how in the survey all the different factors were covered from different perspectives. The survey was translated for the Arabic-speaking participants, and its validity was assessed and confirmed. It was distributed by two methods, online and paper-based, using personal distribution and social media. From the several thousand copies of the questionnaire sent out, 1008 were completed and returned. These were tested for missing data, and the demographic features of the sample were described. Some of the returned questionnaires were omitted for various reasons, including high levels of missing data or evidence of unengaged answers, and lower levels of missing data were remedied using mean substitution.

The next chapter will address the research's findings and includes the assessment of the research' hypotheses and the conceptual framework.

Chapter 9 Quantitative Data Analysis (Validation Study [1])

9.1 Introduction

The empirical settings and descriptive analysis of the study variables were discussed in the previous chapter, including an analysis of missing data, as well as the survey design and administration. In this chapter, the conceptualised research constructs or the framework underlying assumptions were empirically tested via two main analysis. The two main analyses include: measurement analysis and structural analysis. These consist of a systematic application for the evaluation of the measurement models by assessing internal consistency (composite reliability), indicator reliability, convergent validity (average variance extracted) and discriminant validity for the study constructs.

9.2 The Study Overview

The research conceptual framework has been carefully developed through the research's previous phases. In this phase of the research, the developed framework will be empirically tested using a robust technique and approach. This will help in identifying which of the research hypotheses is true and which ones needs to be rejected. This will help in generalizing the results amongst the Saudi society and contributes to investigating the gap of the underlying problem. As mentioned earlier in "*Chapter 3: Research Design and Methodology*" the Partial Least Squares Structural Equation Modelling (PLS-SEM) was used due its steady growth and popularity as a key multivariate analysis method. The PLS-SEM involves two main empirical measures. First, is the structural model (also called the inner model) which represents and addresses the relationships (paths) between the research constructs (factors). Second, is the measurement models (also referred to as the outer models) which represents, and addresses, the research constructs and their indicator variables.

According to Hair Jr et al. (2014), a research framework/model contains three key components: constructs/factors, the constructs' indicators and path models (i.e. relationships between the constructs). *Constructs* (factors) cannot be measured directly but they can be measured via their measurements/indicators. However, there are two types of constructs/factors: one is the exogenous latent variables (i.e. those constructs that explain other constructs in the model) and one is the endogenous latent variables (i.e. those constructs that are being explained by other constructs in the model). *Indicators* are also called items or manifest variables, and they are the proxy variables that hold the actual (raw) data. *Path models* are the graphs used to visually represent the propositions and construct relationships that are analysed when SEM is adopted.

Furthermore, paths in the model are the relationships that connect variables (constructs) and their allocated indicators together, displayed as arrows. In PLS-SEM, the arrows are always single-headed, consequently interpreting directional relationships. Single-headed arrows are viewed as a predictive relationship, and with solid hypothetical/theoretical support, can be considered as causal relationships. Error terms are the error terms associated with the (endogenous) latent variables and the reflectively measured constructs. Error terms denote the unexplained variance when path models are evaluated (Hair Jr et al., 2014).

9.3 Measurement Model

As mentioned above, model estimation delivers empirical measures of the relationships between the indicators and the constructs (measurement models), as well as between the constructs (structural model). The empirical measures enable the researcher to compare the theoretically established

measurement and structural models with reality, as represented by the sample data. In other words, the researcher can determine how well the theory fits the data.

Following Hair Jr et al. (2014) the assessment of reflective measurement models should include composite reliability to evaluate internal consistency, individual indicator reliability, and average variance extracted (AVE) to evaluate convergent validity. In addition, the Fornell and Larcker (1981) criterion and cross loading are used to assess discriminant validity. Below, each criterion for the assessment of reflective measurement models is addressed.

According to Hair Jr et al. (2014) and Aibinu and Al-Lawati (2010), the adequacy of the model of the relationship between the latent variables and the items measuring them can be evaluated using the following main categories: *internal consistency reliability, convergent validity* of the measures associated with individual latent variables and *discriminant validity* of the research instruments.

9.3.1 Internal Consistency Reliability

The first criterion to be evaluated is typically *internal consistency reliability*. The traditional criterion for internal consistency is *Cronbach's alpha*, which provides an estimate of the reliability based on the inter-correlations of the observed indicator variables. Cronbach's alpha assumes that all indicators are equally reliable (i.e. all the indicators have equal outer loading on the construct). However, PLS-SEM prioritises the indicators according to their individual reliability. Furthermore, Cronbach's alpha is sensitive to the number of items in the scale and generally tends to underestimate the internal consistency reliability. As such, it may be used as a conservative measure of internal consistency reliability. Due to Cronbach's alpha's limitations in the population, it is more appropriate to apply a different measure of internal consistency reliability, which is referred to as **composite reliability** (Chin, 1998b). This type of reliability takes into account the different outer loading of the indicator variables and is calculated using the following formula (Hair Jr et al., 2014):

$$\rho c = \frac{(\sum_i 1i)^2}{(\sum_i 1i)^2 + \sum_i var(e_i)}$$

The composite reliability ranges between 0 and 1, with higher values referring to higher levels of reliability. It is commonly interpreted in the same way as Cronbach's alpha. Nunnally (1978) recommends 0.7 as a benchmark for 'modest' composite reliability. Likewise, Hair et al. (2010) recommend that a Cronbach's alpha value of 0.7 is preferable. In this study, the composite reliabilities generated as part of SmartPLS 3.0's output are presented in Table 9.1. Using IBM SPSS Statistics 19, the Cronbach's alpha for the constructs were also determined and are also presented in Table 9.1. Using Nunnally's benchmark of 0.7 for composite reliability, all the research constructs demonstrate an acceptable level. Similarly, applying Hair et al. (2010) benchmark for Cronbach's alpha (0.7), all constructs showed good reliability. Henceforth, the measurement items are appropriate for their respective latent variables.

Table 9.1: Internal Consistency and Convergent Validity.

Latent Variable		# of items	AVE	Cronbach's alpha	Composite Reliability
COT	Cost	3	0.894	0.874	0.923
EU	Ease of Use	3	0.911	0.898	0.936
GEC	Government E-Readiness	4	0.848	0.872	0.911
IDC	Individualism - Collectivism	3	0.844	0.796	0.882
IU	Intention to Use	3	0.955	0.950	0.969
MF	Masculinity - Femininity	3	0.886	0.863	0.916
NVS	Navigational Structure	3	0.903	0.887	0.930
PWD	Power Distance	3	0.831	0.779	0.870
IFR	Telecommunication Infrastructure	3	0.848	0.805	0.884
SEC	Security	5	0.799	0.858	0.898
SIF	Social Influence	5	0.804	0.861	0.899

TSP	Trust	3	0.880	0.856	0.912
UAV	Uncertainty Avoidance	5	0.812	0.840	0.905
USF	Usefulness	4	0.828	0.847	0.897
WS	Visual Appeal	3	0.903	0.887	0.930
	Total	53	-	-	-

9.3.2 Convergent Validity

Convergent validity is the extent to which a measure correlates positively with other measures of the same construct. Therefore, it shows whether the items that are indicators (measures) of a specific construct converge or share a high proportion of variance. To establish convergent validity, the outer loadings of the indicators should be considered, as well as the average variance extracted (AVE). High outer loadings on a construct mean that the associated indicators have much in common, which is captured by the construct. This characteristic is also frequently called *indicator reliability*. All indicators' outer loadings should be statistically significant, at a minimum, as a significant outer loading could still be fairly weak (Hair Jr et al., 2014). Furthermore, individual item (indicator) reliability is the extent to which measurements of the latent variables (constructs), measured with a multiple-item scale, reflect the true score of the latent variables relative to the error (Hulland, 1999). In order to evaluate the items' reliability, the standardised loadings (or simple correlation) were measured. A rule of thumb applied by many researchers is to accept items with loadings of 0.7 or higher, which suggests that there is more shared variance between the latent variables (constructs) and its measure than error variance (Carmines and Zeller, 1979).

Basically, the loadings are correlations, thus, a loading of 0.7 indicates that about 50% of the variance in the observed variables (i.e., the square of the loadings) is relevant to the latent variable (Hulland, 1999). Nunnally et al. (1967) recommended that items with low loadings should be reviewed and perhaps dropped, since they would add very little explanatory power to the model and would therefore bias the estimates of the parameters linking the latent variables. According to Hulland (1999), in general terms, items with loadings of less than 0.4 (a threshold generally used for factor analysis results) or 0.5 should be removed. Fornell and Larcker (1981) suggested a cut-off point of 0.7 whereas Chin (1998b) recommended a cut-off of 0.707. However, for scales which are adapted from other settings a loading of 0.5 can be used as a cut-off point (Chin, 1998b). Barclay et al. (1995) also believed that in such cases where the instrument is established under a specific context and implemented on a different context, the loadings' cut-off point may become lower. Hair Jr et al. (2014) state that researchers should carefully inspect the effects of items' elimination on the composite reliability, as well as on the construct's content validity, rather than automatically removing indicators when their outer loading is below 0.70. Indicators with a very low outer loading (below 0.40) should, however, always be eliminated from the scale (Hair et al., 2011).

In this study, based on the output from SmartPLS 3.0, all items have loadings above 0.750, with an average of 0.853 (see Table 9.2), except the observed variables SEC5 (0.666), SIF4 (0.590) and UAV5 (0.594). They all have loadings above 0.5 which implies that less than half of all items' variances are due to error (Aibinu and Al-Lawati, 2010). Furthermore, removing any one of these items does not improve the composite reliability, nor the AVE (i.e. the content validity). Thus all the items demonstrate a satisfactory level of individual item reliability. In addition, the significance of the indicator loadings was tested using a bootstrapping procedure with 1,000 resamples. According to Table 9.2 all loadings are statistically significant at the $p < 0.001$ level and t values > 2.57 (see Table 9.2). A commonly applied measure of convergent validity on the construct level is the average variance extracted (AVE) proposed by Fornell and Larcker (1981). Fornell and Larcker (1981) stated that the AVE should be greater than 0.5. All the research constructs have AVE indicators above 0.70 (see Table 9.1) with an average of 0.863, indicating that the constructs' variance is greater than the variance produced by the respective measurement errors and, thus, signifying that all constructs possess adequate reliability (Segars, 1997).

Table 9.2: Convergent Validity.

Construct	Items	Loading	*T* Statistics	*P*
Cost	COT1	0.8889	173.3748	0.0001***
	COT2	0.8674	109.3857	0.0001***
	COT3	0.9245	261.9152	0.0001***
Ease of Use	EU1	0.9076	182.4757	0.0001***
	EU2	0.9268	275.2269	0.0001***
	EU3	0.8994	190.9552	0.0001***
Government E-readiness	GEC1	0.8607	148.1087	0.0001***
	GEC2	0.8667	113.1232	0.0001***
	GEC3	0.8777	117.4981	0.0001***
	GEC4	0.7857	54.9554	0.0001***
Individualism - Collectivism	IDC1	0.8738	133.887	0.0001***
	IDC2	0.8187	73.2017	0.0001***
	IDC3	0.8395	103.3886	0.0001***
Telecommunication Infrastructure	IFR1	0.8356	100.5532	0.0001***
	IFR2	0.9026	187.1538	0.0001***
	IFR3	0.8016	69.8725	0.0001***
Intention to Use	IU1	0.9563	321.3989	0.0001***
	IU2	0.9486	310.7549	0.0001***
	IU3	0.959	407.5279	0.0001***
Masculinity - Femininity	MF1	0.8893	184.3111	0.0001***
	MF2	0.8944	145.7033	0.0001***
	MF3	0.8735	117.6544	0.0001***
Navigational Structure	NVS1	0.8985	177.743	0.0001***
	NVS2	0.9146	227.1985	0.0001***
	NVS3	0.8973	172.9501	0.0001***
Power Distance	PWD1	0.8339	85.7416	0.0001***
	PWD2	0.9024	239.8611	0.0001***
	PWD3	0.7511	49.9767	0.0001***
Security	SEC1	0.8013	77.8229	0.0001***
	SEC2	0.8611	130.6045	0.0001***
	SEC3	0.8495	105.4173	0.0001***
	SEC4	0.8033	70.0239	0.0001***
	SEC5	0.6665	41.0401	0.0001***
Social Influence	SIF1	0.8721	150.7235	0.0001***
	SIF2	0.8702	165.459	0.0001***
	SIF3	0.8886	177.1937	0.0001***
	SIF4	0.590	27.6081	0.0001***
	SIF5	0.7576	70.8127	0.0001***
Trust	TSP1	0.8834	145.4061	0.0001***
	TSP2	0.8843	103.7769	0.0001***
	TSP3	0.8724	88.1914	0.0001***
Uncertainty Avoidance	UAV1	0.8529	128.0625	0.0001***
	UAV2	0.8513	117.8486	0.0001***
	UAV3	0.8952	209.8521	0.0001***
	UAV4	0.8293	105.9002	0.0001***
	UAV5	0.594	29.2822	0.0001***
Usefulness	USF1	0.8463	156.6175	0.0001***
	USF2	0.8575	138.0237	0.0001***
	USF3	0.8071	80.0819	0.0001***
	USF4	0.7999	76.7007	0.0001***
Visual Appeal	WS1	0.8811	144.3468	0.0001***
	WS2	0.9088	185.9649	0.0001***
	WS3	0.919	231.4196	0.0001***

9.3.3 Discriminant Validity

After evaluating the internal consistency reliability and convergent validity of the measurement model, *the discriminant validity* of the measurement shall be evaluated next. Discriminant validity is the extent to which a construct is really distinct from other constructs by empirical standards. Thus, establishing discriminant validity signifies that a construct is unique and captures phenomena not

represented by another constructs in the model (Hair Jr et al., 2014). Two measures of discriminant validity have been proposed. One method for assessing discriminant validity is by inspecting the *cross loadings* of the indicators, specifically an indicator's outer loadings on other constructs. The presence of cross loadings that surpass the indicators' outer loadings indicates a discriminant validity problem (Hair et al., 2011). The analysis of cross-loading was performed by following the rule that items should have a higher correlation with the construct that they are supposed to measure than with any other construct in the model (Chin, 1998b). A cross-loading check was performed using SmartPLS 3.0. The results are presented in Table 9.3. The results in the table demonstrate that all items loaded higher on the construct they were theoretically specified to measure than any other construct in the model. The analysis cross-loading thus indicates that all the 53 measurement items loaded distinctly on the specified construct they measured, hence demonstrating discriminant validity of the 15 constructs.

Table 9.3: Cross Loading Analysis.

	Cost	EU	GEC	IDC	IFR	IU	MF	NVS	PWD	SEC	SIF	TSP	UAV	USF	WS
COT1	**0.889**	0.591	0.450	0.479	0.332	0.561	0.447	0.533	0.478	0.221	0.479	0.004	0.551	0.519	0.509
COT2	**0.867**	0.490	0.461	0.413	0.306	0.454	0.414	0.429	0.401	0.209	0.425	0.103	0.478	0.430	0.427
COT3	**0.925**	0.648	0.498	0.526	0.359	0.607	0.528	0.540	0.490	0.256	0.505	0.038	0.592	0.546	0.545
EU1	0.609	**0.908**	0.508	0.601	0.493	0.744	0.566	0.647	0.593	0.288	0.566	0.078	0.701	0.678	0.631
EU2	0.597	**0.927**	0.506	0.584	0.482	0.754	0.527	0.724	0.562	0.285	0.545	0.117	0.669	0.700	0.647
EU3	0.575	**0.899**	0.470	0.557	0.442	0.723	0.492	0.673	0.548	0.300	0.539	0.099	0.629	0.663	0.658
GEC1	0.509	0.535	**0.861**	0.492	0.535	0.553	0.450	0.571	0.424	0.407	0.522	0.263	0.548	0.547	0.532
GEC2	0.458	0.481	**0.867**	0.460	0.524	0.450	0.396	0.485	0.374	0.384	0.440	0.315	0.502	0.484	0.447
GEC3	0.461	0.458	**0.878**	0.434	0.553	0.444	0.407	0.521	0.351	0.476	0.508	0.348	0.529	0.489	0.478
GEC4	0.309	0.317	**0.786**	0.351	0.448	0.311	0.298	0.415	0.296	0.418	0.390	0.366	0.391	0.357	0.372
IDC1	0.438	0.555	0.442	**0.874**	0.373	0.619	0.436	0.488	0.529	0.253	0.447	0.147	0.494	0.518	0.477
IDC2	0.387	0.484	0.427	**0.819**	0.335	0.557	0.346	0.428	0.498	0.287	0.399	0.164	0.442	0.469	0.417
IDC3	0.517	0.569	0.449	**0.840**	0.404	0.653	0.461	0.492	0.512	0.256	0.506	0.101	0.549	0.533	0.512
IFR1	0.277	0.402	0.509	0.337	**0.836**	0.345	0.356	0.446	0.251	0.436	0.367	0.368	0.386	0.420	0.411
IFR2	0.421	0.553	0.588	0.453	**0.903**	0.534	0.498	0.550	0.376	0.471	0.534	0.379	0.585	0.546	0.524
IFR3	0.224	0.333	0.443	0.313	**0.802**	0.306	0.297	0.361	0.214	0.390	0.351	0.381	0.366	0.374	0.390
IU1	0.571	0.762	0.501	0.685	0.453	**0.956**	0.537	0.669	0.617	0.330	0.586	0.121	0.670	0.689	0.654
IU2	0.572	0.768	0.503	0.685	0.440	**0.949**	0.514	0.658	0.618	0.299	0.587	0.096	0.655	0.686	0.650
IU3	0.608	0.797	0.527	0.705	0.479	**0.959**	0.575	0.701	0.621	0.332	0.621	0.124	0.692	0.721	0.690
MF1	0.505	0.564	0.436	0.484	0.399	0.573	**0.889**	0.497	0.464	0.267	0.461	0.107	0.623	0.510	0.464
MF2	0.438	0.489	0.409	0.388	0.426	0.465	**0.894**	0.438	0.401	0.316	0.438	0.110	0.545	0.432	0.436
MF3	0.436	0.475	0.390	0.431	0.411	0.456	**0.874**	0.394	0.421	0.276	0.429	0.122	0.521	0.435	0.405
NVS1	0.527	0.666	0.521	0.510	0.465	0.661	0.452	**0.899**	0.493	0.346	0.573	0.165	0.608	0.640	0.718
NVS2	0.508	0.679	0.560	0.494	0.498	0.640	0.471	**0.915**	0.460	0.345	0.547	0.181	0.624	0.683	0.681
NVS3	0.497	0.683	0.535	0.508	0.507	0.618	0.444	**0.897**	0.474	0.358	0.540	0.200	0.575	0.684	0.735
PWD1	0.385	0.453	0.320	0.426	0.227	0.495	0.372	0.382	**0.834**	0.180	0.364	0.074	0.395	0.402	0.366
PWD2	0.513	0.638	0.395	0.605	0.320	0.660	0.467	0.518	**0.902**	0.234	0.485	0.058	0.525	0.547	0.508
PWD3	0.362	0.428	0.369	0.464	0.301	0.423	0.363	0.397	**0.751**	0.286	0.416	0.158	0.390	0.419	0.391
SEC1	0.280	0.360	0.425	0.273	0.428	0.353	0.307	0.415	0.282	**0.801**	0.442	0.202	0.330	0.381	0.370
SEC2	0.251	0.325	0.411	0.306	0.454	0.343	0.322	0.360	0.282	**0.861**	0.463	0.260	0.319	0.360	0.368
SEC3	0.158	0.156	0.373	0.206	0.381	0.186	0.213	0.221	0.157	**0.850**	0.359	0.299	0.190	0.259	0.248
SEC4	0.140	0.139	0.332	0.196	0.348	0.180	0.197	0.211	0.128	**0.803**	0.367	0.301	0.186	0.234	0.226
SEC5	0.177	0.256	0.405	0.247	0.406	0.245	0.222	0.305	0.219	**0.667**	0.292	0.348	0.242	0.258	0.248
SIF1	0.448	0.543	0.510	0.487	0.458	0.573	0.450	0.538	0.444	0.425	**0.872**	0.186	0.541	0.578	0.570
SIF2	0.444	0.557	0.482	0.470	0.446	0.575	0.445	0.581	0.429	0.371	**0.870**	0.193	0.535	0.604	0.554
SIF3	0.496	0.561	0.487	0.485	0.446	0.566	0.468	0.549	0.470	0.437	**0.889**	0.150	0.521	0.601	0.575
SIF4	0.256	0.214	0.295	0.250	0.245	0.258	0.210	0.272	0.270	0.404	**0.590**	0.224	0.251	0.284	0.328
SIF5	0.441	0.460	0.420	0.413	0.382	0.469	0.383	0.453	0.406	0.346	**0.758**	0.135	0.431	0.471	0.471
TSP1	0.100	0.179	0.337	0.195	0.435	0.205	0.155	0.239	0.159	0.313	0.222	**0.883**	0.234	0.201	0.202
TSP2	-0.013	0.039	0.304	0.103	0.348	0.039	0.069	0.129	0.047	0.290	0.147	**0.884**	0.139	0.091	0.081
TSP3	0.029	0.045	0.333	0.113	0.370	0.046	0.101	0.147	0.059	0.332	0.184	**0.872**	0.152	0.092	0.115
UAV1	0.508	0.605	0.528	0.500	0.468	0.578	0.570	0.555	0.433	0.296	0.460	0.229	**0.853**	0.542	0.493
UAV2	0.500	0.607	0.530	0.496	0.452	0.582	0.578	0.555	0.392	0.289	0.478	0.226	**0.851**	0.515	0.539
UAV3	0.582	0.713	0.512	0.520	0.472	0.683	0.571	0.628	0.492	0.252	0.535	0.123	**0.895**	0.614	0.577
UAV4	0.516	0.617	0.445	0.515	0.415	0.612	0.520	0.545	0.519	0.236	0.506	0.083	**0.829**	0.554	0.545
UAV5	0.319	0.355	0.376	0.330	0.398	0.333	0.304	0.396	0.289	0.276	0.389	0.215	**0.594**	0.362	0.396
USF1	0.568	0.744	0.503	0.582	0.489	0.743	0.553	0.693	0.574	0.334	0.616	0.096	0.659	**0.846**	0.663
USF2	0.501	0.683	0.476	0.543	0.437	0.657	0.463	0.627	0.481	0.266	0.529	0.098	0.548	**0.858**	0.599
USF3	0.375	0.484	0.439	0.414	0.406	0.490	0.324	0.545	0.367	0.325	0.513	0.157	0.451	**0.807**	0.554
USF4	0.375	0.502	0.446	0.418	0.432	0.476	0.338	0.560	0.375	0.343	0.477	0.171	0.440	**0.800**	0.569
WS1	0.500	0.644	0.491	0.487	0.476	0.626	0.460	0.713	0.457	0.320	0.572	0.120	0.582	0.632	**0.881**
WS2	0.502	0.627	0.484	0.500	0.457	0.622	0.418	0.687	0.464	0.319	0.566	0.149	0.544	0.661	**0.909**
WS3	0.507	0.647	0.512	0.523	0.495	0.639	0.459	0.733	0.471	0.368	0.579	0.155	0.588	0.669	**0.919**

The Fornell and Larcker (1981) criterion is a second and more conservative approach to evaluating discriminant validity. It compares the square root of the AVE values with the construct correlations. Specifically, the square root of each construct's AVE should be higher than its highest correlation

with any other construct. The rationale of this method is based on the idea that a latent variable shares more variance with its associated items than with any other latent variable (Hair Jr et al., 2014).

In this study, this condition is demonstrated in the correlation matrix for the constructs. In Table 9.4, the diagonal of the matrix is the square root of the AVE; and for adequate discriminant validity, the diagonal elements should be higher than the off-diagonal elements in the corresponding rows and columns (Hulland, 1999). The results signify that there was no correlation between any two latent variables larger than, or even equivalent to, the square root AVEs of the two latent variables. Hence the discriminant validity test does not reveal any concerns, providing evidence that all of the constructs are sufficiently dissimilar.

Table 9.4: Comparisons of Correlations Between Latent Variables and Square Root of AVE.

	COT	EU	GEC	IDC	IU	MF	NVS	PWD	IFR	SEC	SIF	TSP	UAV	USF	WS
COT	**0.893**														
EU	0.652	**0.911**													
GEC	0.526	0.543	**0.848**												
IDC	0.533	0.637	0.521	**0.844**											
IU	0.612	0.813	0.535	0.725	**0.954**										
MF	0.522	0.580	0.467	0.495	0.568	**0.885**									
NVS	0.566	0.748	0.596	0.558	0.708	0.505	**0.903**								
PWD	0.514	0.623	0.434	0.608	0.648	0.487	0.527	**0.831**							
IFR	0.374	0.518	0.611	0.441	0.479	0.464	0.542	0.340	**0.847**						
SEC	0.257	0.319	0.493	0.313	0.336	0.321	0.387	0.275	0.512	**0.799**					
SIF	0.528	0.604	0.556	0.537	0.627	0.501	0.613	0.510	0.503	0.485	**0.803**				
TSP	0.050	0.107	0.370	0.161	0.119	0.127	0.201	0.107	0.442	0.355	0.213	**0.880**			
UAV	0.609	0.731	0.590	0.589	0.705	0.640	0.667	0.533	0.539	0.324	0.585	0.204	**0.811**		
USF	0.563	0.747	0.566	0.602	0.732	0.522	0.740	0.556	0.536	0.380	0.651	0.151	0.647	**0.828**	
WS	0.557	0.708	0.549	0.558	0.696	0.493	0.787	0.514	0.527	0.372	0.634	0.157	0.633	0.725	**0.903**

9.3.4 Summary for Measurement Model

The underlying goal of reflective measurement model assessments is to ensure the reliability and validity of the construct measures and therefore offer support for the suitability of their inclusion in the path model. The key criteria consist of indicator reliability, composite reliability, and convergent validity. Additionally, discriminant validity should be achieved, which means that every reflective latent variable must share more variance with its own indicators than with other latent variables in the path model. Reflective constructs are appropriate for PLE-SEM analyses if they satisfy all these requirements.

The resulting factors can be interpreted roughly representing the following 15 constructed concepts: Cost (COT), Ease of Use (EU), Government E-Readiness (GEC), Individualism – Collectivism (IDC), Intention to Use (IU), Masculinity – Femininity (MF), Navigational Structure (NVS), Power Distance (PWD), Telecommunication Infrastructure (IFR), Security (SEC), Social Influence (SIF), Trust (TSP), Uncertainty Avoidance (UAV), Usefulness (USF), and Visual Appeal (WS) as illustrated in Figure 9.1. These latent variables have met the requirements of being appropriate reflective constructs for PLS-SEM analyses (Hair Jr et al., 2014). These requirements are summarised as following:

- Internal consistency reliability: composite reliability should be greater than 0.708 (in exploratory research, 0.60 to 0.70 is considered acceptable). Consider Cronbach's alpha as a conservative measure of internal consistency reliability.
- Indicators' reliability: the indicator's outer loadings should be greater than 0.708. Indicators with outer loadings of between 0.40 and 0.70 should be considered for elimination only if the deletion leads to an increase in composite reliability and AVE above the suggested threshold value.
- Convergent validity: the AVE should be greater than 0.50.

- Discriminant validity:
    - An indicator's outer loadings on a construct should be greater than all its cross loadings with other constructs.
    - The square root of the AVE of each construct should be greater than its highest correlation with any other construct.

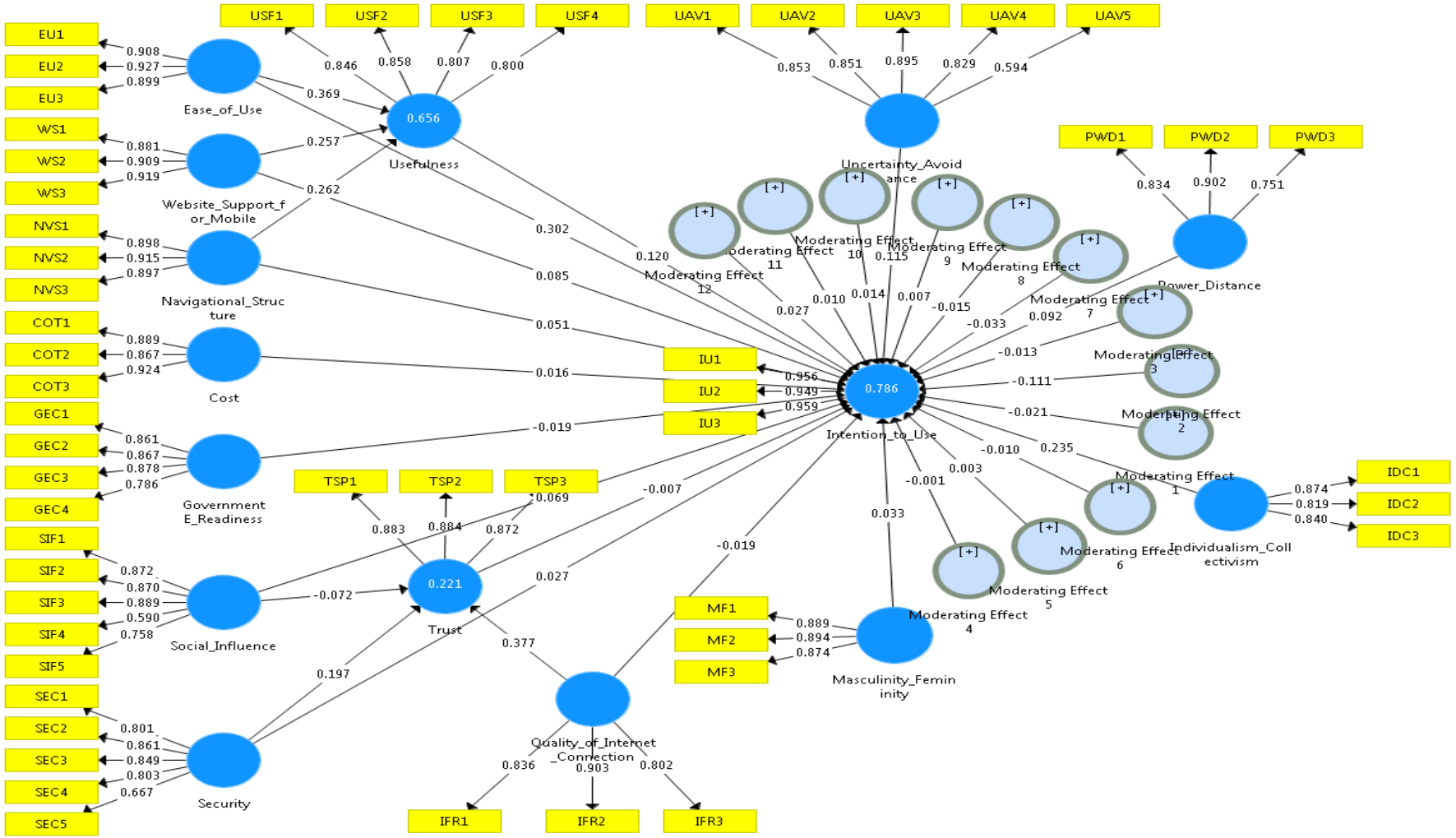

Figure 9.1: Conceptual Framework for the Intention to Use M-Transactions.

9.4 Structural Model

The previous sections provided insights into the evaluation of reflective measurement models. This section continues the analysis and focuses on the structural model that represents the underlying theory/concept of the path model. Assessment of the structural model's results enables the researcher to determine how well empirical data support the theory/concept and therefore to decide if the theory/concept has been empirically confirmed.

Based on the results, the measurement model has sufficient internal consistency reliability, convergent validity and discriminant validity. The latent variables are within an acceptable level of error. Consequently, the measurement model indicates that there is sufficient robustness to assess the relationships amongst the latent variables and the dependent variables. Once the construct measures are confirmed to be reliable and valid, the next step is to address the assessment of the structural model's results and to test the research hypotheses. This involves examining the model's predictive capabilities and the relationship between the constructs.

Hair Jr et al. (2014) conclude the structural model assessment procedures as: assess structural model for collinearity issues, assess the significance and relevance of the structural model's relationships, assess the level of Coefficient of Determination (R^2), assess the effect sizes (f^2), assess the predictive relevance (Q^2).

9.5.1 Structural Model Collinearity Assessment

The reason for collinearity assessment is that the estimation of path coefficients in the structural models is based on Ordinary Least Squares (OLS) regressions of each endogenous latent variable on its corresponding predecessor constructs. Just as in a regular multiple regression, the path coefficients might be biased if the estimation involves significant levels of collinearity amongst the predictor constructs.

At the point of analysing the structural model, it is critical to comprehend that PLS-SEM fits the model to the sample data to get the best parameter estimates by amplifying the explained variance of the endogenous constructs. This part of PLS-SEM is not quite the same as CB-SEM (which is based on the difference between the two covariance matrices), which estimates parameters so that the differences between the sample covariance and those anticipated/predicted by the hypothetical/theoretical model are minimized. Subsequently, with CB-SEM, the covariance matrix underlying the hypothetical/conceptual model is as close as it would be to the sample covariance matrix (Hair Jr et al., 2014; Aibinu and Al-Lawati, 2010; Chin, 1998b). The goodness-of-fit measures connected with CB-SEM (which are built on the differences between the two covariance matrices), for example the chisquare (x^2) measurement or the various fit indices, are not relevant/applicable in a PLS-SEM setting and context. As an alternative for applying measures of "goodness-of-fit", the structural model in PLS-SEM is evaluated/measured on the basis of heuristic criteria that are determined by the model's predictive capabilities. These criteria, by definition, do not take into account testing the overall goodness-of-the-model fit in a CB-SEM sense. Rather, the model is supposed to be specified appropriately and is measured to assess how well it predicts the endogenous constructs/variables. The key criteria for evaluating the structural model in PLS-SEM are the significance of the path coefficients, the level of the R^2 values, the f^2 effect size, and the predictive relevance Q^2 (Hair Jr et al., 2014).

To assess collinearity, we can apply the same measures as in the evaluation of formative measurement models (i.e. tolerance and the Variance Inflation Factor (VIF)). In doing so, we need to examine each set of predictor constructs separately for each sub-part of the structural model. For instance, in the model shown in Figure 9.1, *ease of use*, *visual appeal* and *navigational structure* jointly explain *usefulness*. Likewise, *social influence*, *telecommunication infrastructure* and *security* act as predictors of *trust*. Similarly, *cost*, *ease of use*, *government E-readiness*, *individualism*

collectivism, masculinity/femininity, navigational structure, power distance, telecommunication infrastructure, security, social influence, trust, uncertainty avoidance, usefulness, visual appeal explain *intention to use*.

Therefore, one needs to check whether there are significant levels of collinearity between each set of predictor variables, that is, (1) *ease of use, visual appeal* and *navigational structure* as well as (2) *social influence, telecommunication infrastructure* and *security* as well as (3) *cost, ease of use, government E-readiness, individualism collectivism, masculinity/femininity, navigational structure, power distance, telecommunication infrastructure, security, social influence, trust, uncertainty avoidance, usefulness,* and *visual appeal*.

Similar to the assessment of formative measurement models, tolerance levels below 0.20 (VIF above 5.00) in the predictor constructs are considered as indicative of collinearity (Hair Jr et al., 2014). Table 9.5 illustrates the collinearity evaluation for the first set of constructs.

Table 9.5: Evaluating Collinearity Amongst Predictors Constructs (Set 1).

Predictors Constructs (Set 1)	Collinearity Statistics	
	Tolerance	VIF
Ease of Use	.403	2.482
Navigational Structure	.307	3.255
Visual Appeal	.348	2.873

a. Dependent Variable: Usefulness

The results in the Table 9.5 indicate that there are no collinearity issues within the predictor constructs (*ease of use, navigational structure, visual appeal*) of the endogenous construct *usefulness*.

Below are the collinearity results (Table 9.6) of set 2: *social influence, telecommunication infrastructure* and *security* acting as *predictors of trust.*

Table 9.6: Evaluating Collinearity Amongst Exogenous Constructs (Set 2).

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
2	(Constant)		
	Telecommunication Infrastructure	.653	1.531
	Security	.668	1.496
	Social Influence	.677	1.478

a. Dependent Variable: Trust

As per the results in Table 9.6, there are no collinearity issues within the predictor constructs of the endogenous construct *trust*.

Below are the collinearity results (Table 9.7) of set 3: *cost, ease of use, government E-readiness, individualism/collectivism, masculinity/femininity, navigational structure, power distance, telecommunication infrastructure, security, social influence, trust, uncertainty avoidance, usefulness, visual appeal* explaining *intention to use.*

Table 9.7: Evaluating Collinearity Amongst Exogenous Constructs (Set 3).

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
3	(Constant)		
	Cost	.475	2.106
	Ease of Use	.256	3.913
	Government E Readiness	.426	2.348
	Individualism Collectivism	.468	2.136
	Masculinity Femininity	.520	1.922
	Navigational Structure	.274	3.652
	Power Distance	.509	1.965
	Telecommunication Infrastructure	.447	2.235
	Security	.618	1.617
	Social Influence	.432	2.315
	Trust	.715	1.399
	Uncertainty Avoidance	.338	2.958
	Usefulness	.313	3.200
	Visual Appeal	.309	3.233

a. Dependent Variable: Intention to Use

Likewise, the results in the Table 9.7 show no collinearity concerns within the predictor constructs of *intention to use*.

It is recommended that if collinearity is indicated by the tolerance or VIF guidelines, one should consider removing constructs, merging predictors into a single construct, or creating higher-order constructs (Hair Jr et al., 2014). However, from tables 9.5, 9.6 and 9.7 we can see that all VIF values are clearly below the threshold of 5.00 and above the tolerance levels of 0.20. This indicates that the level of collinearity/tolerance is within the acceptable range and there is no indication of collinearity amongst predictor constructs. Furthermore, the collinearity for the interaction effects was evaluated using SmartPLS 3.0.

Table 9.8: Evaluating Collinearity Amongst Interaction Effects.

No	Interaction Effects	VIF
1	Individualism Collectivism -> Security	3.018
2	Individualism Collectivism -> Social Influence	2.327
3	Individualism Collectivism -> Trust	2.342
4	Masculinity Femininity -> Security	2.719
5	Masculinity Femininity -> Social Influence	2.425
6	Masculinity Femininity -> Trust	1.965
7	Power Distance -> Security	2.559
8	Power Distance -> Social Influence	2.325
9	Power Distance -> Trust	2.047
10	Uncertainty Avoidance -> Security	3.411
11	Uncertainty Avoidance -> Social Influence	2.531
12	Uncertainty Avoidance -> Trust	2.493

The results in Table 9.8 show that there are no collinearity issues to be considered between the interaction effects.

9.5.2 Assessment of the Significance and Relevance of the Structural Model Relationships

The PLS-SEM algorithm is used to obtain the estimates for the structural model's hypothesised relationships (i.e. the path coefficients), which point to the hypothesised relationships amongst the factors (i.e. constructs, latent variables). The path coefficients are represented by standardised values between -1 and +1. Path coefficients that are close to +1 show a robust positive relationship (and the other way around for negative values) that is quite often statistically significant (i.e. different from zero in the population). The closer the estimates of coefficients are to 0, the weaker the relationship. Very low values near 0 are typically non-significant (i.e. not significantly different from zero).

The significance decision of a coefficient ultimately relies on its standard error which is acquired by means of bootstrapping. The bootstrap standard error permits figuring the *empirical t value*. The *t* distribution can be sensibly approximated for sample sizes bigger than 30. Subsequently, we can utilise the quantiles from the normal distribution as vital values with which to compare the empirical *t* value. At the point where the empirical *t* value is bigger than the critical value, we can say that the coefficient is significant at a certain error probability (i.e. significance level). Regularly utilised critical values for two-tailed tests are 1.65 (significance level = 10%), 1.96 (significance level = 5%), and 2.57 (significance level = 1%). In marketing, scientists normally accept a significance level of 5%. This does not necessarily always apply, nevertheless, since user research studies occasionally presume a significance level of 1%, particularly when experiments are included. Then again, when a study is exploratory in nature, scientists regularly accept a significance level of 10%. In summary, the decision of the significance level relies on the field of study and the objective of the study (Hair Jr et al., 2014).

Since this research is mainly exploratory in nature, the researcher has decided to apply all the significance levels to measure the research hypotheses. This can be summarised in the Table 9.9.

Table 9.9: Summary of the *t* Values and Their Significance Levels.

***t* value**	**Significance level**	**Percentage**
1.65	$P < 0.1^{*}$	10%
1.96	$P < 0.05^{**}$	5%
2.57	$P < 0.001^{***}$	1%

In order to analyse the hypothesised relationships between the constructs, bootstrapping was used with 5,000 resamples to determine the significance of the paths within the structural model. There are a total of 32 hypotheses in this research, 20 hypotheses are direct relationships (paths) between the hypothesised constructs and there are 12 hypotheses which are moderation (interaction) effects that could affect the interaction relationship between any two hypothesised constructs. The direct relationships are examined and illustrated in Table 9.10 and the interaction effects are also investigated and presented in Table 9.11.

Table 9.10: Results of Structural Model.

NO	Research Hypotheses	Sign	*Path Coefficients (β)*	T Statistics Values	Supported	
					Yes/No	P value
1	Cost -> Intention to Use	+	0.0128	1.2776	No	-
2	Ease of Use -> Intention to Use	+	0.3031	15.2731	Yes	0.001***
3	Ease of Use -> Usefulness	+	0.3689	18.8417	Yes	0.001***
4	Government E Readiness -> Intention to Use	-	0.0214	1.6304	No	-
5	Individualism Collectivism -> Intention to Use	+	0.2330	17.5068	Yes	0.001***
6	Masculinity Femininity -> Intention to Use	+	0.0349	2.4574	Yes	0.05**
7	Navigational Structure -> Intention to Use	+	0.0497	2.9636	Yes	0.001***
8	Navigational Structure -> Usefulness	+	0.2617	11.6263	Yes	0.001***
9	Power Distance -> Intention to Use	+	0.0942	6.6933	Yes	0.001***
10	Telecommunication Infrastructure -> Intention to Use	-	0.021	1.6892	Yes	0.1*
11	Telecommunication Infrastructure -> Trust	+	0.3771	18.8962	Yes	0.001***
12	Security -> Intention to Use	+	0.0243	2.0735	Yes	0.05**
13	Security -> Trust	+	0.1966	8.7408	Yes	0.001***
14	Social Influence -> Intention to Use	+	0.0701	4.75	Yes	0.001***
15	Social Influence -> Trust	-	0.0721	3.3157	Yes	0.001***
16	Trust -> Intention to Use	-	0.0116	1.1629	No	-
17	Uncertainty Avoidance -> Intention to Use	+	0.1167	6.7664	Yes	0.001***
18	Usefulness -> Intention to Use	+	0.1218	7.1189	Yes	0.001***
19	Visual Appeal -> Intention to Use	+	0.0857	5.4148	Yes	0.001***
20	Visual Appeal -> Usefulness	+	0.2573	12.9303	Yes	0.001***

All the signs, sizes and statistical significances of the path coefficients (β) were examined in Table 9.10. The results revealed that *ease of use*, *individualism collectivism*, *navigational structure*, *power distance*, *social influence*, *uncertainty avoidance*, *usefulness*, and *visual appeal* are positively significant determinants for *m-transaction intention to use* at the significance level of (p <0.001, t > 2.57). The highest three significant predictors for m-transaction intention to use, as indicated by the significance level, are individualism and collectivism (b = 0.233, p < 0.001, t = 17.506), followed by ease of use (b = 0.303, p = 0.001, t = 15.273) and usefulness (b = 0.121, p = 0.001, t = 7.118). However, the path coefficient (β) for ease of use is bigger than the other two constructs (i.e. individualism collectivism and usefulness) which means that it explains more variance of the predicted dependent variable (i.e. intention to use m-transactions). Furthermore, *masculinity femininity* (b = 0.034) and *security* (b = 0.024) are positively significant determinants for *m-transaction intention to use* at the significance level of (p < 0.05, t > 1.96). *Telecommunication infrastructure* (b = -0.021) is a negatively significant determinant for m-transaction intention, however, the path coefficient is not high. The *cost*, *government e-readiness* and *trust* constructs have no significant impact on the predicted construct *m-transaction intention to use*. This made *ease of use* the most influential factor of m-transaction intention to use, which makes it a possible candidate for further investigation (see *Chapter 10: Validation Study (2) Usability Study*).

Table 9.11: Results of Structural Model (Interaction Effects).

No	Research Hypotheses (Interaction)	Sign	*Path Coefficients (β)*	T Statistics Values	Supported	
					Yes/No	P value
1	Security * Individualism Collectivism -> Intention to Use	-	0.0286	1.8308	Yes	0.1*
2	Security * Masculinity Femininity -> Intention to Use	-	0.0093	0.9359	No	-
3	Security * Power Distance -> Intention to Use	-	0.0235	1.9904	Yes	0.05**
4	Security * Uncertainty Avoidance -> Intention to Use	+	0.0207	1.5441	No	-
5	Social Influence * Individualism Collectivism -> Intention to Use	-	0.1201	9.3372	Yes	0.001***
6	Social Influence * Masculinity Femininity -> Intention to Use	+	0.0060	0.6743	No	-
7	Social Influence * Power Distance -> Intention to Use	-	0.0108	1.1355	No	-
8	Social Influence * Uncertainty Avoidance -> Intention to Use	+	0.0055	0.6215	No	-
9	Trust * Individualism Collectivism -> Intention to Use	-	0.0317	2.1166	Yes	0.05**
10	Trust * Masculinity Femininity -> Intention to Use	+	0.0094	0.5124	No	-
11	Trust * Power Distance -> Intention to Use	+	0.0240	2.0484	Yes	0.05**
12	Trust * Uncertainty Avoidance -> Intention to Use	+	0.0346	2.2169	Yes	0.05**

The interaction model considers whether a factor could affect the relationship between any two constructs of the research. In Saudi Arabia "a high level of cultural and social homogeneity prevails" (Eid, 2011) and the Saudis' cultural beliefs are a strong predictor of the acceptance or resistance of new Information Technology (IT) (Al-Gahtani et al., 2007; Straub et al., 2002; Loch et al., 2003). This research therefore considers the direct effects as well as the interaction effects of the cultural dimensions of Saudi Arabia.

The results presented in Table 9.11 show that individualism/collectivism is the only affecting construct and it has the highest negatively significant effect (b = -0.120, $p < 0.001$, t = 9.337) on the releationship between social influence and intention to use m-transaction. Both individualism/collectivism ($p < 0.1$, t = 1.830) and power distance ($p < 0.05$, t = 1.990) have a significant negative impact on the relationship between security and intention to use m-transaction with slightly low path coefficients (β) (b = -0.0286, b = -0.0235). On the other hand, power distance ($p < 0.05$, t = 2.048) and uncertainty avoidance ($p < 0.05$, t = 20216) positively affect the relationship between trust and intention to use m-transaction, with slightly low path coefficients (i.e. b = 0.024, b = 0.0346). However, individualism/ collectivism has a negative impact on this relationship ($p < 0.05$, t = 2.116) with slightly low path coefficients (β) (b = -0.0317).

The Figure 9.2 illustrates the assessment of the structural model results and presents the signs and the path coefficients values. In addition, it highlights the significant paths with black arrows, insignificant paths with dotted arrows, and the moderating effects with green arrows.

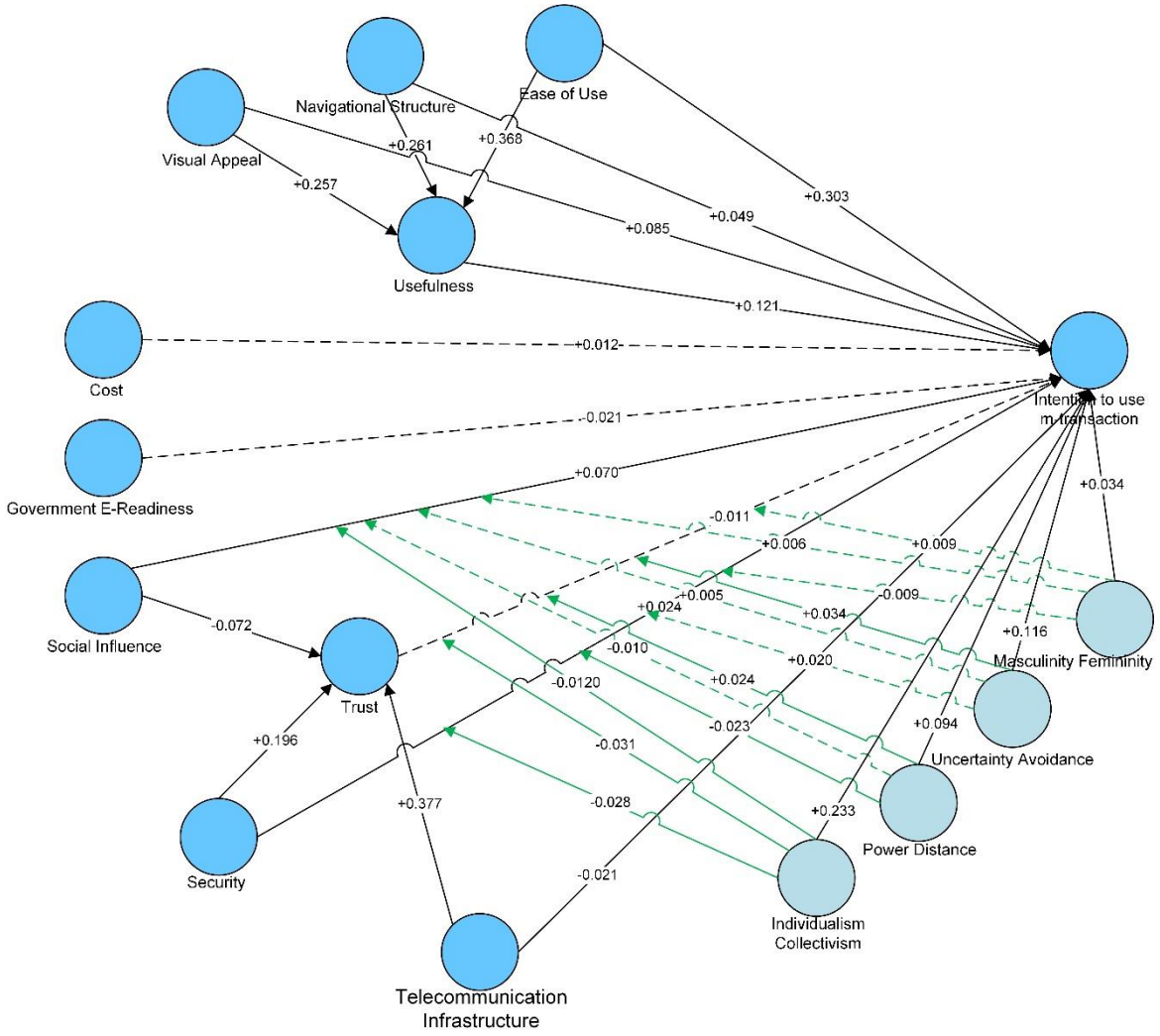

Figure 9.2: Assessment of the Structural Model.

[*]*Black arrows = significant paths, Dotted arrows = insignificant paths, and Green arrows = moderating effects.*

Furthermore, the Table 9.12 summarizes the analysis and the assessment of the research hypotheses.

Table 9.12: Summary of the Research Hypotheses' Assessment.

Hypotheses	***Relationship***	***Sign***	***Path Coefficients (β***	***Results***
H_a1 and H_a2	Ease of Use -> Usefulness	+	0.3689	Supported
	Ease of Use -> Intention to Use	+	0.3031	Supported
H_b1 and H_b2	Navigational Structure -> Usefulness	+	0.2617	Supported
	Navigational Structure -> Intention to Use	+	0.0497	Supported
H_c1 and H_c2	Visual Appeal -> Usefulness	+	0.2573	Supported
	Visual Appeal -> Intention to Use	+	0.0857	Supported
H_d	Usefulness -> Intention to Use	+	0.1218	Supported
H_e	Cost -> Intention to Use	+	0.0128	Unsupported
	Trust -> Intention to Use	-	0.0116	Unsupported
H_f1, H_f2, H_f3, H_f4 and H_f5	Trust * Uncertainty Avoidance -> Intention to Use	+	0.0346	Supported
	Trust * Power Distance -> Intention to Use	+	0.0240	Supported
	Trust * Individualism Collectivism -> Intention to Use	-	0.0317	Supported
	Trust * Masculinity Femininity -> Intention to Use	+	0.0094	Unsupported
H_g1 and H_g2	Telecommunication Infrastructure -> Trust	+	0.3771	Supported
	Telecommunication Infrastructure -> Intention to Use	-	0.021	Supported
H_h1, H_h2, H_h3, H_h4, H_h5 and H_h6	Security -> Trust	+	0.1966	Supported
	Security -> Intention to Use	+	0.0243	Supported
	Security * Uncertainty Avoidance -> Intention to Use	+	0.0207	Supported
	Security * Power Distance -> Intention to Use	-	0.0235	Supported
	Security * Individualism Collectivism -> Intention to Use	-	0.0286	Supported
	Security * Masculinity Femininity -> Intention to Use	-	0.0093	Unsupported
H_i1	Government E Readiness -> Intention to Use	-	0.0214	Unsupported
H_j1, H_j2, H_j3, H_j4, H_j5 and H_{j6}	Social Influence -> Trust	-	0.0721	Supported
	Social Influence -> Intention to Use	+	0.0701	Supported
	Social Influence * Uncertainty Avoidance -> Intention to Use	+	0.0055	Unsupported
	Social Influence * Power Distance -> Intention to Use	-	0.0108	Unsupported
	Social Influence * Individualism Collectivism -> Intention to Use	-	0.1201	Supported
	Social Influence * Masculinity Femininity -> Intention to Use	+	0.0060	Unsupported
H_k1, H_k2, H_k3, and H_k4	Masculinity Femininity -> Intention to Use	+	0.0349	Supported
	Individualism Collectivism -> Intention to Use	+	0.2330	Supported
	Power Distance -> Intention to Use	+	0.0942	Supported
	Uncertainty Avoidance -> Intention to Use	+	0.1167	Supported

9.5.3 Coefficient of Determination (R^2 Value)

The most widely used measure to assess the structural model is the *coefficient of determination* (R^2 value). This coefficient is a measure of the model's predictive accuracy and is determined as the squared correlation between a particular endogenous variable's real and predicted value. The coefficient interprets the exogenous latent variables' combined effects on the endogenous latent variable. Since the coefficient is the squared correlation of real and predicted values, it additionally interprets the amount of variance in the endogenous factors explained by all of the exogenous variables connected to it. The R^2 value ranges from 0 to 1, with higher levels showing a higher level of predictive accuracy. It is hard to give hard-and-fast rules/guidelines for acceptable R^2 values as this relies on the model's level of complexity and the research field. While R^2 estimations (values) of 0.20 are viewed as high in the fields of, for example, consumer/user behaviour, in success-driven research (e.g. in studies that aim to explain customers' satisfaction or loyalty), scientists expect much higher estimations (values) of 0.75 or more. In scholarly research that concentrates on marketing topics, R^2 estimations (values) of 0.75, 0.50, or 0.25 for endogenous constructs can, as a definite rule, be respectively illustrated as substantial, moderate, or weak (Hair Jr et al., 2014; Hair et al., 2011; Henseler et al., 2009). As with regards to multiple regression, the adjusted R^2 value R^2_{adj} can be utilised as the criterion to avoid bias with regards to complex models. This criterion is adjusted as per the number of exogenous latent variables with respect to the sample size. The R^2_{adj} value is formally defined as:

$$R^2_{adj} = 1 - (1 - R^2).\frac{(n-1)}{n-k-1},$$

Where *n* is the sample size and *k* is the number of exogenous constructs used to predict the endogenous construct under consideration. As this research mainly considers consumer behaviour, the threshold of 0.20 will be used to determine the level of predictive accuracy. Table 9.13 illustrates the R^2 values for all the endogenous latent variables in the model (i.e. *intention to use*, *trust* and *usefulness*).

Table 9.13: R^2 Values for the Endogenous Latent Variables of the Model.

Endogenous Latent Variables	R^2	R^2 Adjusted	Predictive Accuracy	R^2 *t* values	R^2 P values	R^2 Adjusted *t* values	R^2 Adjusted P values
Intention to Use	0.786	0.779	High	44.902	0.000	65.377	0.000
Trust	0.221	0.218	High	7.076	0.000	7.092	0.000
Usefulness	0.656	0.655	High	36.755	0.000	35.031	0.000

According to (Breiman and Friedman, 1985), the criterion R^2 is critical in evaluating a structural model. In this study, the R^2 for *Intention to use m-transaction* is 0.786, meaning that about 78% of the changes in the intention to use m-transaction by Saudi users is due to the fourteen latent variables in the model. Furthermore, around 65% of the latent variable *usefulness* is explained by the constructs *ease of use*, *visual appeal* and *navigational structure*. Moreover, about 22% of the construct trust is explained by *social influence*, *security* and *telecommunication infrastructure* latent variables.

9.5.4 Assessment of Effect Size f^2

In addition to assessing the R^2 estimations (values) of all endogenous latent variables, the change in the R^2 value when a particular exogenous construct is excluded from the model can be utilised to assess whether the removed construct has a substantive effect on the endogenous constructs. This measure is referred to as the f^2 effect size. The effect size is calculated as:

$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}}$$

Where $R^2_{included}$ and $R^2_{excluded}$ are the R^2 values of the endogenous constructs when a chosen exogenous construct is included in or excluded from the model. The change in the R^2 values is determined by evaluating the PLS path model twice. It is estimated the first time with the exogenous construct included $(yielding\ R^2_{included})$ and the second time with the exogenous construct excluded $(yielding\ R^2_{excluded})$. The Table 9.14 presents the f^2 assessment and values.

Table 9.14: f^2 Values for The Endogenous Latent Variables of The Model.

No	Exogenous Latent Variables	f^2 for Endogenous Latent Variables		
		Intention to Use	Trust	Usefulness
1	Cost	0.107		
2	Ease of Use	0.225		0.159
3	Government E Readiness	0.107		
4	Individualism Collectivism	0.223		
5	Masculinity Femininity	0.109		
6	Navigational Structure	0.110		0.061
7	Power Distance	0.127		
8	Telecommunication Infrastructure	0.107	0.119	
9	Security	0.108	0.033	
10	Social Influence	0.116	0.005	
11	Trust	0.107		
12	Uncertainty Avoidance	0.128		
13	Usefulness	0.130		
14	Visual Appeal	0.118		0.067

With regards to the assessment of f^2 values, 0.02, 0.15 and 0.35 respectively, represent small, medium and large effects (Cohen, 2013). In the path assessments shown in the Table 9.14, the effect sizes of the exogenous constructs (*ease of use* and *individualism/collectivism*) on the endogenous latent variable (*intention to use*) are medium. On the other hand, the effect sizes of the exogenous constructs (*cost, government E-readiness, masculinity/femininity, power distance, telecommunication infrastructure, security, social influence, trust, uncertainty avoidance, usefulness* and *visual appeal*) on the endogenous latent variable (*intention to use*) are small. Moreover, the effect sizes of the exogenous construct (*telecommunication infrastructure*) on the endogenous latent variable (*trust*) is medium, whereas the exogenous constructs (*security* and *social influence*) have small effect sizes. Furthermore, the exogenous construct (*ease of use*) has a medium effect size on the endogenous latent variable (*usefulness*), whereas the exogenous constructs (*navigational structure* and *visual appeal*) have small effect size.

Table 9.15: f^2 Values for The Interaction Effects in The Model.

No	Interaction Effects (Moderator -> Predictor)	f^2 for Endogenous Latent Variables
		Intention to Use
1	Individualism Collectivism (Product Indicator) -> Security	0.108
2	Individualism Collectivism (Product Indicator) -> Social Influence	0.138
3	Individualism Collectivism (Product Indicator) -> Trust	0.108
4	Masculinity Femininity (Product Indicator) -> Security	0.106
5	Masculinity Femininity (Product Indicator) -> Social Influence	0.106
6	Masculinity Femininity (Product Indicator) -> Trust	0.106
7	Power Distance (Product Indicator) -> Security	0.107
8	Power Distance (Product Indicator) -> Social Influence	0.106
9	Power Distance (Product Indicator) -> Trust	0.108
10	Uncertainty Avoidance (Product Indicator) -> Security	0.107
11	Uncertainty Avoidance (Product Indicator) -> Social Influence	0.106
12	Uncertainty Avoidance (Product Indicator) -> Trust	0.109

Table 9.15 presents the effect sizes of the interaction effects of the exogenous constructs (moderators variables) *individualism/collectivism*, *masculinity/femininity*, *power distance* and *uncertainty avoidance* on the relationships between the exogenous constructs *security*, *social influence* and *trust* on the endogenous latent variable *intention to use*. The results reveal that all moderator variables have small effect sizes on the relationships between the exogenous constructs *security*, *social influence* and *trust* on the endogenous latent variable *intention to use*.

9.5.5 Blindfolding and Predictive Relevance Q^2

In addition to evaluating the magnitude of the R^2 values as a criterion of predictive accuracy, researchers should also examine Stone-Geisser's Q^2 value (Geisser, 1974; Stone, 1974). This measure is an indicator of the model's predictive relevance. More specifically, when PLS-SEM exhibits predictive relevance, it accurately predicts the data points of indicators in reflective measurement models of endogenous constructs. In the structural model, Q^2 values larger than zero for a certain reflective endogenous latent variable indicate the path model's predictive relevance for this particular construct. Blindfolding is a sample re-use technique that starts with the first data point and omits every d^{th} data point in the endogenous construct's indicators. Then, the procedure estimates the PLS path model parameters using the remaining data points. The omitted data points are considered missing values and treated accordingly when running the PLS-SEM algorithm (e.g. by using mean value replacements). The resulting estimates are then used to predict the omitted data points. The difference between the true (i.e., omitted) data points and the predicted ones is then used as input for the Q^2 measure (Geisser, 1974; Stone, 1974).

Table 9.16: Q^2 Values for The Endogenous Latent Variables of The Model.

Endogenous Latent Variables	Q^2	Predictive Value
Intention to Use	0.711	> 0
Trust	0.167	> 0
Usefulness	0.438	> 0

Table 9.16 illustrates that all the Q^2 values for the endogenous constructs (i.e. *intention to use, trust* and *usefulness*) are bigger than zero, therefore, indeed they all indicate a sufficient path model's predictive relevance.

9.5 Advanced Analysis Using PLS-SEM

In this section, further analysis will be carried out to better understand the structural model of the research. The control variables will be tested against the main endogenous (dependent) construct of the research (i.e. *intention to use*). The multi-group analysis of observations of the structural model is further evaluated. This assesses whether or not there is a situation where different parameters occur for different subpopulations, such as segments of gender.

9.5.1 Structural Model Assessment for Control Variables

This section considers the structural path for the control variables (i.e. *age, computer skills, gender, income (SAR), internet purchase experience, internet purchase frequency, location, mobile internet access, mobile skills level,* and *the level of qualification*). The Table 9.17 explains each control variable.

Table 9.17: Summary of Control Variables.

Control Variables	Details
Age	The user's age range
Computer Skills	The user's level of computer skills
Gender	The user's gender of the participants
Income	The user's annual income in SAR
Internet Purchase	The user's experience of conducting online purchasing from a PC
Internet Purchase Frequency	The user's frequency of online purchasing from a PC
Location	The user's geographical location
Mobile Internet Access	The user's mobile device has internet access
Mobile skills	The user's level of mobile skills
Qualification	The user's latest level of qualification.

The control variables are tested using the PLS-SEM algorithm in SmartPLS 3.0, and the results are presented in Table 9.18:

Table 9.18: Control Variables Structural Path Results.

Control Variables	β	Sample Mean (M)	Standard Error (STERR)	Sign	T Statistics (|O/STERR|)	P Values
Age -> IU	-0.021	-0.022	0.022	-	0.974	0.330
Computer Skills -> IU	0.049	0.049	0.022	+	**2.288**	**0.022****
Gender -> IU	-0.080	-0.079	0.019	-	**4.246**	**0.000*****
Income -> IU	0.041	0.041	0.021	+	**1.976**	**0.048****
Internet Purchase -> IU	-0.026	-0.025	0.024	-	1.061	0.289
Internet Purchase Frequency -> IU	-0.035	-0.034	0.021	-	1.622	0.105
Location -> IU	-0.003	-0.002	0.015	-	0.174	0.862
Mobile Internet Access -> IU	0.061	0.061	0.018	+	**3.376**	**0.001*****
Mob Skills -> IU	0.085	0.087	0.022	+	**3.953**	**0.000*****
Qualification -> IU	0.034	0.035	0.022	+	1.513	0.131

The signs, sizes and statistical significances of the path coefficients (β) were examined in Table 9.18. The results revealed that *mobile internet access* and *mobile skills* are positively significant determinants for *m-transaction intention to use* (p <0.001, t > 2.57). However, *gender* is negatively significant determinate for m-transaction intention to use (p <0.001, t >2.57). *Computer skills, income* is positively significant determinant for *m-transaction intention to use* (p <0.05, t > 1.96). However, *age, internet purchase, internet purchase frequency, location* and *qualification* are not statistically significant determinates for *m-transaction intention to use*.

9.5.2 Multi-Group Analysis (MGA)

The multi-group analysis (MGA) algorithm in PLS-SEM is a method to test multiple pre-defined data groups for significant differences in their group-specific parameter estimates (e.g., outer loadings, outer weights and path coefficients). This algorithm combines different methods that are

based on bootstrapping results from every group: (1) Confidence Intervals (Bias Corrected). This method computes the bias-corrected confidence intervals for the group-specific estimations of parameters in the PLS path model. The group-specific results of a path coefficient are significantly different if the bias-corrected confidence intervals do not overlap. (2) Henseler's Multi-Group Analysis (MGA) for PLS-SEM. This method is a non-parametric significance test for the difference of group-specific results that builds on PLS-SEM bootstrapping results. A result is significant at the 5% probability of error level, if the *p*-value is smaller than 0.05 or larger than 0.95 for a certain difference of group-specific path coefficients. (3) Parametric Test. This method is a parametric significance test for the difference of group-specific PLS-SEM results that assume equal variances across groups. (4) Welch-Satterthwait Test. This method is a parametric significance test for the difference of group-specific PLS-SEM results that assumes unequal variances across groups. (Hair Jr et al., 2014; Sarstedt et al., 2011).

Therefore, the following empirical assessment for different groups (i.e. male vs female, paper-based vs online-based, online purchase experience vs non-online purchase experience and mobile internet access vs non-mobile internet access) will be discussed below. The Path Coefficients analysis will be performed using Multi-Group Analysis (MGA) in SmartPLS 3.0 to identify in which groups the independent construct (predictor) has a significant effect on the dependent construct. Furthermore, Henseler's Multi-Group Analysis (MGA) test will be performed to examine if there is a significant difference between any two groups with regards to the relationship between independent and dependent variables.

9.5.2.1 Gender (Males vs Females)

In this section the difference between *females* and *males* will be evaluated. The structural model will be analysed and examined to assess whether there is a difference between these two groups (*female* vs *male*). The data set was divided into two groups; the first group was females with a sample size of 192, and the second group was males with a sample size of 732. All the hypothesised relationships between the exogenous constructs and the main endogenous construct (i.e. *intention to use*) were tested to see if there was any statistically significant difference between each group. Table 9.19 illustrates the difference between the control variable *gender* (i.e. between males and females), all exogenous variables of the model and the main dependent variable of the model (i.e. *intention to use*).

Table 9.19: Gender Structural Path Results.

No	Hypotheses	*β* Female	*β* Male	*β* Mean Female	*β* Mean Male	t-Values Female	t-Values Male	p-Values Female	p-Values Male
1	Cost -> IU	0.093	-0.014	0.024	-0.015	0.826	0.502	0.409	0.616
2	EU -> IU	0.437	0.262	0.423	0.259	**4.840**	**6.713**	**0.000*****	**0.000*****
3	EU -> USF	0.173	0.375	0.173	0.374	**1.979**	**9.066**	**0.048****	**0.000*****
4	GEC -> IU	0.055	-0.027	0.075	-0.026	0.733	0.940	0.464	0.348
5	IDC -> IU	0.031	0.335	0.048	0.338	0.446	**10.813**	0.655	**0.000*****
6	MF -> IU	-0.066	0.076	-0.033	0.075	0.807	**2.224**	0.420	**0.026****
7	NVS -> IU	0.019	0.043	0.035	0.044	0.148	1.262	0.882	0.207
8	NVS -> USF	0.276	0.244	0.278	0.245	**2.894**	**5.676**	**0.004*****	**0.000*****
9	PWD -> IU	0.039	0.086	0.064	0.085	0.650	**3.170**	0.516	**0.002*****
10	IFR -> IU	-0.064	-0.019	-0.098	-0.020	0.660	0.690	0.509	0.490
11	IFR -> TSP	0.354	0.377	0.354	0.380	**4.181**	**9.449**	**0.000*****	**0.000*****
12	SEC -> IU	0.015	0.008	0.038	0.009	0.167	0.345	0.868	0.730
13	SEC -> TSP	0.162	0.220	0.168	0.217	**1.740**	**5.033**	**0.082***	**0.000*****
14	SIF -> IU	0.120	0.050	0.132	0.051	1.477	**1.762**	0.140	**0.078***
15	SIF -> TSP	0.085	-0.146	0.087	-0.146	1.083	**3.372**	0.279	**0.001*****
16	TSP -> IU	-0.029	-0.028	-0.053	-0.029	0.337	1.223	0.736	0.221
17	UAV -> IU	0.163	0.026	0.168	0.028	**2.497**	0.724	**0.013****	0.469
18	USF -> IU	0.013	0.131	-0.002	0.130	0.159	**3.771**	0.874	**0.000*****
19	WS -> IU	0.078	0.073	0.072	0.073	0.742	**2.299**	0.458	**0.022****
20	WS -> USF	0.226	0.274	0.225	0.275	**2.641**	**6.701**	**0.008*****	**0.000*****

The results revealed that the group of exogenous constructs (*ease of use*, *individualism/ collectivism*, *navigational structure*, *power distance*, and *usefulness*) and the group of exogenous constructs (*masculinity/femininity* and *visual appeal*) and the exogenous construct (*social influence*) are statistically significant determinants within the male group for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57), (p <0.05, t > 1.96) and (p <0.1, t > 1.56) respectively. On the other hand, within the female group the exogenous construct (*ease of use*) and the exogenous construct (*uncertainty avoidance*) are statistically significant determinants for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57) and (p <0.05, t > 1.96). Furthermore, Henseler's Multi-Group Analysis (MGA) test was performed to examine if there is a statistical significant difference between female and male groups in the relationships between exogenous constructs and the endogenous construct (*intention to use*). Table 9.20 summarises the Henseler's (MGA) test for the different significance between males and females.

Table 9.20: Henseler's Test Results Between Female and Male.

No	Hypotheses	Path Coefficients-diff (| Male - Female |)	p-Value (Male vs Female)
1	Cost -> IU	0.107	0.771
2	EU -> IU	0.175	0.958
3	EU -> USF	0.202	**0.019*****
4	GEC -> IU	0.082	0.851
5	IDC -> IU	0.304	**0.000*****
6	MF -> IU	0.142	**0.063***
7	NVS -> IU	0.024	0.428
8	NVS -> USF	0.032	0.623
9	PWD -> IU	0.046	0.237
10	IFR -> IU	0.044	0.325
11	IFR -> TSP	0.024	0.405
12	SEC -> IU	0.007	0.527
13	SEC -> TSP	0.058	0.286
14	SIF -> IU	0.070	0.790
15	SIF -> TSP	0.231	0.991
16	TSP -> IU	0.001	0.518
17	UAV -> IU	0.137	0.971
18	USF -> IU	0.117	**0.098***
19	WS -> IU	0.005	0.515
20	WS -> USF	0.049	0.309

The results show that the relationship between the construct exogenous (*individualism/ collectivism*) and the endogenous construct (*intention to use*) is statistically significantly different between males and females. With reference to the path coefficients in Table 9.19, they indicate that the exogenous construct (*individualism/collectivism*) is more likely to affect the endogenous construct (*intention to use*) in the group of males than in the females, at the level of (p <0.001, t > 2.57). Furthermore, it can be seen from Table 9.20 that the relationship between the exogenous construct (*masculinity/femininity*) and the endogenous construct (*intention to use*) is slightly statistically different between males and females. Likewise, the path coefficients show that the exogenous construct (*masculinity/femininity*) affects the endogenous construct (*intention to use*) more in the group of males than in the group of females, at the level of (p <0.1, t > 1.65). In addition, the results in Table 9.20 show that the relationship between the exogenous construct (*usefulness*) and the endogenous construct (*intention to use*) is slightly statistically different between males and females. Similarly, the path coefficients indicate that the exogenous construct (*usefulness*) affects the endogenous construct (*intention to use*) more in the group of males than in the female group, at the level of (p <0.1, t > 1.65).

9.5.2.2 Distribution Methods (Paper vs Online)

In this section the difference between surveys distributed as *paper-based* and surveys distributed as *online-based* will be evaluated. The structural model will be analysed and examined to assess whether there is a difference between these two groups (*paper* vs *online*). The data set was divided

into two groups; the first group was the *paper-based* distribution method with a sample size of 482, and the second group was the *online-based* distribution method with a sample size of 442. All the hypothesised relationships between the exogenous constructs and the main endogenous construct (i.e. *intention to use*) were tested to see if there was any statistically significant difference between each group. Table 9.21 illustrates the difference between the surveys distributed as paper-based and the surveys distributed as online-based, all the exogenous variables of the model and the main dependent variable of the model (i.e. *intention to use*).

Table 9.21: Distribution Methods (Paper vs Online) Structural Path Results.

No	Hypotheses	*β* (Online)	*β* (Paper)	*β* Mean (Online)	*β* Mean (Paper)	t-Values (Online)	t-Values (Paper)	p-Values (Online)	p-Values (Paper)
1	Cost -> IU	-0.036	-0.064	-0.059	-0.001	0.593	0.829	0.553	0.407
2	EU -> IU	0.428	0.005	0.421	0.008	**6.945**	0.111	**0.000*****	0.911
3	EU -> USF	0.188	0.250	0.192	0.237	**3.665**	**2.220**	**0.000*****	**0.027****
4	GEC -> IU	-0.020	0.046	-0.003	-0.003	0.366	0.635	0.714	0.526
5	IDC -> IU	0.077	0.551	0.078	0.544	**1.720**	**10.479**	**0.086***	**0.000*****
6	MF -> IU	0.028	0.074	0.029	0.071	0.538	1.456	0.591	0.146
7	NVS -> IU	-0.008	0.032	-0.003	0.006	0.099	0.585	0.921	0.559
8	NVS -> USF	0.223	-0.171	0.224	-0.050	**3.376**	0.946	**0.001*****	0.345
9	PWD -> IU	-0.017	0.097	0.003	0.094	0.296	**2.386**	0.767	**0.017****
10	IFR -> IU	-0.021	-0.039	-0.025	-0.043	0.333	1.051	0.739	0.294
11	IFR -> TSP	0.446	-0.018	0.445	-0.017	**8.621**	0.244	**0.000*****	0.807
12	SEC -> IU	0.053	0.022	0.052	0.038	0.879	0.325	0.380	0.746
13	SEC -> TSP	0.198	-0.115	0.199	-0.088	**3.332**	1.158	**0.001*****	0.247
14	SIF -> IU	0.127	-0.048	0.129	-0.042	**2.513**	0.822	**0.012****	0.411
15	SIF -> TSP	0.091	-0.081	0.092	-0.093	**1.976**	1.011	**0.048****	0.312
16	TSP -> IU	-0.036	0.068	-0.047	0.063	0.612	1.600	0.541	0.110
17	UAV -> IU	0.023	-0.024	0.039	-0.030	0.533	0.550	0.594	0.582
18	USF -> IU	0.068	-0.004	0.064	0.000	1.205	0.083	0.228	0.934
19	WS -> IU	0.061	0.029	0.062	0.037	0.890	0.651	0.374	0.515
20	WS -> USF	0.264	-0.217	0.263	-0.171	**4.628**	**1.742**	**0.000*****	**0.082****

The results revealed that the exogenous constructs (*individualism/collectivism* and *power distance*) are statistically significant determinants within the surveys distributed as paper-based for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57) and (p <0.05, t > 1.96) respectively. On the other hand, the exogenous constructs (*ease of use*, *social influence* and *individualism/collectivism)* are statistically significant determinants within the surveys distributed as online-based for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57), (p <0.05, t > 1.96) and (p <0.1, t > 1.56) respectively. Furthermore, Henseler's Multi-Group Analysis (MGA) test was carried out to examine if there is a statistical significant difference between surveys distributed as paper-based and as online-based, on the relationships between the exogenous constructs and the endogenous construct (*intention to use*). Table 9.22 presents the Henseler's (MGA) test results for the different significance between paper-based and online-based distribution.

Table 9.22: Henseler's Test Results Between Paper and Online surveys.

No	Hypotheses	Path Coefficients-diff (| Paper - Online |)	p-Value (Paper vs Online)
1	Cost -> IU	0.027	0.605
2	EU -> IU	0.424	1.000
3	EU -> USF	0.061	0.174
4	GEC -> IU	0.066	0.249
5	IDC -> IU	0.474	0.216
6	MF -> IU	0.046	0.261
7	NVS -> IU	0.039	0.338
8	NVS -> USF	0.393	0.989
9	PWD -> IU	0.114	**0.048****
10	IFR -> IU	0.018	0.597
11	IFR -> TSP	0.464	1.000
12	SEC -> IU	0.031	0.641
13	SEC -> TSP	0.313	0.988
14	SIF -> IU	0.174	0.978
15	SIF -> TSP	0.172	0.939
16	TSP -> IU	0.104	**0.072***
17	UAV -> IU	0.047	0.779
18	USF -> IU	0.072	0.832
19	WS -> IU	0.032	0.652
20	WS -> USF	0.481	0.997

The results from Table 9.22 show that the relationship between the exogenous construct (*power distance*) and the endogenous construct (*intention to use*) is statistically significantly different between *paper* and *online*. With reference to the path coefficients in Table 9.21, they indicate that the exogenous construct (*power distance*) affects the endogenous construct (*intention to use*) in the *paper-based* group more than in the *online-based* group at the level of (p <0.05, t > 1.96). Furthermore, it can be seen from Table 9.22 that the relationship between the exogenous construct (*trust*) and the endogenous construct (*intention to use*) is slightly statistically significantly different between *paper* and *online*. Likewise, the path coefficients show that the exogenous construct (*trust*) affects the endogenous construct (*intention to use*) in the *paper-based* group more than in the *online-based* group, at the level of (p <0.1, t > 1.65).

9.5.2.3 Online Purchase Experience

In this section the difference between users who have previous experience of online purchasing from normal PCs, and users who do not have such previous experience, will be evaluated. The structural model will be analysed and examined to assess whether there is a difference between these two groups (*online purchase experience from PC [Yes vs No]*). The data set was divided into two groups; the first group was *the users with previous experience of online purchasing from normal PCs* with a sample size of 633, and the second group was *those who have no previous experience* with a sample size of 291. All the hypothesised relationships between the exogenous constructs and the main endogenous construct (i.e. *intention to use*) were tested to see if there is any statistically significant difference between each group. Table 9.23 illustrates the difference between the users who have online purchase experience and those who have no previous experience in online purchasing, between all exogenous variables of the model and the main dependent variable of the model (i.e. *intention to use*).

Table 9.23: Online Purchase (Yes vs No) Structural Path Results.

No	Hypotheses	*β* (Purchas Online No)	*β* (Purchas Online Yes)	*β* Mean (Purchas Online No)	*β* Mean (Purchas Online Yes)	t-Values (Purchas Online No)	t-Values (Purchas Online Yes)	p-Values (Purchas Online No)	p-Values (Purchas Online Yes)
1	COT -> IU	0.003	0.012	-0.003	0.011	0.046	0.471	0.963	0.638
2	EU -> IU	0.203	0.374	0.198	0.373	**3.499**	**8.999**	**0.000*****	**0.000*****
3	EU -> USF	0.311	0.375	0.311	0.376	**5.268**	**8.294**	**0.000*****	**0.000*****
4	GEC -> IU	0.037	-0.034	0.038	-0.034	0.733	1.189	0.463	0.235
5	IDC -> IU	0.320	0.227	0.320	0.229	**6.239**	**7.662**	**0.000*****	**0.000*****
6	MF -> IU	-0.016	0.035	-0.011	0.035	0.257	1.332	0.797	0.183
7	NVS -> IU	0.042	0.058	0.048	0.057	0.638	1.641	0.523	0.101
8	NVS -> USF	0.268	0.253	0.270	0.252	**4.470**	**4.938**	**0.000*****	**0.000*****
9	PWD -> IU	0.083	0.086	0.085	0.086	**2.041**	**3.150**	**0.042****	**0.002*****
10	IFR -> IU	-0.014	-0.034	-0.015	-0.035	0.267	1.208	0.790	0.227
11	IFR -> Trust	0.366	0.397	0.366	0.396	**5.137**	**9.411**	**0.000*****	**0.000*****
12	SEC -> IU	0.095	-0.026	0.094	-0.024	**2.271**	1.031	**0.023****	0.303
13	SEC -> TSP	0.182	0.184	0.187	0.187	**2.343**	**3.710**	**0.019****	**0.000*****
14	SIF -> IU	0.012	0.068	0.015	0.068	0.222	**2.333**	0.824	**0.020****
15	SIF -> TSP	-0.070	-0.036	-0.067	-0.040	0.779	0.807	0.436	0.420
16	TSP -> IU	-0.011	-0.015	-0.010	-0.016	0.269	0.625	0.788	0.532
17	UAV -> IU	0.154	0.075	0.150	0.077	**2.699**	**2.319**	**0.007*****	**0.021****
18	USF -> IU	0.047	0.119	0.049	0.117	0.933	**3.348**	0.351	**0.001*****
19	WS -> IU	0.111	0.065	0.108	0.067	1.507	**2.029**	0.132	**0.043****
20	WS -> USF	0.295	0.251	0.295	0.252	**5.155**	**5.540**	**0.000*****	**0.000*****

The results revealed that the group of exogenous constructs (*ease of use, individualism/ collectivism, power distance and usefulness*) and the group of exogenous constructs (*social influence, uncertainty avoidance and visual appeal*) are statistically significant determinants within those who have previous experience of m-transactions for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57) and (p <0.05, t > 1.96) respectively. On the other hand, the group of exogenous constructs (*ease of use, individualism/collectivism and uncertainty avoidance*) are statistically significant determinants within those who have not experienced m-transactions before, for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57) and (p <0.05, t > 1.96) respectively. Furthermore, Henseler's Multi-Group Analysis (MGA) test was carried out to examine if there is a statistically significant difference between users who have previous online purchase experience and those who have not, on the relationships between exogenous constructs and the endogenous construct (*intention to use*). Table 9.24 presents the Henseler's (MGA) test for the different significance between users with previous experience of online purchasing from normal PCs, and users without online purchasing experience.

Table 9.24: Henseler's Test Results for Purchase Online Experience (Yes vs No).

No	Hypotheses	Path Coefficients-diff (| Purchas Online Yes - Purchas Online No |)	p-Value (Purchas Online Yes vs Purchas Online No)
1	Cost -> IU	0.009	0.446
2	EU -> IU	0.171	**0.010****
3	EU -> USF	0.064	0.194
4	GEC -> IU	0.072	0.890
5	IDC -> IU	0.093	0.942
6	MF -> IU	0.051	0.226
7	NVS -> IU	0.016	0.418
8	NVS -> USF	0.015	0.570
9	PWD -> IU	0.003	0.477
10	IFR -> IU	0.020	0.633
11	IFR -> TSP	0.031	0.360
12	SEC -> IU	0.120	0.993
13	SEC -> TSP	0.002	0.490
14	SIF -> IU	0.056	0.185
15	SIF -> TSP	0.034	0.360
16	TSP -> IU	0.005	0.531
17	UAV -> IU	0.078	0.883

18	USF -> IU	0.072	0.118
19	WS -> IU	0.046	0.718
20	WS -> USF	0.043	0.730

The results in Table 9.24 show that there is only one relationship – between the exogenous construct (*ease of use*) and the endogenous construct (*intention to use*) – with a statistically significant difference between those who have previous online purchase experience and those who do not. With reference to the path coefficients in Table 9.23, they indicate that the exogenous construct (*ease of use*) affects the endogenous construct (*intention to use*) more within those who have previous experience of online purchasing than in those who do not have such experience, at the level of (p <0.05, t > 1.96).

9.5.2.4 Mobile Internet Access

In this section the difference between users who *have internet access via mobile devices* and *users who do not have internet access*, will be evaluated. The structural model will be analysed and examined to assess whether there is a difference between these two groups (*mobile internet access [Yes vs No]*). The data set was divided into two groups; the first group was *the users with mobile internet access* with a sample size of 834, and the second group was *those who have no internet access* with a sample size of 90. All the hypothesised relationships between the exogenous constructs and the main endogenous construct (i.e. *intention to use*) were tested to see if there was any statistically significant difference between each group. Table 9.25 illustrates the difference between the users who have internet access via their mobile devices and those who have no access, between all exogenous variables of the model and the main dependent variable of the model (i.e. *intention to use*).

Table 9.25: Mobile Internet Access (Yes vs No) Structural Path Results.

No	Hypotheses	*β* (M-internet access No)	*β* (M-internet access Yes)	*β* Mean (M-internet access No)	*β* Mean (M-internet access Yes)	t-Values (M-internet access No)	t-Values (M-internet access Yes)	p-Values (M-internet access No)	p-Values (M-internet access Yes)
1	COT -> IU	-0.185	0.036	-0.193	0.037	1.523	1.461	0.128	0.144
2	EU -> IU	0.071	0.341	0.072	0.342	0.855	**8.751**	0.393	**0.000*****
3	EU -> USF	0.507	0.348	0.498	0.347	**5.203**	**8.804**	**0.000*****	**0.000*****
4	GEC -> IU	-0.027	-0.031	0.014	-0.030	0.262	1.121	0.793	0.263
5	IDC -> IU	0.431	0.211	0.460	0.212	**4.794**	**8.528**	**0.000*****	**0.000*****
6	MF -> IU	0.116	0.012	0.118	0.012	1.367	0.455	0.172	0.649
7	NVS -> IU	0.034	0.077	0.033	0.075	0.426	**2.098**	0.670	**0.036****
8	NVS -> USF	0.133	0.275	0.132	0.275	1.073	**6.198**	0.284	**0.000*****
9	PWD -> IU	0.142	0.085	0.093	0.084	1.015	**3.656**	0.310	**0.000*****
10	IFR -> IU	-0.138	0.006	-0.113	0.005	1.514	0.207	0.130	0.836
11	IFR -> TSP	0.307	0.383	0.295	0.386	**2.453**	**9.609**	**0.014****	**0.000*****
12	SEC -> IU	0.124	-0.003	0.106	-0.002	1.380	0.148	0.168	0.883
13	SEC -> TSP	0.303	0.188	0.309	0.188	**2.294**	**4.104**	**0.022****	**0.000*****
14	SIF -> IU	-0.125	0.064	-0.069	0.063	1.128	**2.359**	0.260	**0.019****
15	SIF -> TSP	-0.090	-0.075	-0.073	-0.074	0.708	**1.805**	0.479	**0.071***
16	TSP -> IU	0.139	-0.047	0.156	-0.047	**1.779**	**2.218**	**0.076***	**0.027****
17	UAV -> IU	0.213	0.108	0.210	0.109	**2.303**	**3.384**	**0.021****	**0.001*****
18	USF -> IU	0.261	0.096	0.207	0.095	**1.966**	**3.076**	**0.050****	**0.002*****
19	WS -> IU	0.153	0.049	0.159	0.049	**1.757**	1.412	**0.079***	0.158
20	WS -> USF	0.270	0.256	0.269	0.256	**2.328**	**6.655**	**0.020****	**0.000*****

The results in Table 9.25 revealed that the group of exogenous constructs (*ease of use, individualism/collectivism, power distance and uncertainty avoidance*) and the group of exogenous constructs (*navigational structure, social influence, and trust*) are statistically significant determinants within those who have internet access via their mobile devices of m-transactions for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57) and (p <0.05, t > 1.96) respectively. On the other hand, the exogenous construct (*individualism/collectivism*), the group of

exogenous constructs (*uncertainty avoidance* and *usefulness*), and the group of exogenous constructs (*trust* and *visual appeal*) are statistically significant determinants within those who do not have internet access via their mobile devices, for the endogenous construct *intention to use* at the levels of (p <0.001, t > 2.57), (p <0.05, t > 1.96) and (p <0.1, t > 1.56) respectively. Furthermore, Henseler's Multi-Group Analysis (MGA) test was carried out to examine if there is a statistically significant difference between users who have internet access via their mobile devices and those who do not, between exogenous constructs and the endogenous construct (*intention to use*). Table 9.26 presents the Henseler's (MGA) test for the different significance between users with mobile internet access and with those who do not have internet access.

Table 9.26: Henseler's Test Results for Mobile Internet Access (Yes vs No).

No	Hypotheses	Path Coefficients-diff (| M-internet Access Yes - M-internet Access No |)	p-Value (M-internet Access Yes vs M-internet Access No)
1	Cost -> IU	0.222	**0.028****
2	EU -> IU	0.270	**0.002*****
3	EU -> USF	0.159	0.930
4	GEC -> IU	0.004	0.523
5	IDC -> IU	0.220	0.993
6	MF -> IU	0.105	0.882
7	NVS -> IU	0.043	0.317
8	NVS -> USF	0.142	0.134
9	PWD -> IU	0.056	0.673
10	IFR -> IU	0.143	**0.064***
11	IFR -> TSP	0.076	0.288
12	SEC -> IU	0.127	0.917
13	SEC -> TSP	0.115	0.846
14	SIF -> IU	0.189	**0.045****
15	SIF -> TSP	0.016	0.457
16	TSP -> IU	0.186	0.991
17	UAV -> IU	0.105	0.870
18	USF -> IU	0.165	0.889
19	WS -> IU	0.105	0.870
20	WS -> USF	0.014	0.564

The results in Table 9.26 show that the relationship between the exogenous construct (*ease of use*) and the endogenous construct (*intention to use*) is statistically significantly different between *users with mobile internet access* and *users with no internet access*. With reference to the path coefficients in Table 9.25, they indicate that the exogenous construct (*ease of use*) affects the endogenous construct (*intention to use*) more in the group of users who have internet access via their mobile devices than in those who do not have access, at the level of (p <0.001, t > 2.57). Furthermore, it can be seen from Table 9.26 that the relationship between the exogenous construct (*cost*) and the endogenous construct (*intention to use*) is statistically significantly different between *users with mobile internet access* and *users with no mobile internet access*. Likewise, the path coefficients show that the exogenous construct (*cost*) affects the endogenous construct (*intention to use*) more in the group of users who have no internet access via their mobile devices than in those who have internet access, at the level of (p <0.05, t > 1.96). In addition, the relationship between the exogenous construct (*telecommunication infrastructure*) and the endogenous construct (*intention to use*) is slightly statistically significantly different between *users with mobile internet access* and *users with no internet access*. With reference to the path coefficients in Table 9.25, they indicate that the exogenous construct (*telecommunication infrastructure*) affects the endogenous construct (*intention to use*) more in the group of users who do not have internet access via their mobile devices than in those who have access, at the level of (p <0. 1, t > 1.65).

9.5.6 Summary for Structural Model

Here, the main key assessments and tests for the structural model shall briefly be summarised, highlighting whether or not they meet the criteria. Firstly, the evaluation of the path coefficients in the structural model of the research. There are two things which are important when evaluating the PLS-SEM results for the structural model: (1) the significance and the relevance of coefficients of the structural model. The application of the bootstrapping routine and examination of *t* or *p* values can be utilised for assessing the significance required. (2) The relative sizes of the path coefficients are evaluated and compared, as well as the total effects, f^2 effect size, and q^2 effect size. The understanding of these results can help to determine the key factors with the most relevance to explain the endogenous constructs in the structural model of the research. Secondly, assessing the coefficients of determination (R^2 values). The PLS-SEM values (i.e. coefficients of determination) interpret the volume of explained variance of the endogenous factors in the structural model. A properly developed path model to explain certain key target factors ought to deliver sufficiently high R^2 values. Thirdly, comprehend and assess the f^2 effect size. The f^2 effect size empowers the researcher to investigate the relevance of factors in explaining the chosen endogenous constructs. More particularly, it helps to investigate the amount a predictor factor contributes to the R^2 value of a target latent variable in the structural model. Fourthly, utilizing the blindfolding method for evaluating the predictive relevance ($Q2$ value) which is an indicator of the path model's predictive relevance. The blindfolding methodology is a resampling procedure that systematically removes and predicts each data of the indicators in the reflective measurement model of endogenous factors. The path shows that it has a predictive relevance for a chosen reflective endogenous factor if the Q^2 value is bigger than zero. All the criteria mentioned above were discussed in this chapter (please see above) and their results were in the acceptable range and were considered satisfactory.

9.6 Summary

This chapter helped to test the conceptualised research constructs and identified the factors that are expected to be important when considering using m-transaction within the Saudi context. Amongst the different significant factors in the data analysis, the findings and the assessment of the significance and relevance of the structural model relationship show that ease of use is the most significant factor to affect the intention to use of m-transaction. In other words, being an easy to use application is important for Saudi users and it is a vital in their decision to accept and use any innovation (i.e. m-transaction). Therefore, a further study was undertaken to understand how easy to use (usability) a real m-transaction application within the Saudi environment. This need was answered by conducting a usability study in the following chapter.

Chapter 10 Usability Study (Validation Study (2))

10.1 Introduction

The previous chapter has helped to test the conceptualized hypotheses (*Section 9.4.2*) and identify the significant factors that are influential in adopting m-transaction within the Saudi society. The findings indicated that the level of usability of the underlying innovation possesses a high level of importance for Saudi users in order to use m-transaction. Therefore, the need to investigate the usability level of m-transaction in Saudi Arabia is answered via the study explained in this chapter.

10.2 The Study Purpose

Both the rapid advances in wireless technologies and the high proliferation rate of mobile communication services and artefacts have had a profound impact on industry, and are beginning to offer interesting and advantageous new services. In particular, the mobile transaction (m-transaction) system has emerged, enabling users to pay for physical and digital goods and services using their mobile devices whenever they want, regardless of their location. Although it is anticipated that m-transactions will enjoy a bright future, there is apparently still reluctance amongst users to accept mobile transactions, particularly in Saudi Arabia. Furthermore, it is believed that usability is critical to the success and acceptance of mobile technology innovations in general, and m-transactions in particular. While most of the research into IT innovation acceptance is based on TAM (Technology Acceptance Model) and its many variants, the literature review reveals that there is little research on mobile application usability as an important antecedent factor for the success and acceptance of mobile technologies. This is particularly true in developing countries, especially the Middle East, therefore this investigation aims to fill this gap in the research.

This study is an extension of previous chapters, which indicated that usability is the most influential factor in Saudi users' intentions of utilising mobile transactions. It aims to investigate and empirically test the usability level of mobile transactions from the perspective of Saudi users; this will be achieved by conducting usability experiments with real mobile applications within the target group. In other words, serves as a further validation/verification tool to answer the question "Why does the ease of use of mobile transactions have the highest impact on the intention to use mobile transactions in Saudi Arabia?" Moreover, it will produce a set of empirically-based recommendations for the developers and providers of mobile applications who are interested in the Saudi market. The results of this study showed that the usability of the tested application, which is considered one of the most popular commercial mobile application in Saudi Arabia, (i.e. 'Souq.com'), is unsatisfactory, with an average SUS Score of 50. Not surprisingly, this low usability negatively affected the willingness of the participants to use the application.

10.3 The Study Motivation

The previous chapters (i.e. Chapter 4, 5 and 6) have helped in developing the research conceptual framework which contains the most important factors that expected to significantly affect the Saudi users decision to adopt m-transaction. In Chapter 9, the developed framework and its factors were empirically validated in a study which involved a statistically representative sample size of approximately 1,000 Saudi users from different demographic backgrounds. The empirical analysis revealed that visual appeal, navigational structure, ease of use, usefulness, social influence, security, telecommunication infrastructure, individualism, power distance, uncertainty avoidance and masculinity all have a significant impact on consumers' intentions to use m-transactions in Saudi Arabia. However, the data analysis and the results in Chapter 9 identified *ease of use* as the most

significant influential factor to affect the intention to use m-transaction in Saudi Arabia (section 9.4.2). This result motivated the researcher to conduct a further study to understand the level of ease of use (usability) of m-transaction in Saudi Arabia. In addition, the researcher extensively reviewed the existing literature; this revealed that there are no studies investigating the usability of mobile applications in Saudi Arabia, or how the usability could affect users' intentions to employ m-transactions. That makes this study a first in its field. In particular this study aimed to validate this result by conducting a usability test for m-transactions with Saudi users. The feedback from these tests should shed light on why usability was ranked higher than other factors.

10.4 Test Application

Firstly, the researcher sought to ensure that the selected mobile application would enable to explore the research goals and objectives. The selection process was criteria-based, and four aspects were determined and verified: (1) fully working application with rich functionality; (2) the whole processes can be conducted in a mobile context (e.g. via smart mobile phone); (3) the application was developed and intended for use in the Saudi market and by Saudi users; and (4) it has not been used before by the test participants. The researcher faced some difficulties when trying to find an application which met all four criteria and which would provide a full transaction via the mobile application – i.e. (1) registering with the application; (2) shopping and finding the required product; (3) adding the product to the basket and managing the basket; (4) conducting the purchase transaction; (5) contacting the support team about the purchased product. The researcher could only find one mobile application which was available in the Saudi market and which met all four criteria: the well-known application called 'Souq.com' (Figure 10.1). Souq.com is considered the largest e-commerce site in the Arab world, featuring more than 400,000 products across many different categories (e.g. fashion, electronics, household goods …etc) and is often tagged as the "Amazon of the Middle East". It was established in 2005 as an auction site linked to the Arab internet portal "Maktoob" then moved to a marketplace with a fixed price model in early 2011, and finally launched its retail division at the end of 2011 (Souq.com, 2014). The researcher was able to gain approval by email for conducting the usability study on the mobile application for Souq.com, and it was decided to conduct the test on an IOS devic;e, as it is one of the most popular mobile operating systems (Nayebi et al., 2013). A recent study by Algethmi (2014) showed that iPhone (IOS) mobile phones are more popular and used within Saudi users (see Figure 10.2).

Figure 10.1: The Tested Mobile Application.

"Souq.com" (Souq.com, 2014).

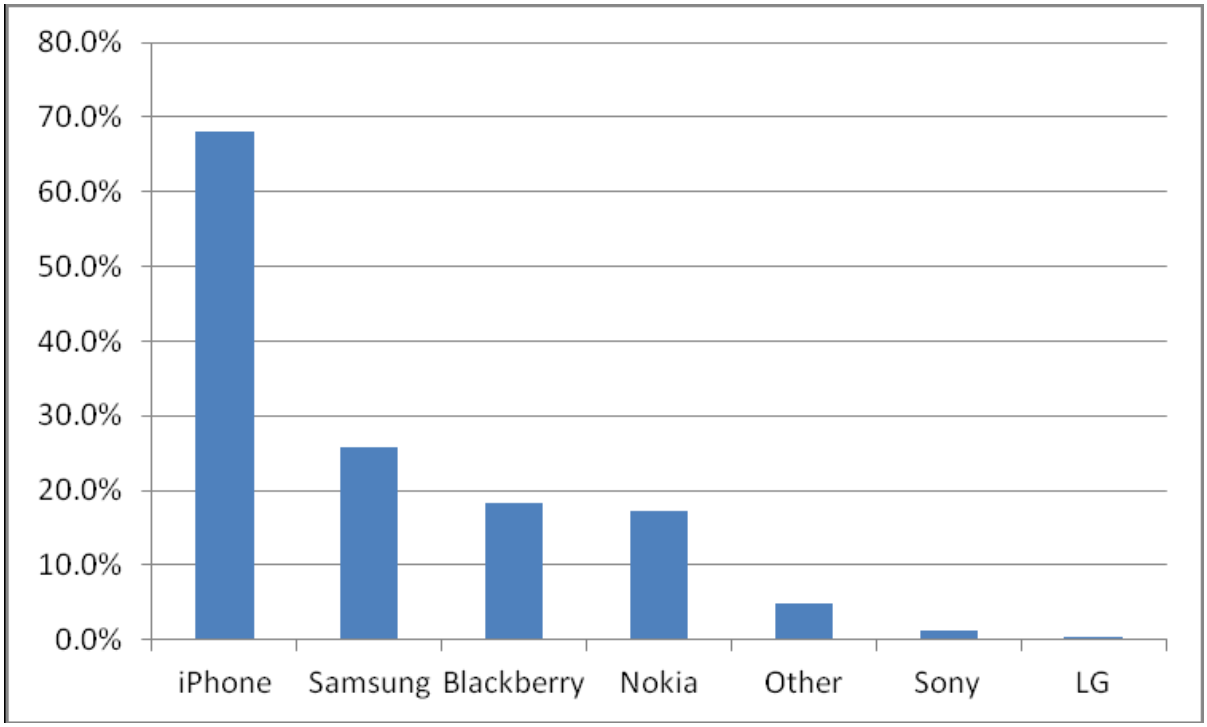

Figure 10.2: Mobile Phones Penetration in Saudi Arabia.

Source: (Algethmi, 2014).

10.5 Tasks

In-lab usability testing requires typical users of the product to be recruited to perform a set of predesigned tasks. These tasks should be as typical as possible of the activities that real users would perform on the selected application. The tasks should be designed to focus on the main functions of the system, such as the product and catalogue pages, searching features, displaying of records, interactivity, participation and sorting features (Alrobai et al., 2012). Snyder (2003) outlined the characteristics of tasks which would be suitable for use in testing, which can be summarised into 6 points: (1) based on a goal that matters to the user's profile; (2) covers important questions about the success of the product; (3) has appropriate scope; (4) has predictable and a finite number of possible solutions; (5) has a clear end that the user can recognise; and (6) elicits action. Furthermore, Snyder (2003) proposed a task template which can be used for any type of usability testing, shown in Table 10.1. This template was carefully applied to all the experiment's tasks.

Table 10.1: Task Template

Task #: < Task Name >
Goals/output:
Inputs/Assumptions:
Steps:
Time for expert:
Instructions for user:
Notes:

Source: (Snyder, 2003)

Furthermore, a usability context of use analysis is commonly used before designing the tasks, in order to ensure that the tasks are realistic and that the users are representative of a typical user. This analysis usually mitigates the artificial nature of usability testing and improves the validity of the

results. The usability context of use analysis can be carried out in various ways. The best way to collect the information is to arrange a meeting with stakeholders who have knowledge about the system under evaluation. If it is impossible to arrange a meeting, the information can be collected by interviewing the stakeholders or by using a questionnaire. Stakeholders may include, but are not limited to, the project manager, users' representatives, developers and system support (Maguire, 2001). In the absence of any response from the "Souq.com" owners/representatives regarding the main functions of their application, the researcher arranged interviews with five active "Souq.com" members. An interview agenda containing the topic of the study, the aim of the interview, and the estimated time was sent to the interviewees beforehand. The interview had a default time limit of 10 to 15 minutes in order to maintain an active conversation. The interviews took place in a convenient place predetermined by the interviewee (e.g. in a coffee shop near to the interviewee's house) and involved two main questions: (i) what type of tasks do you most commonly perform in Souq.com that involve mobile transactions? (ii) If you have any further ideas/suggestions on any relevant topic, please feel free to let us know. The researcher used the information acquired from the interviews to create seven different test tasks. Furthermore, two experts were consulted to evaluate the tasks. One task (downloading the application from the Apple store) was removed based on the experts' recommendations, as this task involved evaluating the store holding the application – e.g. the Apple store itself – rather than the actual application.

There are a number of different categories of usability testing tasks; the best known are: structured tasks, uncertain tasks, and scenario tasks (also known as problem solving). The tasks adopted in this study were developed and presented in a scenario format. Scenario task formats are the most widely used in usability testing, and are usually recommended by usability textbooks such as Barnum (2010); Dumas and Redish (1999), as they help usability testing to emulate real-world contexts of use. For further details of the tasks, such as their titles, instructions, goals, input, steps, times and notes, please see Appendix G.

The task time is measured by recording the time it takes a user to perform a predefined task; this can be the total time spent on a web page or the duration of a phone call. It could be measured in seconds, minutes, hours, days, months or even years (Sauro and Lewis, 2012). In order to evaluate the usability of a task, the researcher needed to set a maximum acceptable task completion time (specification limit), against which the actual time for completion of the task could be compared. Setting this limit is not easy. Guidelines in the usability literature suggested four approaches for setting task time specification limits (Sauro and Kindlund, 2012):

1- The task is examined by the test designers and they set the criteria.

2- The fastest task time is identified (can be by an expert), and then the specification limit is set to 1.5 times this time for each task.

3- Historical tests with the system can be used to set the time limit.

4- An agreement for the time specifications can be reached, based on negotiations between all parties responsible for the system.

Therefore, the researcher decided to set the acceptable time limit for the 6 tasks by applying the following method:

The tasks are completed by two experts and the formula (expert 1 time * 1.5) is used. Table 10.2 shows the time of each task for the two experts (Expert 1 & 2), the average time for the experts, the task time.

Table 10.2: Tasks timing.

Task	Expert 1	Expert 2	Average	Time Task (Average * 1.5)
Task 1	1.19	1.55	1.37	2.05
Task 2	1.30	1.28	1.29	1.93
Task 3	0.36	0.30	0.33	0.49
Task 4	0.57	0.45	0.51	0.76
Task 5	2.30	2.30	2.30	3.45
Task 6	2.20	2.20	2.20	3.30

Therefore, each task was allocated the time as presented in Table 10.2. According to Sauro and Lewis (2012) guidance in calculating the task's time. The two experts conducted the tests and the time spent on each task was recorded using a stop watch. Then the average was calculated for each task, then in order to calculate the task time, the average was multiply by 1.5 for each task as illustrated in Table 10.2.

10.6 Participants

The number and background of test participants are key factors in usability testing. To date, there is no agreement on how many users should be involved in usability testing. Some researcher state that eight participants are sufficient, while others suggest that ten participants are enough for an effective test (Lewis, 2006). A recent study (AlRoobaea and Mayhew, 2014) investigated the sample size required for usability testing through empirical studies, with the aim of answering this challenging question that has been hotly debated by researchers for many years. Their results concluded the following: 5 users are enough to uncover cosmetic problems and problems relating to structure and content; 8 users are enough for a few major, and some minor, problems, and are more appropriate for commercial studies and problems with layout and formatting; 16±4 users are enough to discover catastrophic, major, minor and cosmetic problems, and also for finding problems relating to design, navigation and the key aims and functions of the system, particularly in comparative studies. Finally, more than 20 users are needed for statistically significant studies and analysis of performance metrics, such as the success rate.

Accordingly, it was decided that 30 participants would be recruited for this study (see Table 10.3). In usability testing, the test sample should be as representative as possible of the target users. Relevant users are more likely to encounter relevant problems, which in turn will produce more relevant results. The test sample therefore had to be mobile phone users, be familiar with m-commerce, but without prior experience of the 'Souq.com' application. In addition, two independent experts were recruited to objectively rate each problem and to help with coding and categorizing them (van den Haak et al., 2009).

Table 10.3: Summary of Respondents' Demographic Data.

Demographic	Category	Frequency	Percent
Age	Less than 20	8	26.7
	20 - 34	18	60.0
	35 - 49	3	10.0
	50 - 65	1	3.3
Income *(SAR)	Less than 50,000	9	30.0
	50,000 – 100,000	5	16.7
	100,001 – 150,000	10	33.3
	150,001 – 200,000	3	10.0
	200,001 – 300,000	3	10.0
Qualification Level	Under Bachelor	9	30.0
	Bachelor	9	30.0
	Higher Diploma	1	3.3
	Master	8	26.7
	PhD/Doctor	3	10.0
Mobile Skills level	Intermediate	14	46.7
	Advanced	16	53.3
How long have you been using mobile internet?	1 - 2 Years	1	3.3
	3- 5 Years	18	60.0
	More than 5 years	11	36.7
How often do you use mobile transactions?	Every day	2	6.7
	Weekly	11	36.7
	Monthly	10	33.3
	Hardly ever	7	23.3
	Total	30	100.0

**SAR = Saudi Arabian Riyal, 1.00 SAR= 0.266 USD*

All participants were males as no female was willing to participate in the usability tests. This as discussed in *Chapters 4, 5 and 6*, is due to the fact that Saudi is a conservative society and approaching females is usually difficult.

10.7 Ethical Concerns

This study has passed the UEA Computing Sciences Research Ethics Committee. The participants' information was kept anonymous. The participants were told at the beginning that they were totally free to stop or withdraw from the experiment at any time, without any questions. They could refuse to answer any questions and permission for recording the experiment was gained from the participants prior to starting the tests.

10.8 Materials and Equipment Used

In the experiment preparation phase, a set of preparation documents was built consisting of an information and task sheet, an observer sheet, and a demographics and satisfaction questionnaire, see Appendices H, I, J and K. These documents were handed to the participants prior to the experiment, with the exception of the satisfaction questionnaire which was completed once the user had finished the test tasks. The information sheet contains the goals and objectives of the assessment and the roles of the users. The task sheets contain information about the 6 tasks, organised and divided into seven sections: the first section explains the purpose of each task and how to perform it, and also explains how to transfer from one task to another. The other six sections explain the task goal, and provide instructions and details which the users need to perform the relevant task. The test environment was a quiet room. The researcher tried to identify which equipment the users regularly used and set it up for them before the test. A mobile usability testing sled was developed, as there is a lack of these tools in the market and they are expensive to purchase. This gadget provides a perfect angle for the camera to capture the user's behaviour and actions while performing the activities on the smart phone. It also provides a stand for the smart phone to rest on in a comfortable way for the

user. A separate microphone with a stand was also set up to give a clearer sound recording, and to make it more convenient for the user as he/she did not then need to lean towards the camera's microphone. These tools were all attached to a laptop which recorded a video of each task for each user. Microsoft Windows Movie Maker was installed and utilised to import the recording from the camera and the audio from the attached microphone to provide a single multimedia file (video), which could then be edited. The researcher could also watch the videos, and fast-forward, rewind and increase/decrease the speed of each video footage (See Figure 10.3).

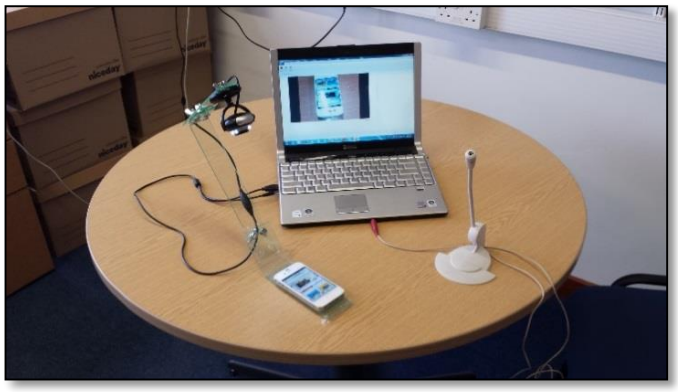

Figure 10.3: Equipment Used.

10.9 Piloting and Correction

To make sure that the tasks and all the procedures were clear and understandable, a pilot study was conducted with four users. All materials were checked to make sure that there were no spelling or grammatical errors and no ambiguous words or phrases, the users' behaviour was monitored, and all the usability measures were assessed as they would be in the actual testing. All of these steps resulted in useful corrections and adjustments for the real test. Further changes were made based on the users' comments such as rewording some statements and adding some pictures for further illustration.

10.10 Experimental Procedure

The experiments took place in a typical usability lab setting in Saudi Arabia from July 2014 to September 2014. All the participants were selected regardless of their age, income and gender. The researcher approached people from private and public organizations in different locations (e.g. universities, companies, schools, Internet cafes, streets and shops). However, this research is about adopting m-transactions, so the researcher had to verify that the participants were mobile users, familiar with mobile commerce, and had conducted a mobile transaction before, but had not used the tested application before (this was verified in the demographic section of the questionnaire (see APPENDIX H). The sample size of this experiment was 30. The researcher adopted the role of the evaluator in all the sessions, the participants were asked to think aloud and the evaluator noted all the comments made by the users. The evaluator used a stopwatch to record the time spent by each user on each task, and the observation sheet to write down the behaviour of each user and the problems discovered. After the users had finished their tasks, they were asked to rate their level of satisfaction in a SUS questionnaire with a five point scale – 1 for strongly disagree and 5 for strongly agree. Bangor et al. (2008) suggested slightly modified statements from those used in the original SUS instrument by Brooke (1996). The changes are (1) replacing the word "cumbersome" with "awkward" and (2) replacing the word "system" with "product". This study applied this slightly modified SUS and also replaced the word "product" with "application" as can be seen in Appendix H. To add a valid assessment of what the absolute numerical score of SUS means, a 7 point adjective rating scale can be used to judge the SUS scores. This has become known as the "university grade analog" (Bangor et al., 2008). This study applied this technique and again replaced the word

"product" with "application" (see Appendix I). Each participant conducted the experiment individually and the researcher ensured that every participant felt at ease whilst performing the tasks. Furthermore, users were given a chance to fill in an open-ended questionnaire by writing down their comments and feedback on the application, and explaining any reaction that was observed during the test. Subsequently, the researcher extracted the problems from the observer sheet and they were merged into a final master problem list.

Before starting the actual evaluation, users completed a demographics questionnaire (APPENDIX H) to provide the researcher with more information about themselves. Paper-based instructions were given to the users. The moderator described the test environment and how to use the equipment, gave a quick introduction to the task designs, and explained how to 'think aloud' for each test. In addition to the voice recording, video footage of the mobile's screen was captured. All these records were supplemented by the evaluators' notes. The experiment consisted of three stages as follows:

Introductory stage: Before the experiment, participants were introduced to the procedure by instructions read aloud by the evaluator. They were then given a questionnaire to complete with their personal details, demographics, and their experience of using a mobile phone, specifically their experience with mobile transactions. When all the necessary documents had been completed, the participants were allowed ten minutes to explore the Souq.com application. After the allotted time or when the participant said that he/she was ready, the experiment proceeded to the next stage. There are several reasons for allowing exploration of the application: firstly, it helps to familiarise participants with the interface; secondly, it gives the evaluator time to adjust the video recording equipment and test other equipment; finally, the exploration phase serves as a kind of rehearsal before the real experiment that follows. It gives the evaluator time to take his seat and prepare for taking notes, while users on the other hand can become used to the hardware and software, and regain their normal speed of interaction with the mobile systems.

Main stage: The main stage of the experiment began with an explanation of the tasks. Each user got the task sheets, but the tasks were also explained verbally by the evaluator, first by reading the text of the task and then by describing what kind of result he/she expected to see. After this explanation, the evaluator asked the user to explain each task back to him/her using their own words, to check their understanding. The execution of the tasks started after the video recording equipment was activated. The participants performed the tasks at their own pace and executed one after the other. During the entire experiment the evaluators were present without interfering with the tasks. If a participant became silent for a period of time, the evaluator reminded him/her about thinking aloud by saying, "Please think aloud". The users could ask questions before and after execution of the task, but not while the task was being performed.

Post experiment stage: After every experiment and after filling the questionnaire (SUS), the user was assured of the importance of their participation in the experiment and thanked. After that all the documents and notes relating to that experiment were stapled together and placed in a file. All the video footage of that participant and their screen were compressed and copied to a folder identified by the number of the experiment. Finally, the testing environment was restored back to its original state so that the next experiment could take place.

10.11 Measurements

To determine how the target application had impacted on users' ability to complete their m-transaction, the following measures were used:

1- Number and types of usability problems.

2- Time spent: this was a measure of the time spent by each user on completing the relevant task. In other words, it was used to measure the efficiency attribute of the application under evaluation.

3- Users' Satisfaction System Usability Scale (SUS) was used to show how pleased people were with their experience of using the tested application.

4- Success rate: this metric is used to measure the users' ability to successfully complete tasks.

These measurements can help to identify the level of usability whilst using m-transaction in Saudi Arabia. For example, the number and types of problems in using an application indicate the level of professionalism and the appropriate standard of design that suits the Saudi user. It also indicates how much effort was paid in developing the application through the different stages (e.g. system analysis, system requirements, user requirements, system design …etc) and whether the application was piloted enough or not. Furthermore, the time spent in using an application reflects the clarity, consistency between different functions of the application, simplicity of designing and straight forward steps to follow. In other words, it shows the efficiency of the application being used. The user satisfaction system usability scale (SUS) helps in measuring the level of satisfaction of the user after using an application, it indicates if the user is willing to use the application again. It reflects the user's impression about using the application's different functions. In general it shows the degree of satisfaction of the user to use the application. These different measurements can help in assessing the level of usability of using a typical m-transaction application in Saudi Arabia.

10.12 Usability Problems Discovered

10.13.1 Number of Problems Discovered

In Task 1, which is about registering with the application, users discovered 92 problems (13% of the total problems) in total. During Task 2, when participants had to find a smart phone and add it to the basket, they encountered 83 problems (11.66% of the total problems). They identified 104 problems (14.61% of the total problems) in Task 3 while trying to find a book that they liked and add it to the basket. Users faced 67 (9.4% of total problems) usability problems when finding a football as a gift in Task 4, and in Task 5, where they had to conduct a transaction for one of the products inside the basket, they found most of the usability problems, a total of 234 (32.9% of total problems). This meant that Task 5 alone accounted for more than 32% of the total usability problems experienced by the users. Finally, the users had to contact the support team to ask about the arrival/delivery time of their purchased product in Task 6, which generated 132 (18.54% of total problems) usability problems. In total, 712 usability problems were observed (see Figure 10.4).

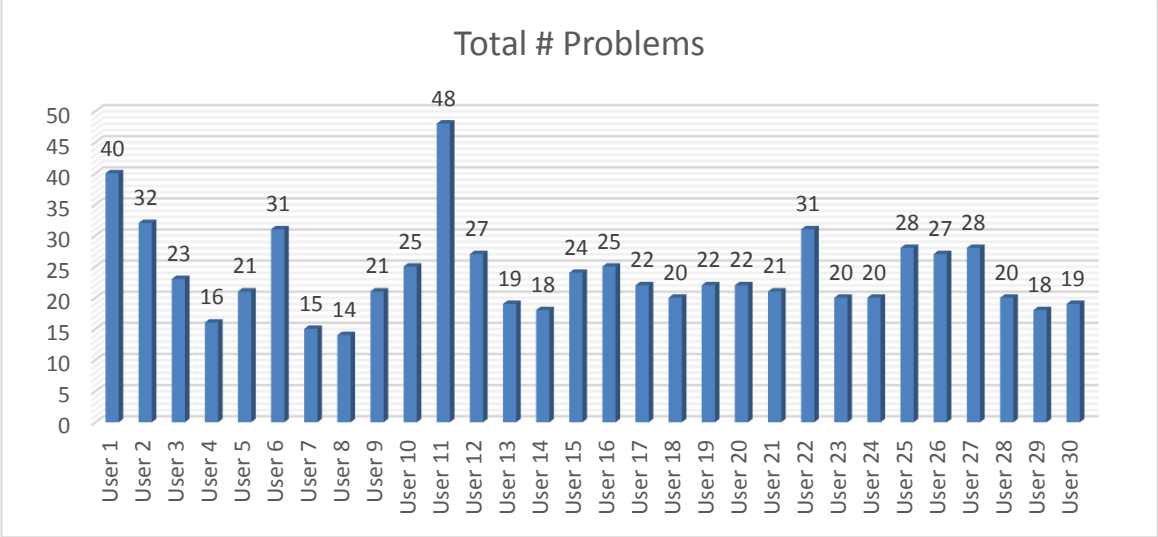

Figure 10.4: Users' Total Number of Problems.

The Figure 10.4 shows the total number of usability problems discovered by each user over the 6 tasks. The average number of problems amongst users is 24, and the median is 22. This again supports the claim that conducting transactions via mobile devices is still in its infancy stage, and that a lot of effort is needed to improve the users' experiences.

As mentioned above, the total number of usability problems discovered by the 30 users across the 6 tasks was 712. However, the researcher used Excel software (a product of the package Microsoft Office Professional Plus 2013) to help with filtering and organizing the final problems as follows:

1- The researcher transcribed all the problems discovered by the users from the observation sheet into one Excel sheet.
2- Repeated problems were consolidated into a single problem.
3- Two independent experts categorised all the detected problems into 8 specific problem categories.
4- The final number of problems in each category was calculated.

This process reduced the total number of problems from 712 to 136 unique cases. This is an approach similar to that used by Alshamari and Mayhew (2008) and van den Haak et al. (2009) in which two usability experts were asked to collaboratively categorize all detected problems into eight specific problem types. Hornbaek and Frøkjeer (2008) suggest that team classification/matching is a promising technique to strength the reliability of usability problem data. The two experts were also asked to rate collaboratively the severity of the uncovered problems. The scale was 0: Not a problem, 1: Cosmetic (i.e. need not be fixed unless extra time is available on project), 2: minor (i.e. fixing this should be given low priority), 3: Major (i.e. important to fix, so should be given high priority), and 4: Catastrophic (i.e. imperative to fix this before product can be released) (Nielsen, 1995). With an average score of 2.55 for all problems, this indicates that the majority of the test applications had major problems.

These categories are as follows:

- **Comprehension:** The participant finds that the information in the application is not clear or does not make sense, which usually confuses the user when completing the task or makes it difficult to make the right decision.

- **Relevance:** in this category the user finds unnecessary information and details that may make the task more difficult to accomplish.

- **Completeness:** This category involves problems such as the lack of required information, guidance or help, lack of functions, options or features.
- **Design/Layout:** This category refers to where the user may face problems or difficulties with regard to the design, the page structure and layout, styling and formatting, language used, and navigation.
- **Correctness:** This category groups together problems such as a violation of syntax, unresponsive functions, links and buttons, or the application failing to do what it is supposed to do and crashing.
- **Data entry:** This category encompasses the problems experienced by the users when entering data into the application. This includes the use of GUI (Graphical User Interface) widgets, the virtual smart phone keyboard, editing, clicking and filling in forms and text/number fields.
- **Visibility:** This category includes problems such as not being able to find a particular link, button, piece of information or a particular page.
- **Download delays:** This category summarizes the problems regarding the loading time for pages and processes to be completed.

10.13.2 Types of Usability Problems Discovered

Tables 10.4 and 10.5 illustrate the proportion and number of problems identified in each category and the number of total problems. The actual final problem descriptions and their categories can be seen in Appendix J.

Table 10.4: Problem Categories.

Category	# Final Problems
Relevance	4
Data entry	7
Design/Layout	46
Completeness	25
Visibility	9
Download delays	8
Correctness	23
Comprehension	14
Total	136

According to Nielsen (1993), usability problems can fall into one of the following categories of severity: not a usability problem, cosmetic, minor, major, and catastrophic. To ensure an objective assessment of the problems discovered in this study, the researcher sent the final set of problems identified by the participants to two usability experts with many years of experience in the usability field, who then classified their severity based on their frequency, impact and persistence. Table 10.5 shows the frequency of each severity category.

Table 10.5: Problems Types.

Problem Types	No.
Cosmetic Problems	13
Minor Problems	51
Major Problems	56
Catastrophic Problems	16
Total Problems	136

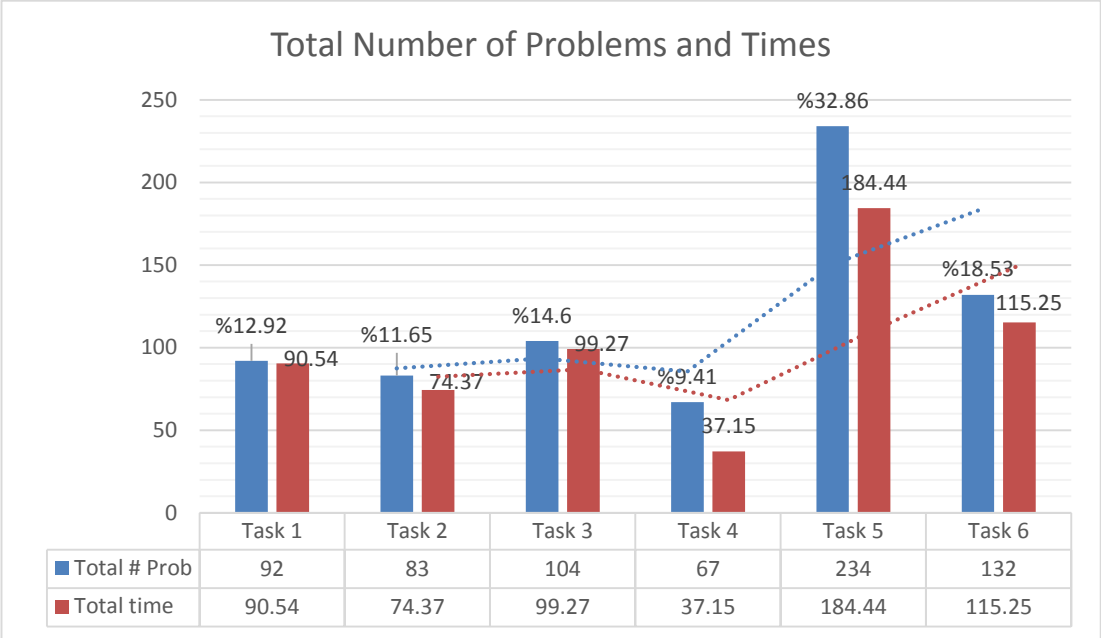

Figure 10.5: Total Number of Problems in Conjunction with Total Time.

The above chart (Figure 10.5) summarises the total number of total problems discovered in each test task by the users (i.e. all problem by all users). It also shows the total time spent on all 6 tasks. As expected, it highlights the fact that when the users encounter more problems, they spend more time completing the task. Task 5took the longest total time, and users encountered the highest number of problems when completing it; the problems clearly cost them time. This was mirrored in Task 6 which had the second highest number of problems and the second longest completion time. This, furthermore, leads to the conclusion that users encounter more usability problems when using a mobile device (compared to PC) and, therefore spend more time completing the task (Nielsen and Budiu, 2012). Using the adjusted Wald formulae (also called the modified Wald interval), we can estimate the confidence interval for the completion of the fifth task by entering the number of those who successfully passed this task and the total number of participants (Sauro, 2005). The results show that we can be 95% confident that the actual completion rate for this task is between 6% and 34% of the whole population. In other words, we can be 95% confident that only between 6% and 34% of the whole targeted population (i.e. Saudi users) would be able to complete this task. This illustrates the poor usability of the app and how difficult it can be for Saudi users to conduct m-transactions.

10.13 Results and Discussion

In this section the analysis and results obtained from the experiments will be presented. This includes a detailed analysis of the problems discovered and their type, participants' performance of tasks, and their satisfaction level.

10.13.3 Task Completion

As mentioned earlier there were 30 users who conducted the 6 test tasks. Each participant was asked to perform 6 tasks with the targeted application Souq.com, meaning that a total of 180 tasks were performed. At the end of each task, the researcher assessed its completion rate and then classified it as successful (completed) or unsuccessful (not completed). For each task the user was left alone until he/she completed the task, or decided that they could not perform the task (they gave up). All the tasks were either completed successfully or not completed; there were no partially successful tasks.

Table 10.6 shows the completion rate for each task in numbers and in percentages. Furthermore, it shows those who successfully performed the task within the time allocated to each task (benchmark) and those who successfully performed the task but exceeded the time limit for that task (without benchmark).

Table 10.6: Task Completion vs Benchmark.

		Participants performing correctly (with benchmark)				**Participants performing correctly (without benchmark)**	
	Number of users	#	%	Time Average	SD	#	%
Task 1	30	9	30	03:02	0.001	13	43.33
Task 2	30	3	10	02:29	0.001	15	50
Task 3	30	3	10	03:19	0.001	4	13.33
Task 4	30	13	43.33	01:15	0.001	10	33.33
Task 5	30	2	6.67	06:09	0.002	3	10
Task 6	30	3	10	03:51	0.001	2	6.67

It can be seen from Table 10.6 that in Task 1 there were 9 participants (30%) who were able to successfully complete the task within the time frame, however 13 users (43.33%) needed more time to finish the allocated task. The table also shows that the number of participants completing the task within the benchmark time were 3, 3, 13, 2 and 3 for Task 2, Task 3, Task 4, Task 5 and Task 6 respectively. On the other hand, 50% of the users were unable to complete Task 2 inside the allotted time, as were 4, 10, 3 and 2 users for Tasks 3, 4, 5 and 6 respectively. Also, from the average time taken for each task as shown in Table 10.6, we can see that Tasks 5 and 6 took the longest average time, while Task 4 had the shortest average time. The standard deviation between users for each task is low which indicates that there is no significant fluctuation between the users' performances, confirming that the test environment was stable.

Table 10.7: Task Completion Rate.

	Task 1	**Task 2**	**Task 3**	**Task 4**	**Task 5**	**Task 6**	**Total**	**Average**
Successful	22	18	7	23	5	5	80	13.33
Unsuccessful	8	12	23	7	25	25	100	16.67
Total	30	30	30	30	30	30	180	30.00

The Table 10.7 highlights the total number of users who succeeded (within or outside of the benchmark time) in each test task. Users performed best in Tasks 1 and 4 with a success rate > 70%. Task 2 was performed quite well with a success rate of 60%, however in contrast, users completed Task 3 poorly with only a 23.33% success rate. Tasks 5 and 6 ranked at the bottom, with failure rates just above 83%, demonstrating that they were the most difficult tasks. Two possible reasons for the poor performance of tasks 3, 5 and 6 are that 1) the tasks were too difficult for the users to achieve or 2), the application was exhibiting a very low level of usability. The success rate, time, number and type of problems will help to clarify the real reason, which will be discussed in the following sections. However, it is worth mentioning that the researcher carefully followed a proven methodology taken from the literature review, and ensured that all the test tasks were set up to emulate realistic situations as far as possible. Also the researcher, prior to each task, made sure that each user understood the task and that he/she was fully happy to perform it, with no doubts at all. This was also supported by the pilot study which enabled the researcher to fully address the participants' comments and doubts. Finally, no user pointed out any difficulty in the task, or the criteria of each task, during or after each task. The average success rate for the tested application can be calculated using the following formula:

$$\frac{\text{Number of tasks completed successfully}}{\text{the total number of task performed}} * 100$$

By applying the above formula we obtain the following results:

Success rate = 80/180*100= 44.44%

In general, 50% is the acceptable success to be considered as working fine (Nielsen, 2001). However, 44.44% is considered as a failure (Nielsen, 2001).

10.13.4 Time on Tasks

Table 10.8: Tasks Total, Maximum and Minimum Times.

	Task 1	**Task 2**	**Task 3**	**Task 4**	**Task 5**	**Task 6**	**Total**	**Average**
Total Time	90.54	74.37	99.27	37.15	184.44	115.25	601.02	100.17
Maximum Time	07:05	06:54	06:31	03:01	10:55	06:17		
Minimum Time	00:59	00:50	01:20	00:28	01:51	01:10		

**Times are in minutes and seconds (mm:ss).*

Table 10.8 shows the total time spent by all the participants (including those who failed to complete the task) on each task. For example, the total time spent by all the users on Task 1 was 90 minutes and 54 seconds. Again, it is noticeable that Tasks 5 and 6 took the longest total time to complete, a fact which correlates with the high number of problems encountered by all users in these two tasks. The actual total number of problems in Task 5 was 234, and in Task 6 was 132; this reflects the large number of usability problems uncovered by these two tasks (see Figure 10.9).

10.13.5 System Usability Scale (SUS)

Satisfaction shows how pleased people are with their experience of using the tested application (also referred to as user experience). This was measured with a ten question survey (Appendix H), taken at the end of the test using a marking system called the System Usability Scale (SUS). Each question has a scale from 1 (Strongly disagree) to 5 (strongly agree). From these surveys a SUS Score is derived, which indicates how user-friendly participants perceive the application to be. A SUS Score can range from 0 (worst) to 100 (best) (Brooke, 1996). Bangor et al. (2009) have developed a seven-point scale, adding a user-friendliness item to the 10 questions of SUS (see Figures 10.4 & 10.6). They produced a grading scale in which SUS scores below 60 are graded as 'F', between 60 and 69 as a 'D', between 70 and 79 as a 'C', between 80 and 89 as a 'B', and 90 and above are granted an 'A' (see Figure 10.6). The overall SUS Score of the tested application Souq.com was 50.42, which achieved a usability grade of 'F', signifying that the usability level is far below that expected.

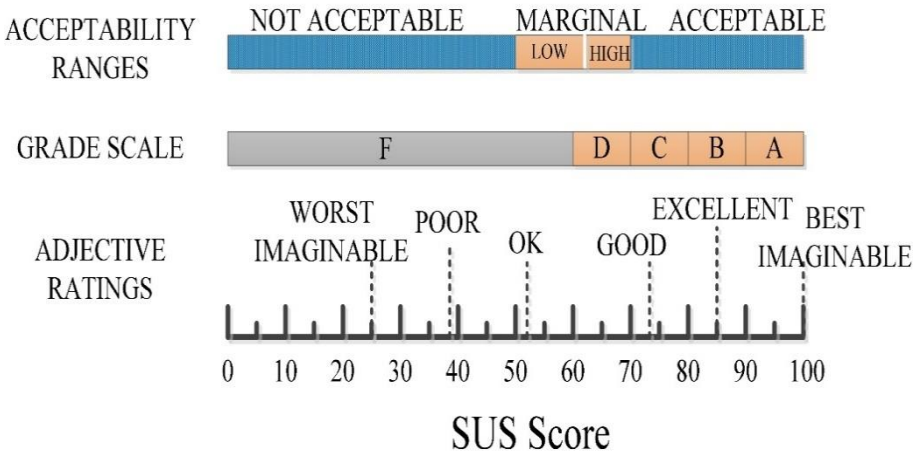

Figure 10.6: A Comparison of The Adjective Ratings, Acceptability Ranges and Grading Scales In Relation to SUS Score.

Adapted from (Bangor et al., 2009).

Figure 10.7 presents the average rating for each SUS question. Due to the wide use of SUS in usability studies, Sauro (2011) conducted an extensive study, reviewing the existing research on SUS and analysing the data from more than 5,000 users across approximately 500 different evaluations. He concluded from the data that SUS is a reliable and valid measure of perceived usability. Furthermore it performs as well as, or better than, commercial questionnaires and home-grown internal questionnaires. In statistics, Cronbach's α alpha (alpha) measures the coefficient of internal consistency. It is normally used as an estimation of the reliability of a psychometric test for a sample of examinees (Cronbach, 1951). The value of Cronbach's alpha should be above 0.70, although a value of 0.8 or higher is preferred and a slightly lower score of 0.60 is acceptable (Hair et al., 2010). Therefore, the researcher conducted Cronbach's Alpha reliability test using IBM SPSS for the 10 items of the SUS questionnaire, and obtained the following result (Table 10.9), which means that the 10 items have a good reliability. Therefore, the measurement items are appropriate for their respective latent variables.

Table 10.9: Cronbach's Alpha.

Reliability Statistics	
Cronbach's Alpha	N of Items
.856	10

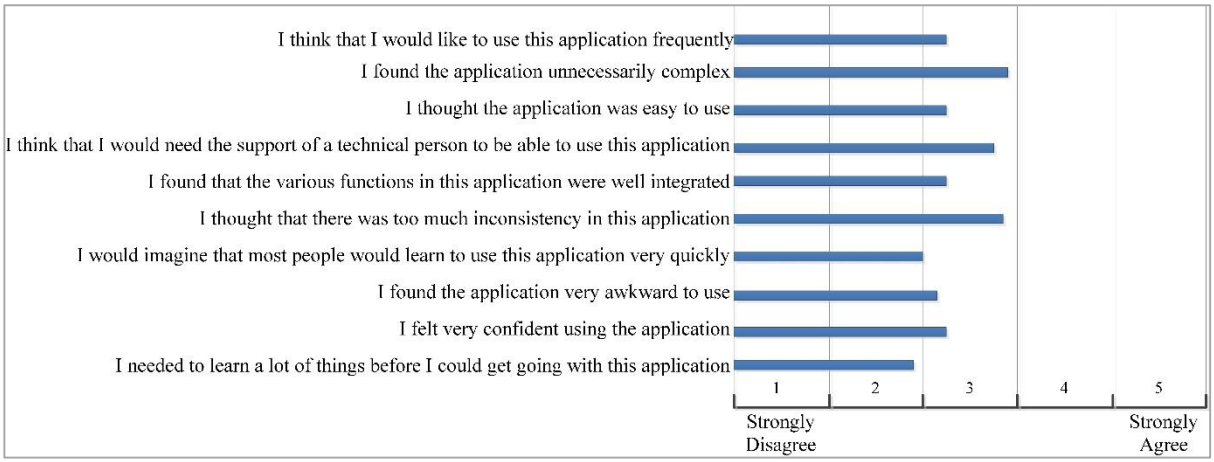

Figure 10.7: Users' Answers to SUS Questionnaire.

From the Figure 10.7, it can be summarized that the users agree with the negative statements more than with the positive statements. For example, none of the users agreed with the statement "I think that I would like to use this application frequently", indicating that they are unlikely to use this mobile application (m-transaction) again. This indicates that the poor usability of m-transactions negatively affects the users' intention to use them in the future.

Furthermore, a correlation between the total numbers of problems for each user with the total time for each person, using Pearson Correlation test, gave the following result (Table 10.10):

Table 10.10: Pearson Correlation.

Total Problems & Total Time	**Total Problems & SUS**
0.383	-0.001

The Table 10.10 shows that there is a statistically strong positive relationship between the total time spent and the number of problems discovered during the tasks. It implies that the more problems the user discovers, the more time the user spends on each task. This should be expected as a logical result. The correlation test reveals that the relationship between the total number of problems encountered and the users' satisfaction is negative, which means the more problems discovered by the user, the less satisfied they felt with the system. Interestingly, this result is in contrast with the findings of several studies, e.g. (Herman, 1996), which highlights that subjective evaluation techniques such as questionnaires should be interpreted with caution when used with participants from the Eastern culture, as they tend to rate the system under evaluation positively despite clear indication of a poor performance, in order to show politeness to the evaluator. However, in this study it was found that Saudi participants were not influenced by such a cultural effect.

10.13.6 Adjective Rating Scale

Although a SUS questionnaire is considered an effective tool for assessing the usability of products including web sites, mobile phones and any product or system that has an interactive face, there is still a need for information describing how the numeric score translates into an absolute judgment of usability. Bangor et al. (2009) have added an adjective rating scale to the SUS Score in order to help interpreting the numeric value of the SUS Score and explain the results to non-human factors professionals (see Figure 10.8). This study has applied this addition.

Overall, I would rate the user-friendliness of this application.

Worst Imaginable	Awful	Poor	OK	Good	Excellent	Best Imaginable
❍	❍	❍	❍	❍	❍	❍

Figure 10.8: The Adjective Rating Statement Appended To The SUS Score.

Figure 10.9 illustrates the participants' overall judgment of the tested application. It can be seen that the majority of users were not happy with the application's usability level. More than half of the users (53.32%) had a negative user experience, with 36.66% of the users rating it as 'Poor', 13.33% describing it as 'Awful', and 3.33% assessing it as 'Worst Imaginable'. On the other hand, 36.66% of the participants commented on their experience as 'OK'. 10% chose 'Good' to reflect their opinion of the tested application, however none of the participants rated it as 'Excellent' or 'Best Imaginable' (see Figure 10.9).

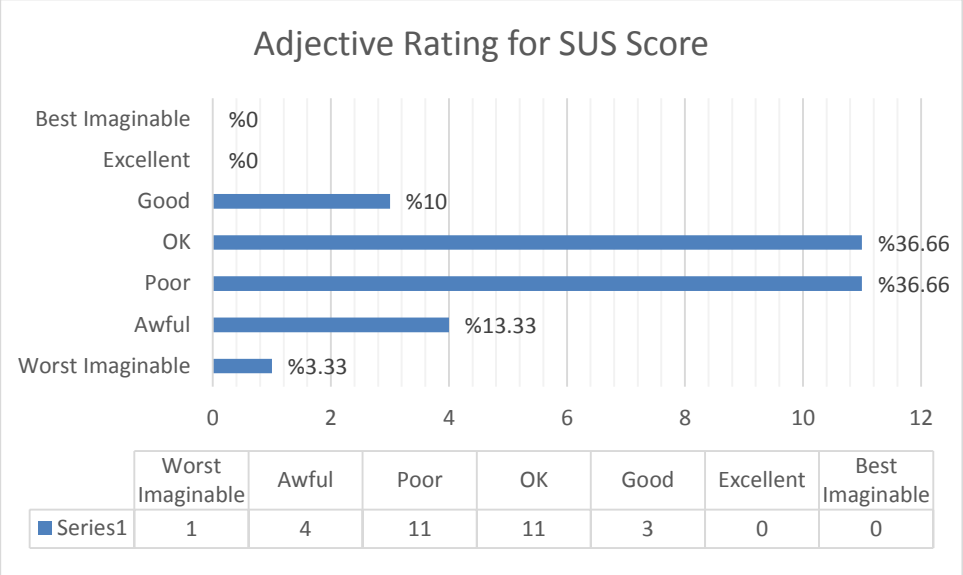

Figure 10.9: Overall Users' Judgment on The Tested Application.

In correlation with the users' responses between the SUS questionnaire (see Figure 10.7) and the adjective rating for SUS score (Figure 10.9). The users express the same attitude with regards to their impression and the level of satisfaction about the tested application. For example, from the Figure 10.9 more than half of the users' responses was in the negative side (which ranges from worst imaginable to poor). This show a negative attitude towards using this application in the feature. Similarly, the users' answers in the SUS questionnaire (Figure 10.7) show most of the users agree with the negative statements more than the positive ones. Which shows unsatisfactory feelings about their experience with the tested application. In summary, the users show a low level of satisfaction of using the tested application.

10.14 Conclusion and Recommendation

This research sheds some light on usability levels with respect to m-transactions in Saudi Arabia. The outcomes of this study contributes to the market stakeholders' understanding of their potential customers' needs and concerns. Exploring the market, especially at the time when m-transactions are still in their infancy in most countries around the globe, is critical for industry stakeholders if they are to ensure the success of this emerging market. Therefore, this research highlights the most important factor (i.e. usability) that needs to be considered in order to support the widespread adoption and advancement of m-transactions in developing countries, and especially in Saudi Arabia.

With reference to the results of the experiments, this study was able to generate a visualisation of the current situation of m-transaction usability which shed light on:

- The current usability level of m-transactions within the Saudi context.
- The number and types of problems that Saudi users may encounter while conducting m-transactions, thus deepening understanding and awareness of these issues.

- Saudi users' performance and rate of success with regards to conducting m-transactions.

All of the above provide opportunities and the potential for policy makers, businesses and application developers to develop and personalize the m-transactions process, so that it fits Saudi users' requirements. This ultimately can have a significant indirect impact on the intention to use m-transactions in Saudi Arabia and therefore, the adoption and use of m-transactions from a consumer's perspective. Mobile application developers and designers, companies extending their business into mobile commerce, and governments, need to pay attention to the m-transaction usability levels shown in the tables and figures in this study. Failure to do so could lead to an increase in the number of Saudi users neglecting or avoiding the use of m-transactions. The results of this study could be further validated using other usability methods (e.g. interviews) and could also be applied to a larger number of Saudi users or to different locations of the kingdom to confirm the current results. Also, including female participants in a future study could help to generalize the results.

Although the tested application Souq.com enjoys great popularity and represents realistic m-transaction functionalities, the results clearly showed that it was unsatisfactory as a usable application. It has a very low SUS Score (50) compared to 60 which is recommended as an acceptable score. It also ranked in Bangor et al. (2009)'s classification as 'F' which is considered as unacceptable. Furthermore, it has a very low success rate and efficiency. Therefore, the designers and developers of this application have to pay more attention to the usability level of their application and consider the usability problems discovered through the experiments, especially to those categories with a higher number of problems such as 'design/layout', 'completeness', 'correctness' and 'comprehension'. In more detail, the problems and issues that need to be considered are: (1) simplifying the forms (e.g. registration, contact us and add an address); (2) clearly labelling the buttons with names that are easy to understand and reflect the actual function of that button; (3) redesigning the filter function in all sections in a simple way (e.g. so there is no need to press 'apply' for every specification for finding a product; (4) managing the basket needs to be improved (e.g. the product amount does not handle the value of 0 (zero) and the button 'add to the basket' needs to be renamed); (5) adding further functions (e.g. the ability to delete more than one item at a time); (6) correcting errors of logic (e.g. the authors' names were written in two different languages, English and Arabic, the challenge question (i.e. anti-spam question) was written in Arabic yet does not accept the answer while the keyboard is Arabic, and the whole payment confirmation page was written in English while the chosen interface language was Arabic); and (7) removing the distracting popup messages (e.g. after clicking contact us or while looking for a product). A usability test should be conducted prior the launching of any mobile application to ensure that the usability level is satisfactory. Future research has to pay attention to the importance of usability to consumers' acceptance of IT innovations such as m-transactions.

The extensive literature review conducted by the researcher revealed that there have been no studies which test a mobile application within the context of Saudi Arabia, neither do any the importance of usability as a factor for accepting or using any new IT innovation from Saudi users' perspective. Therefore, this research is considered as a first of its kind in Saudi Arabia.

With regards to limitations, in a conservative society such as Saudi, the authors were not able to involve females, therefore, this study has considered only male participants and another study could involve the females to get more generalizable/interesting results. When another suitable mobile application becomes available, a further study could test that application and compare the results with this study.

Chapter 11 : Discussion of Findings

11.1 Introduction

This chapter, provides a detailed evaluation of the findings drawn from qualitative and quantitative assessment of the research problem. The earlier chapters of the research showed that mobile communication is growing in Saudi Arabia, but the penetration rate is slow when compared with the global growth of m-transactions. Consonant with the previous literature, this research assesses the consumer behaviour towards m-transactions in Saudi Arabia. The earlier chapters of data analysis provide an interpretation of responses generated through different research methods while in this chapter; the researcher provides a comprehensive discussion on the key findings that help to achieve the research objectives.

11.2 Discussion of the Findings

In agreement with AlGhamdi et al. (2012c), the present research findings show that advancing technology and its usage in the developed economies is higher than the developing economies. According to the data analysis, gender differences affect the attitude and perception of a consumer towards mobile transactions. Similarly, the research conducted by Venkatesh and Morris (2000), who highlighted gender as one of the important factors that has received little attention in the context of an individual accepting new technology, recognized gender differences as a critical determinant of using a new technology amongst consumers. In addition, the reason to consider gender differences while analysing the research problem is justified by Burke (2002) as he emphasized gender as one of the demographic variables that has a significant impact on the user's decisions of using electronic purchasing "Men and women had distinctly different views of what would constitute an ideal shopping experience." Hence, it is rational to consider gender differences where it is applicable, while understanding the online transaction acceptance within the Saudi users context (Al-Somali et al., 2009).

In the research of Technology acceptance, demographic characteristics have been considered to understand the association between the acceptance of new technology and the consumer. For example, the research findings showed that an older age consumer tends to show negative attitude towards the innovation and new technologies while a young adult prefers the use of new technology such as internet to seek offers and information related to new products for option and price comparison (Jaradat and Al Rababaa, 2013; Al-Somali et al., 2009; Venkatesh et al., 2003a; Burke, 2002). In contrast to these research findings, the present research consider gender (male vs. female), paper-based vs. online-based, and mobile internet access vs. non-mobile internet access as the important factors of differentiation amongst consumer attitude towards m-transactions. Table 11.1 summarises the demographic aspects considered in this research.

Table 11.1: Control Variable Results.

Control Variables	*β*	Sample Mean (M)	Standard Error (STERR)	Sign	T Statistics (|O/STERR|)	P Values
Age -> IU	-0.021	-0.022	0.022	-	0.974	0.330
Computer Skills -> IU	0.049	0.049	0.022	+	**2.288**	**0.022****
Gender -> IU	-0.080	-0.079	0.019	-	**4.246**	**0.000*****
Income -> IU	0.041	0.041	0.021	+	**1.976**	**0.048****
Internet Purchase -> IU	-0.026	-0.025	0.024	-	1.061	0.289
Internet Purchase Frequency -> IU	-0.035	-0.034	0.021	-	1.622	0.105
Location -> IU	-0.003	-0.002	0.015	-	0.174	0.862
Mobile Internet Access -> IU	0.061	0.061	0.018	+	**3.376**	**0.001*****
Mob Skills -> IU	0.085	0.087	0.022	+	**3.953**	**0.000*****
Qualification -> IU	0.034	0.035	0.022	+	1.513	0.131

According to the data analysis of validation study 1, the intentions to adopt for mobile transaction are being affected by the gender of respondents as the effect is statistically significant. Gender differences affect the attitude and perception of a consumer towards mobile transactions (see table 11.1). Similarly, Venkatesh et al. (2003a) research also identified gender differences as a critical determinant in short-span and long-span usage of a new technology. Amongst other variables, income and computer skills are also positively affecting intention to use mobile transaction. The higher level of computer skills making it easier for the user to navigate through the mobile transactions websites and they are more inclined toward using mobile transactions. Moreover, the level of income is also shaping their behaviours to use mobile transactions positively. If the user has mobile skills and internet access on his handy device, his intention to use mobile transactions becomes higher as it becomes more convenient for him to do such transaction being at any place through his/her mobile device. Corresponding to the earlier established research objectives, below is provided a comprehensive discussion on the research results obtained regarding the factors that shape consumer acceptance of m-transactions in Saudi Arabia.

Furthermore, in order for an international companies who are interested to start a business in m-commerce in Saudi Arabia. They may consider to pay attention to the developed framework in this research and especially to those factors who are found to be critically important. On the other hand, they may also need to consider that any business/e-business in Saudi has to comply with the Sharia Law and the Saudi's unique culture. For example, the use of visa and credit card is allowed but interest is not allowed. Furthermore, with regards to promotions and advertisements, ladies pictures need to be dressed in a decent way. Finally, the postal system, although there is a serious attempts from the government to develop postal system in Saudi, yet it still immature enough to handle online orders.

The Figure 11.1 illustrates the research factors statistical significance order (i.e. critical, very significant, significant, less significant and not significant) by colour-coding.

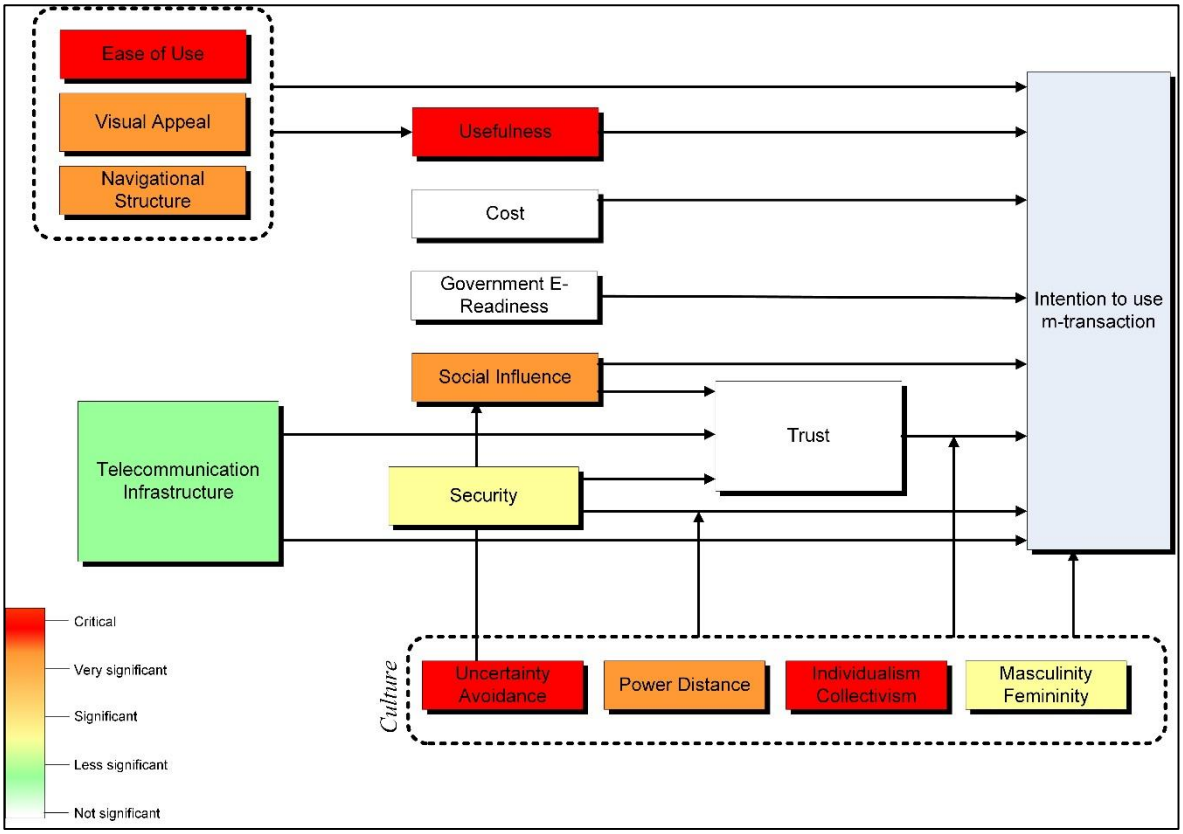

Figure 11.1: The Research Factors Statistical Significance Order.

11.3 Consumer Acceptance and Use of M-Transactions in Saudi Arabia

In recent years, the advancing mobile and internet technologies seem to have profound impact on the daily lives of individuals because these technologies offer advantageous and interesting services. In Saudi Arabia, the research results show that the consumer acceptance towards m-transactions is growing slowly. At present, the consumer response rate to m-transactions is slow; yet positive due to the numerous attached benefits. For example, the analysis shows that the m-transactions serve as an emerging technological system that allows consumers to use their mobile device for the payment of digital, as well as physical goods irrespective of the location and time. In line with other studies (e.g. Kim et al., 2010; Al-Somali et al., 2009; Goeke and Pousttchi, 2010; Lawrence and Tar, 2010), the results extracted from the interviews of exploratory study 2 indicate that Saudi consumers' willingness towards the adoption of m-transaction remains attributable to the availability of good IT infrastructure, reliable connectivity mode and an high standard security system.

In line with AlGhamdi et al. (2011), the research results show that Saudi consumers are gradually accepting the benefits and usefulness of e-transactions; however, the reason that this industry is still at an infancy stage, lies with flaws in the regulatory and business efforts regarding the promotion of e-transaction. For example, interview responses show that the poor application of cyber-laws is one of the reasons that discourage consumers to use m-transactions due to their increasing concerns for information and data privacy. In addition, the low political intent and regulatory support is found to be related to low Saudi consumer adoption and acceptance rate of m-transactions.

In agreement with the present research findings, Aloul (2010) argues that the ineffective implementation of virtual or cyber-laws with low efforts to create consumer awareness about such

advancing technologies can be a cause of discouraging users from online transactions. Therefore, increasing cases of fraud and hacking have lowered mobile technologies' ability to win the trust and confidence of Saudi communities. Therefore, the interview results of exploratory study 1 also show that Saudi communities are currently less aware of the widespread application of m-transactions. The research findings of validity study 1 indicate that gender bias is also amongst the key factors that shape consumer acceptance and adoption of m-transactions in Saudi Arabia. Evaluation of the control variable tests in validity study 1 provides evidence to support the notion, for example, analysis of control variable table indicates that gender is a significant and positive determinant of Saudi communities' intent to use m-transactions. Multi-group analysis results exhibit statistically significant relationship of gender differences with the exogenous constructs (such as ease of use, usefulness, power distance and masculinity/femininity) for the intention to use (endogenous construct). The research results show that a Saudi male consumer's intention to use m-transaction is more likely to be affected by individualism/collectivism than a female consumer. According to the study of Al-Ghaith et al. (2010) conducted in Saudi Arabia by taking a data set of 651 participants using questionnaire. It was observed in this study (i.e. validation study 2) that contrary to developed countries where males use e-services more compared to females, in Saudi Arabia females use E-services more than males. This may be due to the Saudi society's conservative approach where female prefer to buy at home. Furthermore, the path coefficient results suggest that the male and female consumers' intent to use m-transactions differs due to the factor of usefulness. Although, in "Western cultures" males are more likely to adopt e-service than females, the case may not hold the same in Saudi Arabia, where females are more likely to adopt than males Al-Ghaith et al. (2010). Therefore, discussion of results expresses differences in the male and female intention to use m-transactions in Saudi Arabia (see Table 11.2).

Table 11.2: Path Coefficient Results.

No	Hypotheses	*β* Female	*β* Male	*β* Mean Female	*β* Mean Male	t-Values Female	t-Values Male	p-Values Female	p-Values Male
1	Cost -> IU	0.093	-0.014	0.024	-0.015	0.826	0.502	0.409	0.616
2	EU -> IU	0.437	0.262	0.423	0.259	**4.840**	**6.713**	**0.000*****	**0.000*****
3	EU -> USF	0.173	0.375	0.173	0.374	**1.979**	**9.066**	**0.048****	**0.000*****
4	GEC -> IU	0.055	-0.027	0.075	-0.026	0.733	0.940	0.464	0.348
5	IDC -> IU	0.031	0.335	0.048	0.338	0.446	**10.813**	0.655	**0.000*****
6	MF -> IU	-0.066	0.076	-0.033	0.075	0.807	**2.224**	0.420	**0.026****
7	NVS -> IU	0.019	0.043	0.035	0.044	0.148	1.262	0.882	0.207
8	NVS -> USF	0.276	0.244	0.278	0.245	**2.894**	**5.676**	**0.004*****	**0.000*****
9	PWD -> IU	0.039	0.086	0.064	0.085	0.650	**3.170**	0.516	**0.002*****
10	IFR -> IU	-0.064	-0.019	-0.098	-0.020	0.660	0.690	0.509	0.490
11	IFR -> TSP	0.354	0.377	0.354	0.380	**4.181**	**9.449**	**0.000*****	**0.000*****
12	SEC -> IU	0.015	0.008	0.038	0.009	0.167	0.345	0.868	0.730
13	SEC -> TSP	0.162	0.220	0.168	0.217	**1.740**	**5.033**	**0.082***	**0.000*****
14	SIF -> IU	0.120	0.050	0.132	0.051	1.477	**1.762**	0.140	**0.078***
15	SIF -> TSP	0.085	-0.146	0.087	-0.146	1.083	**3.372**	0.279	**0.001*****
16	TSP -> IU	-0.029	-0.028	-0.053	-0.029	0.337	1.223	0.736	0.221
17	UAV -> IU	0.163	0.026	0.168	0.028	**2.497**	0.724	**0.013****	0.469
18	USF -> IU	0.013	0.131	-0.002	0.130	0.159	**3.771**	0.874	**0.000*****
19	WS -> IU	0.078	0.073	0.072	0.073	0.742	**2.299**	0.458	**0.022****
20	WS -> USF	0.226	0.274	0.225	0.275	**2.641**	**6.701**	**0.008*****	**0.000*****

M-transactions is rapidly gaining popularity on the global scale to become one of the swiftest channels of e-commerce for transactions. According to Petrova and Mehra (2010a), consumers are increasingly attracted towards m-transactions because it provide a suitable alternative to PC-web. In addition, AlSukkar (2005) support the present research by stating that increasing accessibility is one of the common reasons that can attract consumers towards the use of e-transactions. Contrary to the global situation, the present research through validity study 1 and exploratory study 2 recognizes that for consumers in the developing economies such as Saudi Arabia, the technology adoption in case of mobile commerce and mobile transaction are lower as compared to developed countries. While the diffusion and utilization of e-commerce technologies has grown dramatically in developed

countries, the proliferation of e-commerce in developing countries has fallen far below expectations, particulalry in Saudi Arabia (Aleid et al., 2009; Aldwsry, 2012). To support the notion, Bamasak (2011) claims that Saudi consumers' slow inclination towards m-transaction is highly influenced by their perceived social, privacy and psychological risks of such transactions.

The data analysis of exploratory study 2 shows that mobile technologies are increasingly penetrating into Saudi communication service industries; however, the Saudi communities and societies seem reluctant to gain the benefits of such opportunities. Review of the relevant literature shows that IT infrastructure serves as a critical factor for the success of m-transaction; in the case of Saudi Arabia, strong acceptance by the key stakeholders such as consumers and businesses is deemed important to the success of m-transaction systems. For example, Henseler's Multi-Group Analysis (MGA) test results show statistically significant association between paper and online based intention to use and power distance amongst Saudi users. Contrary to this, evaluation of the exploratory study 1 results exhibit a low rate of internet access amongst Saudi consumers due to the cost and other related issues.

The conceptual framework designed in the earlier chapters postulates that Saudi consumers' acceptance of m-transactions is largely influenced by factors related to the macro-environment; the exploratory and validity studies highlight these factors as cyber laws, postal services, telecommunication infrastructure and government e-readiness. In accordance with the research work done by Wei et al. (2010), the earlier conducted data analysis shows that the virtual transaction such as e-transactions or m-transactions fail to win the trust and confidence of consumers mainly due to the heightening security and privacy issues. On the other hand, Dahlberg et al. (2008) support the data findings by stating that the little awareness towards the attached benefits and facilities of m-transactions is one of the main reasons of low consumer acceptance of m-transactions in the developing countries such as Saudi Arabia.

11.4 Main Factors that Influence Consumer Acceptance of M-Transactions in Saudi Arabia

Analysis of the data collected through primary and secondary means indicate that internet technologies are enabling consumers to seek product information and directly connect with the online store to purchase a particular good/service. Similarly, Wei et al. (2010) are of the view that the recent technological advancements have provided businesses with the tools to attract consumers beyond geographical boundaries while satisfying their profits needs. From a consumer perspective, the advancing technologies such as m-transactions provide convenient means to carry out transactions. Similar to the research findings of Chung and Lee (2003), the current exploratory and validity study tests suggest that the consumers' acceptance and adoption of m-transactions remains vulnerable to a number of factors, which are related to the system characteristics, industry, individual perception and the environment. The Table 11.3 provides the list of factors recognized through the comparison of prior research studies conducted within different countries such as China and Germany. According to this table, in different contexts, intention to use m-transaction remains vulnerable to different factors. For example, the study conducted by Yang et al. (2012) suggested that subjective influence and usefulness are amongst the key factors, which are supported by the analysis as the forces that affect intention to use m-transactions.

Table 11.3: Summary of Research Studies Conducted in Different Countries on M-transactions.

Literature	Country	Factors affecting intention/using m-transaction	Current research findings (factors)
(Yang et al., 2012)	China	Subjective Influence	Yes
		Personal Innovativeness	Yes
		Perceived Risk	Yes
		Perceived Fee	No
		Compatibility	Yes
		Relative advantage	Yes
(Kim et al., 2010)	Korea	Ease of use	Yes
		Usefulness	Yes
(Schierz et al., 2010)	Germany	Perceived compatibility	Yes
		Attitude towards use	Yes
		Individual mobility	Yes
(Petrova and Mehra, 2010b)	Auckland	Perceived Ease of use	Yes
		Perceived Usefulness	Yes

Assessment of the research problem from different methods (e.g. interviews, focus group and questionnaires) created a list of factors that are likely to influence Saudi consumers' acceptance of m-transactions. For precise results, the researcher performed reliability and validity tests on these variables. According to the statistical tests of convergent validity as summarized in Table 11.4, all of the fifteen identified variables have consistent reliability, which means these factors are likely to affect consumer acceptance of m-transactions in Saudi Arabia. The Cronbach's alpha value suggests that the data collected for each variable is significantly reliable and consistent. Application of a combination of research methods suggests that the key factors that affect Saudi consumer acceptance of m-transactions include intention to use (dependent variable), telecommunication infrastructure, security, ease of use, usefulness, culture (masculinity/femininity, power distance, uncertainty avoidance and individualism/collectivism), social influence, cost, government e-readiness, trust, navigational structure and visual appeal.

Table 11.4: Internal Consistency and Convergent Validity.

Latent Variable		# of items	AVE	Cronbach's alpha	Composite Reliability
COT	Cost	3	0.894	0.874	0.923
EU	Ease of Use	3	0.911	0.898	0.936
GEC	Government E-Readiness	4	0.848	0.872	0.911
IDC	Individualism - Collectivism	3	0.844	0.796	0.882
IU	Intention to Use	3	0.955	0.95	0.969
MF	Masculinity - Femininity	3	0.886	0.863	0.916
NVS	Navigational Structure	3	0.903	0.887	0.930
PWD	Power Distance	3	0.831	0.779	0.870
IFR	Telecommunication Infrastructure	3	0.848	0.805	0.884
SEC	Security	5	0.799	0.858	0.898
SIF	Social Influence	5	0.804	0.861	0.899
TSP	Trust	3	0.880	0.856	0.912
UAV	Uncertainty Avoidance	5	0.812	0.840	0.905
USF	Usefulness	4	0.828	0.847	0.897
WS	Visual Appeal	3	0.903	0.887	0.930
	Total	53	-	-	-

The next sections will discuss the research's findings (factors) which have been identified in Chapter 9.

12.5.1 Telecommunication Infrastructure

According to the research, telecommunication infrastructure earns special importance in the success of m-transaction systems. Results of the exploratory study 1 indicate that 30% of the sample respondents believe that internet/telecommunication infrastructure is one of the important factors that affect Saudi consumers' acceptance of m-transactions. Findings from the analysis show that Saudi communities living in the sub-urban areas are faced with the issues of low availability and

poor technological infrastructure. Therefore, discussion of exploratory study 1 results recognize internet/telecommunication infrastructure as an important factor to shape and influence Saudi consumers' adoption and acceptance of m-transactions. Better infrastructure by service providers in terms of internet speed and access in remote areas can induce and motivate individuals to engage more in mobile transactions. As suggested by Dass and Pal (2011), an effective network and infrastructure implemented by service providers create greater level of trust for the users of the service which leads to a greater intention to be involved in mobile transactions. This has been confirmed in the research findings by San Martín et al. (2012). However, Zarmpou et al. (2012) did not find the technology infrastructure as an influential factor on the intention to use m-transaction, , however, it was found to be influencing the perceived usefulness. This also has been confirmed in similar research on the problem by Chen (2008) who evaluated the consumers' perspective of m-transactions, and did not find a direct effect on m-payment adoption intention.

The validation study 1 has identified telecommunications infrastructure as a significant factor to affect the intention to use m-transaction in Saudi Arabia. Therefore, from the results of the present research, telecommunications infrastructure is one of the pre-requisites to receive the benefits of m-transactions; if the telecommunication infrastructure is not effective, a consumer may not receive/gain the benefits of m-transactions even if they wish for it because in the absence of an effective and reliable infrastructure, the level of trust of users for mobile financial transactions is less which leads to lower probability for being involved in m-transactions. Furthermore, according to the results extracted from the second exploratory study, infrastructure of telecommunication and wireless services is another factor that influences Saudi users' acceptance of m-transactions. The research results show that wireless technology is an important aspect of mobile transactions; hence, Saudi consumers' acceptance of m-transaction significantly relies on the maintenance of a stable telecommunication infrastructure. Wu and Wang (2005) also noted in their study that rapid advancement in wireless technology along with increasing penetration rate of internet is helpful in promoting mobile commerce transactions because it provides more ease to the user "Yet, limited understanding of the customers' urgent demands and lack of technological infrastructure will be impediments to MC success" (Wu and Wang, 2005). The interview results from exploratory study 2 indicates that 44.3% of the total 122 sample participants show high concerns regarding the effectiveness of wireless telecommunication infrastructure. According to the present research findings, it is one of the key factors that affect Saudi consumers' adoption of m-transactions for different reasons. For example, the interview analysis under exploratory study 2 shows that the users put high emphasis on infrastructure and connection speed because in case of poor connection, they may lose their data and money if they are stuck in the middle of the process.

Despite the launch of 3G and 4G technologies, government and business efforts to promote consumer acceptance of m-transactions is still low. Therefore, the interview analysis indicates that the low rate of m-transaction usage amongst Saudi consumers is due partly to their high concerns about network failure because 3G network reception in the country is poor. The above research results are further supported by AlGhamdi et al. (2011); who claim that if the government and organizations intend to increase the acceptance of electronic purchasing in Saudi Arabia; they need to improve the existing ICT infrastructure. In support, Bamasak (2011) state that slow connectivity speed, limited accessibility and weak infrastructure are the leading factors that discourage Saudi users to accept and adopt m-transactions. With respect to multi group analysis conducted in the study, gender and distribution methods (i.e. paper vs. Online) do not significantly affect the relationship between telecommunication infrastructure and intention to use as well as building a trust to use mobile financial transactions. However, if a user has prior internet access on their mobile devices, then the telecommunication infrastructure is positively affecting the intention to use mobile transaction. It can be argued that if the user already has internet access on his/her phone, the role of telecommunication infrastructure becomes important and facilities provided by telecommunication companies are viable

for him/her in using mobile transaction. If a user does not have internet access on his/her phone, they will not be considering telecommunication infrastructure important in using mobile transaction. Therefore, the null hypothesis that there is a significant relationship between telecommunication infrastructure and intention to use m-transactions cannot be rejected.

12.5.2 Security

The convergent and internal consistency results indicate that the Cronbach's alpha value is 0.858, which means the study responses related to this variable are highly consistent and reliable. The co-linearity results of the validity study 1 highlight security as a factor that affects consumer intention to use m-transactions. Moreover, the results derived from the interviews of exploratory study 1 and focus group (exploratory study) discussions put special emphasis on security as one of the key factors that shape consumer acceptance and adoption of m-transactions. For example, analysis of the exploratory study 1 suggests that 17 out of 40 participants agree to the notion that security is a growing concern that affects Saudi consumers' adoption of e-transactions. In Saudi Arabia, weak regulatory control over censorship and online content is amongst the highlighted issues that magnify the influence of consumer security concerns. Similarly, Zhang et al. (2012) argue that low rate of m-transactions seem to be driven by the perception of risk that discourages users to rely on m-transactions. In a similar context, Riquelme and Rios (2010) claim that users' low acceptance of mobile and electronic transactions is mainly influenced by the online retailers' fraudulent behaviour, "The risk factor may be even more important in relation to mobile devices because mobility increases the threat of security violations resulting from the required infrastructure for wireless applications." (Riquelme and Rios, 2010).

The empirical measures in the main study (validation study 1) show that the relationship between the security construct and the intention to use m-transaction is significant. Therefore, the analysis of the present research results show that consumers' use of m-transactions is directly and significantly influenced by the frequency of online fraud and hacking cases. In other words, compromised cyber-security discourages Saudi consumers to adopt m-transactions because in the recent years, security threats from hackers have grown in numbers (Al-Jabri and Sohail, 2012). Al-Jabri and Sohail (2012) who investigated the risk (i.e. security risk) in relation to mobile banking in Saudi Arabia, highlighted this concern as an important perception when deploying new technology (e.g. m-transaction), furthermore, they found that it negatively affects the adoption of mobile banking in Saudi Arabia. As a consequence, individual Saudi consumers are showing low acceptance of, and attraction towards m-transactions. In the present research, results of the exploratory study 1 & 2 and validity study 1 indicated that the cases of stealth and theft negatively affect consumer adoption of m-transactions. Since most of m-transactions involve financial and business arrangements; hence, this research recognizes security as one of the main factors that affect Saudi consumers' acceptance of m-transactions. In accordance with Hashemi and Soroush (2006), Saudi consumers' low acceptance of m-transaction is due to weak security programs deployed by m-transaction service providers. In addition, AlGhamdi et al. (2012a) agree with the findings of this research because safe and secure transaction is the main reason that encourages Saudi consumers to use e-transactions.

Multi group analysis was also conducted on the basis of gender, distribution method (i.e. online and paper based) and internet access for security as a contributory factor in shaping individual behaviour in Saudi Arabia to use mobile transactions. However, security has not been found a statistically significant influencing factor on intention to use mobile transactions in all three groups, gender (male vs. Female), distribution method (paper vs. Online) and internet access (yes/no). So it is evident that security is an important factor which positively shapes the behaviour of users in Saudi Arabia to use mobile transaction, however, this factor is equally important for different gender, already access on mobile phones as well as the data collected from different distribution method as no statistically

significant role of these groups has been found for security in the intention to use mobile transactions relationship. Therefore, the null hypothesis that there is a significant relationship between security and intention to use m-transactions cannot be rejected.

12.5.3 Usefulness and Ease of Use

Corresponding to DOI and TAM theories, the present research highlights usability as one of the main factors that shape consumer acceptance of m-transactions. In the light of these theories, usability (ease of use, navigational structure and visual appeal) and usefulness can directly shape consumer acceptance of m-transactions (Sun et al., 2009; Venkatesh et al., 2003a; Vance et al., 2008). The quantitative assessment recognizes ease of use as an exogenous construct with medium effect on the Saudi consumers' intent to use m-transactions; whereas, review of DOI and TAM theories recognize ease of use as one of the most influential factors to shape consumer acceptance of m-transactions. If the perceived ease of use is greater for a consumer and he/she is feeling the mobile transactions more useful, the inclination towards using mobile transactions will be greater. Many earlier studies had also found this factor to be an important element in technology acceptation and adoption (Davis, 1989; Wu and Wang, 2005; Dass and Pal, 2011). According to the validation study results, Saudi consumers' acceptance of m-transactions is significantly influenced by the three aspects of usability including ease of use, navigational structure and visual appeal. On the other hand, exploratory study 2 results show that 35% of 122 respondents agree that usefulness is an important factor that affects the adoption rate of m-transactions. Evaluation of the research results suggests that complex design of user-interfaces may discourage Saudi users from accepting and adopting m-transactions.

The assessment of the structural model relationships between the constructs usefulness and ease of use and the intention to use m-transaction are found to be significant. Consonant with the previous literature and theories, the present research results show that consumers prefer to use technologies that provide a user-friendly and straightforward interface mechanism (Al-Jabri and Sohail, 2012). In addition, the literature anticipated that system compatibility is another leading issue that highlights usability as an important factor to shape consumer acceptance of m-transactions (Min and Li, 2009).

Moreover, the validity study 1 results for mobile internet access recognize usefulness as one of the important exogenous constructs that determine the intention to use, of individuals who has no internet access on their mobiles devices in Saudi Arabia. In accordance with Chong et al. (2012a), the research results show that m-transactions do provide consumers with better independence/autonomy to access time-limited information; however, low usefulness may stop consumers from gaining the benefits of m-transactions, which is easily available and accessible. The role of ease of use and perceived usefulness of mobile transactions can also be validated by multi group analysis which has also found this to be an important contributing factor which is positively affecting intention to use mobile transactions in Saudi Arabia. With respect to multi group analysis, it was found that ease of use is positively affecting the perceived usefulness of mobile transactions in gender group and this perceived usefulness positively affect the intention to use for users which are male. If the user is male, ease of use of mobile transactions positively shape the perceived usefulness of mobile transactions in Saudi Arabia. These differences are because of the cultural aspects of the country as Saudi Arabia is male dominated country where masculinity is greater (Hofstede, 2001) which make them more inclined to adopt for mobile transactions. Moreover, multi group analysis has also suggested that if the users has already access to internet on his/her device, their intention to use mobile transactions increases because it becomes easier for them to involve in mobile transactions with an easy to use services on devices already having internet access. Therefore, the null hypotheses that there is a significant relationship between usefulness and easy of use and intention to use m-transactions cannot be rejected.

12.5.4 Culture

According to the literature review and results from the previous studies, shown below, culture is one of the key highlighted factors that shape the user behaviour towards modern technologies such as m-transactions in Saudi Arabia. The research uses four parameters including individualism-collectivism, uncertainty avoidance, power distance and masculinity-femininity to determine the influence of culture on the Saudi Arabian communities' intention to use m-transactions (see Figure 11.1).

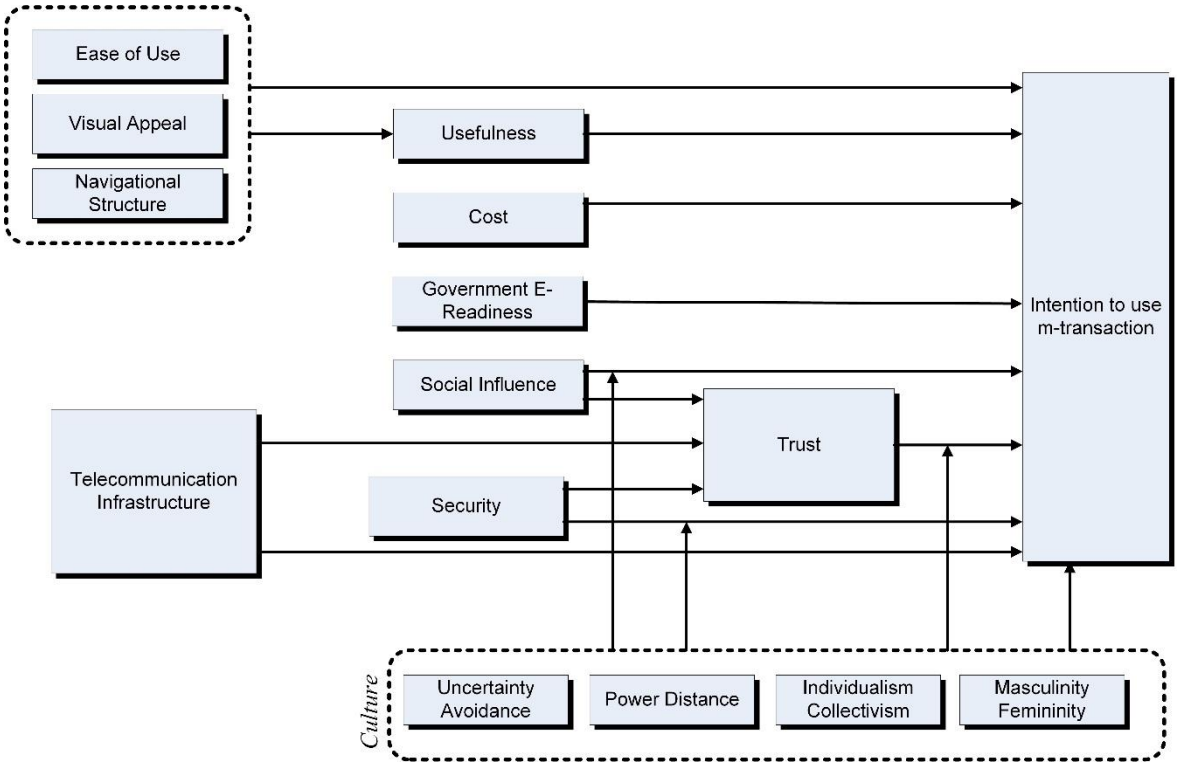

Figure 11.2: Conceptual Framework Factors.

According to the validation study 1, individualism-collectivism has path coefficient of -0.120 with p-value less than 0.001; hence, it is recognized as the affecting construct that has significant negative influence on the association between intention to use m-transactions and social influence. As the society is becoming more individualistic, the association between social influence and intentions to use mobile transactions is getting weaker. It seems clear that the social influence is more prevalent in societies with a more collectivistic approach. The table 11.5 indicates that power distance with p-value less than 0.05 and individualism-collectivism with p-value less than 0.1 are found to draw negative influence on the association between the intention to use m-transactions and security with low coefficient path value i.e. *b* is -0.0235 and -0.0286 respectively. Thus, analysis of the validation study 1 suggests that the cultural dimensions such as individualism-collectivism negatively affect the association between social influence, security, trust and Saudi Arabian communities' intention to use m-transactions. In an individualistic society, the impact of social pressure, level of security and trust on intentions to use mobile transactions is less as compare to collectivism. In support of the research findings, Eid (2011) states that Saudi communities reflect high levels of social and cultural homogeneity, and also in support, research conducted by Al-Gahtani et al. (2007) suggest that cultural belief is one the strong predictors of adoption of modern ICTs by Saudi users.

Table 11.5: Interaction Effect Results from the Structural Model.

No	Research Hypotheses (Interaction)	*Sign*	*Path Coefficients (β)*	T Statistics Values	Supported	
					Yes/No	P value
1	Security * Individualism Collectivism -> Intention to Use	-	0.0286	1.8308	Yes	0.1*
2	Security * Masculinity Femininity -> Intention to Use	-	0.0093	0.9359	No	-
3	Security * Power Distance -> Intention to Use	-	0.0235	1.9904	Yes	0.05**
4	Security * Uncertainty Avoidance -> Intention to Use	+	0.0207	1.5441	No	-
5	Social Influence * Individualism Collectivism -> Intention to Use	-	0.1201	9.3372	Yes	0.001***
6	Social Influence * Masculinity Femininity -> Intention to Use	+	0.0060	0.6743	No	-
7	Social Influence * Power Distance -> Intention to Use	-	0.0108	1.1355	No	-
8	Social Influence * Uncertainty Avoidance -> Intention to Use	+	0.0055	0.6215	No	-
9	Trust * Individualism Collectivism -> Intention to Use	-	0.0317	2.1166	Yes	0.05**
10	Trust * Masculinity Femininity -> Intention to Use	+	0.0094	0.5124	No	-
11	Trust * Power Distance -> Intention to Use	+	0.0240	2.0484	Yes	0.05**
12	Trust * Uncertainty Avoidance -> Intention to Use	+	0.0346	2.2169	Yes	0.05**

In contrast to the above evaluated dimension, uncertainty avoidance is estimated to reflect positive influence on the relationship of social influence, trust and security with the Saudi communities' intention to use m-transactions. The greater the uncertainty avoidance, the stronger the relationship between social influence and intention to use m-transaction, trust and intention to use m-transactions, security and intention to use m-transaction. Uncertainty avoidance leads to the risk concerned behaviour of individuals of a society and hence it strictly affects the relationship of intention to use mobile transaction with security, trust and social influence. In contrast to the case of security, masculinity-femininity positively influences the association between social influence, trust and the Saudi communities' intention to use online transactions. As Saudi Arabian society is a male dominated society (Hofstede, 2001), the role of masculinity is positively influencing the association between social, trust and intention to use mobile transactions. Data validation results in support of Hofstede (2001), Eid (2011) and Straub et al. (2002) suggested that cultural dimensions significantly affect the intention of Saudi communities to use m-transactions (See Table 11.6). Therefore, discussion of validation study 1 results conclude that culture is one of the critical factors that shapes the acceptance or rejection of m-transactions in Saudi Arabia, particularly the role of power uncertainty avoidance, masculinity-femininity and individualism/collectivism is importance in this regard. With respect to multi group analysis, the individualism/collectivism factor and the masculinity/femininity both positively affect the intention to use mobile transactions when gender group analysis was conducted. If the users are male, the cultural aspects of collectivism and masculinity are shaping their behaviour of using mobile transactions because of Saudi Arabian society which as more collectivist society with male dominance as discussed earlier.

Table 11.6: Country Scores based on Hofstede Cultural Dimension Scale.

Cultural Dimension	United States		United Kingdom		Saudi Arabia	
	Index	Rank	Index	Rank	Index	Rank
Power Distance	40	38	35	42-44	80	7
Uncertainty Avoidance	46	43	35	47-48	68	27
Individualism/Collectivism	91	1	89	3	38	26-27
Masculinity/Femininity	62	15	66	9-10	53	23
Long-/Short-Term Orientation	29	27	25	28-29	N/A	N/A

(Source: Hofstede, 2001).

Therefore, the null hypothesis that there is a significant relationship between power distance, uncertainty avoidance, collectivism, and masculinity and intention to use m-transactions cannot be rejected.

12.5.5 Social Influence

According to results from earlier empirical studies of the current research, the focus group discussion (exploratory study 3) on m-transactions is the only qualitative study that recognizes social influence as an important factor of consideration. Results of internal consistency in the validation study 1 indicate that the data collected for the social influence factor is consistent and reliable with Cronbach's alpha of 0.861 and composite reliability value of 0.899. According to the validation study test results, social influence along with security and telecommunication infrastructure is the lead variable to predict trust amongst Saudi communities. Thus, validation results indicate that Saudi communities' intention to use can be explained through social influence. Social association and influence motivate the individuals to use mobile transaction. Chong et al. (2012a) also found similar results that social influence is an important factor of the Technology Adoption Model (TAM) and explains the intention to use and adopt mobile commerce transactions.

As illustrated in the table 11.7, the collinearity value of 0.677 recognize social influence as a factor to predict trust. In the validation study 1, the structural model results suggest that social influence determines Saudi communities' intention to use m-transaction with p-value < 0.01and beta value of 0.0701.

Table 11.7: Collinearity amongst Exogenous Constructs.

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
2	(Constant)		
	Telecommunication Infrastructure	.653	1.531
	Security	.668	1.496
	Social Influence	.677	1.478

a. Dependent Variable: Trust

In addition, analysis of the coefficient of determination test results indicate that 78.6% of Saudi communities' intention to use m-transactions and 22.1% of trust construct can be explained by social influence (See Table 11.8). In contrast with the female group, the results of gender structural path identify social influence an as exogenous construct to determine statistically significant intention to use amongst male group members. With respect to multi group analysis, availability of internet access on mobile devices positively influences the role of social influence in shaping the behaviours of Saudi individuals to use mobile transactions. The users already have access to the internet on their devices are motivated positively to use mobile transactions because of their social circle and groups because this makes it easier for them to do mobile transactions if they already have internet access on their devices. This multi group analysis is not found to be significantly affecting mobile transactions usage intention in gender group as well as distribution method.

Table 11.8: Coefficient of Determination Results for Endogenous Latent Variables.

Endogenous Latent Variables	R^2	R^2 **Adjusted**	**Predictive Accuracy**	R^2 ***t* values**	R^2 **P values**	R^2 **Adjusted *t* values**	R^2 **Adjusted P values**
Intention to Use	0.786	0.779	High	44.902	0.000	65.377	0.000
Trust	0.221	0.218	High	7.076	0.000	7.092	0.000
Usefulness	0.656	0.655	High	36.755	0.000	35.031	0.000

Consistent with the present research findings, Chong et al. (2012a) state that the social influence is a subjective norm, which according to the reasoned action theory, determines the behaviour of an individual. In support, Yang et al. (2012) state that the intention to use m-transactions is significantly shaped by the social influence processes. Therefore, the null hypothesis that there is a significant relationship between social influence and intention to use m-transactions cannot be rejected.

12.5.6 Cost

Although the cost construct was not found to be significantly affecting the intention to use m-transaction in the assessment of the structural model relationships in the main study (validation study 1), the evaluation of the results extracted through exploratory study 2 indicate that the low rate of ICT and m-transaction adoption amongst Saudi users is certainly determined by the service costs in terms of increasing service prices and hidden telecom charges. According to the study results, Saudi users seem to limit the use of subscription and internet services due to the increasing costs and telecom charges. As can be seen in Table 11.9, 13 out of a sample of 40 respondents recognized cost as a highly significant factor in shaping their intent to use. In support, Lawrence and Tar (2010) claim that increasing costs of internet access are amongst the lead factors that reduce consumers' intention to use internet services in developing countries.

Table 11.9: Exploratory Study 1 - Cost Factor Results.

	Telecom Charges (Cost)			
N=40	Frequency	Percent	Mean	Valid Percent
	13	32.5	0.33	32.5

According to the results of exploratory study 2, cost related to a particular service can have an influence on the users' decision to subscribe to a particular service. Hence, the exploratory results suggest that Saudi telecom companies and the providers of internet services prefer to offer such services at a reasonable rate in order to attract and retain the target consumers. These interpretations are drawn from the statistics of the exploratory study 2 in which 30% of 122 sample participants agreed with the notion that the cost associated with the subscription of a particular service such as DSL play an important role in their intent to use such services. Evaluation of the responses obtained from the exploratory study 2, highlight the fact that participants state that their intent to use m-transaction is significantly affected by the related cost. According to the analysis of the study results, Saudi companies are no doubt providing 3G and 4G services to improve the acceptance of m-transaction and ICTs amongst Saudi consumers; however, the hidden charges such as sales tax, service charges and other related costs can make it difficult for Saudi users to incline towards the use of electronic services such as m-transactions (AlGhamdi et al., 2011). Similarly, results of validation study 1 indicate that cost is an exogenous construct that has different impact on the intent to use of users with and without mobile access (See Table 11.10).

Table 11.10: Mobile Internet Access-Henseler's Test Results.

No	Hypotheses	Path Coefficients-diff (| M-internet Access Yes - M-internet Access No |)	p-Value (M-internet Access Yes vs M-internet Access No)
1	Cost -> IU	0.222	**0.028****
2	EU -> IU	0.270	**0.002*****
3	EU -> USF	0.159	0.930
4	GEC -> IU	0.004	0.523
5	IDC -> IU	0.220	0.993
6	MF -> IU	0.105	0.882
7	NVS -> IU	0.043	0.317
8	NVS -> USF	0.142	0.134
9	PWD -> IU	0.056	0.673
10	IFR -> IU	0.143	**0.064***
11	IFR -> TSP	0.076	0.288
12	SEC -> IU	0.127	0.917
13	SEC -> TSP	0.115	0.846
14	SIF -> IU	0.189	**0.045****
15	SIF -> TSP	0.016	0.457
16	TSP -> IU	0.186	0.991
17	UAV -> IU	0.105	0.870
18	USF -> IU	0.165	0.889
19	WS -> IU	0.105	0.870
20	WS -> USF	0.014	0.564

According to the path coefficient results, intention to use mobile transactions amongst the users with no internet access on mobile is significantly affected by the cost factor than those who have access to internet. If the users have internet on their phones or personal devices, cost is not a relevant factor; however, if the internet is not accessed on the phone, cost becomes a significant factor to shape their intention to use mobile transactions. Likewise, in research, AlGhamdi et al. (2011) found that cost is amongst the factors that shape adoption or use of e-services amongst Saudi communities. Therefore, discussion of results recognizes cost as one of the key factors that shape consumers' intent to use mobile and internet-based transactions based upon multi group analysis, however the results were not found significant in validation study 1 which was based on the quantitative analysis of questionnaires. Therefore, the null hypothesis that there is a significant relationship between cost and intention to use m-transactions can be rejected. The alternative hypothesis would be: cost has no statistical significance effect on the intention to use m-transaction.

12.5.7 Government E-Readiness

The assessment of the research conceptual framework constructs in the validation study 1 show that government e-readiness is not a significant factor to affect the intention to use m-transaction in Saudi Arabia. Furthermore, in the light of results obtained through exploratory study 1, a few of the sample respondents believe that the government plays an important role in fostering the use of ICTs in the country. The Table 11.11 shows that out of a sample of 40 respondents, 9 participants state that government role is significant in determining user acceptance of ICTs and m-transactions in Saudi Arabia. Analysis of the responses generated through exploratory study 1 suggested that lack of intention and motivation of government is the key reason behind the delayed development of e-commerce in Saudi Arabia. Consonant with these results, AlGhamdi et al. (2011) state that e-commerce development in Saudi Arabia is certainly influenced by the role of government, for example, their research results recognized government support and promotion as the crucial factors. In addition, Molla and Licker (2005a) claim that e-commerce is mainly enabled by the promotional programmes and activities conducted at industrial and government levels. Similarly, in case of Saudi Arabia, Eid (2011) stated that the growth and development of local e-commerce is considerably shaped by the support of Saudi Arabian government.

Table 11.11: Exploratory Study 1 - Government Role.

Government E-Readiness				
N=40	Frequency	Percent	Mean	Valid Percent
	9	22.5	0.23	22.5

Assessment of the results obtained through the exploratory study 2 indicates that the Saudi consumers believe that the supportive role of Saudi government is very important in improving the development of electronic and mobile transactions. For example, analysis of the exploratory study 2 results suggests that the Saudi government can promote user acceptance of ICTs by creating electronic mechanisms for managing government procedures and applications. As a result, the government can play an important role in improving the quality of e-services with the creation of healthy competition amongst companies of the telecommunication sector. Similarly, the validation study 1 provides results to support the findings. For example, the SPSS collinearity test recognizes government e-readiness as an important factor to explain Saudi communities' intention to use m-transactions. However, the path coefficient value of -0.0214 with t-value of 1.6304 recognize government e-readiness seem to have no significant influence on Saudi users' intention to use m-transactions. This means that there is no relation between the e-readiness of government and intention of users in Saudi Arabia to use mobile transactioins. Similarly, discussion of the results obtained under the R^2 test exhibit small influence of government e-readiness on the intention to use. For example the f^2 value of 0.107 illustrates little impact of government e-readiness on the intention to use. Therefore, consistent with the prior literature, the present research explores association between government e-readiness and the intention to use m-transactions. However, the above evaluation of the validity study results indicates that the degree of association is relatively small and statistically insignificant. Moreover, multi group analysis also failed to find any statistically significant association between government e-readiness and intention to use for different groups in the present study such as gender, distribution method and internet access. Therefore, the null hypothesis that there is a significant relationship between government E-readiness and intention to use m-transactions can be rejected. The alternative hypothesis would be: government E-readiness has no statistical significance effect on the intention to use m-transaction.

12.5.8 Trust

Similar to the government e-readiness factor, trust was not found to be a significant construct to affect the intention to use m-transaction in Saudi Arabia. In the exploratory study 1, a sample of 40 respondents was asked questions about their perception of conducting e-transaction in Saudi Arabia. Evaluation of the study results indicates that 16 out of 40 participants highlighted trust as a significant factor to determine the adoption and acceptance of e-commerce and therefore m-transactions (See Table 11.12). Qualitative assessment of the interview responses shows that Saudi communities consider trust as an important aspect in determining the adoption and acceptance of e-commerce in the country. Discussion of exploratory study 1 results indicate that the possibilities of stealth, privacy concern and other security issues are the lead factors that reduce the level of trust amongst Saudi communities; hence, discouraging users from the acceptance of e-commerce and online transactions such as m-transactions. In line with these results, Ba and Pavlou (2002) argued that the increasing number of threats in the internet services is one of the key reasons that makes it extremely difficult for users to engage in e-commerce transactions. On the other hand, Lu et al. (2011) claimed that intention to use m-commerce services certainly relies on the factor of trust; however, technical perceptions may not be of great assistance in guaranteeing the user trust on e-services.

Table 11.12 : Exploratory Study 1 - Trust Factor.

	Trust			
N=40	Frequency	Percent	Mean	Valid Percent
	16	40.0	0.40	40.0

Analysis of results through the exploratory study 2 exhibits growing concerns of users regarding their trust of mobile transactions. According to the opinions generated through the interview of 122 respondents, trust plays a crucial role in the mobile transactions. In the case of Saudi Arabia, trust is amongst the key variables that discourage consumers from the use of mobile transactions because these transactions are primarily done with remote access; hence, no face-to-face interaction means increasing chances of low trust. For further elaboration of the trust factor, the validation study is performed in which cultural dimensions are used to determine the association between trust and intention to use m-transactions. For example, structural model results indicate that the association between trust and intention to use is positively influenced by uncertainty avoidance ($p < 0.05$, $t = 20216$) and power distance ($p < 0.05$, $t = 2.048$). As the culture of the society tends towards avoiding uncertainty, the role of trust in a user's intentions to adopt mobile transactions becomes more important. If the people of a society like Saudi Arabia are risk concerned and avoiding uncertainty (Hofstede, 2001), trust becomes an important factors for online mobile transaction which might involve losing money. Additionally, the R-square test suggests that the level of influence that trust has on Saudi consumers' intent to use m-transactions is small. Vance et al. (2008) recognized trust as an important factor to determine the users' perception of trust; however, validation study based on quantitative analysis suggests that trust is not an important factor in explaining the consumer's intention to use mobile transactions. Moreover, in multi group analysis, trust is found to significantly affect intention to use mobile transactions only if users already have internet access on their mobile devices. If there is no internet access available to them, the role of trust in shaping their intentions to do mobile transactions is less. This might be because of internet availability on their personal devices make the users more confident about the reliability of mobile financial transactions and they involved in such mobile transactions with more confidence in this case. Therefore, the null hypothesis that there is a significant relationship between trust and intention to use m-transactions can be rejected. The alternative hypothesis would be: trust has no statistical significance effect on the intention to use m-transaction.

12.5.9 Navigational Structure

Analysis of the validation study 1 test results recognizes positive influence of navigational structure on Saudi communities' intention to use m-transactions. Results of the structural model illustrate a positive association between navigational structure and intention to use with positive beta value of 0.0497, and *t* value of 2.9636. Moreover, findings of the coefficient of determination test measure navigational structure as an important factor in combination with ease of use, visual appeal and navigational structure to cause significant change in the usefulness variable. Navigational structure might include user friendliness of mobile sites for financial transaction while navigating them, and inclusion of Arabic language in the websites to support mobile transaction being initiated from Saudi Arabia. If the navigational structure of the mobile transaction websites is user friendly and effective, it can be proved to be an important factor motivating consumers to use mobile transaction. Analysis of the R^2 results obtained for the endogenous latent variables illustrate the association between navigational structure and intention to use with f^2 value of 0.110. Analysis of the results of validation study 1 indicate that being an exogenous construct, navigational structure is found to have a small influence on the intention to use (See Table 11.13).

Table 11.13: The Endogenous Latent Variables - R2 Results.

No	Exogenous Latent Variables	f^2 for Endogenous Latent Variables		
		Intention to Use	**Trust**	**Usefulness**
1	Cost	0.107		
2	Ease of Use	0.225		0.159
3	Government E Readiness	0.107		
4	Individualism Collectivism	0.223		
5	Masculinity Femininity	0.109		
6	Navigational Structure	0.110		0.061
7	Power Distance	0.127		
8	Telecommunication Infrastructure	0.107	0.119	
9	Security	0.108	0.033	
10	Social Influence	0.116	0.005	
11	Trust	0.107		
12	Uncertainty Avoidance	0.128		
13	Usefulness	0.130		
14	Visual Appeal	0.118		0.067

Corresponding to the results stated above, Tsygankov (2004) and Hossain (2012) state that web-based resources and navigational structure is found to have an effect on the online purchase decision of users. For example, in his study, Hossain (2012) explained that problems associated with navigation or browsing on the commercial websites are amongst the lead reasons that urge 28% users to discontinue web-based shopping while 6% of the users seem unhappy with the web-based services. Similarly, Min and Li (2009) use these factors to highlight the significance of addressing these issues in mobile web browsing because the prevalence of such problems can have a direct and significant influence on the consumers' intent to use m-transactions. However, the results of multi group analysis suggest that there are no significant differences for the role of navigational structure and intention to use mobile transactions for different groups of analysis such as gender, distribution method, and internet access. The users in both categories of all these three groups equally consider navigational structure as an important factor for intention to use mobile transactions. Therefore, the null hypothesis that there is a significant relationship between navigational structure and intention to use m-transactions cannot be rejected.

12.5.10 Visual Appeal

The assessment of the research conceptual framework structural model in the main study (validation study 1) highlighted the visual appeal construct as a significant factor affecting the intention to use m-transaction in Saudi Arabia. Furthermore, according to the analysis of the exploratory study 3, visual appeal is treated as attractiveness or graphic style or product characteristics. Evaluation of the results provides convincing response regarding the influence of visual appeal on the intention to use m-transactions. According to the discussion of results, respondents believe that a product's visual appeal shapes user intention by attracting them towards using the application (e.g. m-transaction). Evaluation of the exploratory study 3 results indicates that the Saudi user certainly considers visual appeal as an important factor to determine their use of e-services and e-commerce.

According to Montoya-Weiss et al. (2003) visual appeal refers to the graphic style of an e-service or web-based environment; hence, it can play an important role in determining the interface credibility of an e-service by the users. Accordingly, Vance et al. (2008) put emphasis on the consideration of visual appeal as important factor to determine the acceptance or rejection of e-commerce by users because visual appeal can have influence on the ease of use perception of users. In the view of Chung and Lee (2003), perceived ease of use and visual appeal characteristics determine the intention to use internet shopping. Keeping this in view, results of exploratory study 2 indicate that in mobile transactions, ease of use is certainly an important factor to determine their intention to use.

Qualitative evaluation of the interview results of exploratory study 1 suggests that users prefer to visit web pages with less complicated user interface with readable font size.

Moreover, evaluation of the results obtained through the validity study 1 indicates a positive association between visual appeal and the intention to use. According to the validity study results, the path coefficient of relationship between visual appeal and intention to use is 0.0857 with *t* value of 5.4148; hence, it certainly affects the user intent in Saudi Arabia. Lee and Benbasat (2003) support the present research findings that visual appeal or interface design of a product makes it more attractive for the consumer and is an important factor of consideration to determine the user acceptance of m-transactions. " It is therefore imperative to improve the design elements of m-commerce interfaces to foster consumer adoption." (Lee and Benbasat, 2003). However, just like navigational structure, visual appeal has not been found to be significantly different for different groups of respondents under multi group analysis. Therefore, the null hypothesis that there is a significant relationship between visual appeal and intention to use m-transactions cannot be rejected.

11.5 Chapter Summary

The chapter provided comprehensive discussion on the results of the exploratory and validation studies performed to analyse the adoption of m-transactions amongst Saudi Arabian communities. Discussion of the results showed that a list of factors was generated through the qualitative studies; a few of these variables were similar in all studies while others were different with varied influence on the intention to use. A comparison of prior research studies conducted in other countries suggested that usefulness and ease of use are amongst the key factors that are supported by analysis as the forces to determine the intention of consumers to use m-transactions. However, in this research ease of use was found to be the most influential factor for the Saudi user with regard to the intention to use m-transaction. This finding can be supported by Al-Ghaith et al. (2010) who surveyed 651 Saudi consumers investigating the factors affecting the adoption of online services in Saudi Arabia, found that complexity is the most influential factor. In total, in the present research, there are eleven key factors (ease of use, visual appeal, navigational structure, usefulness, culture (collectivism, masculinity, power distance security and uncertainty avoidance), telecommunication infrastructure, and security) that shape the acceptance and adoption rate of m-transactions in Saudi Arabian communities. Discussion of results obtained via the exploratory and validity studies indicate that each of these identified variables have certain degree of influence on Saudi communities' intent to use m-transactions. In accordance with the qualitative study of the present research, prior literature and researches on the similar titles suggest that it is true that the degree of each variable's influence on the intention to use m-transaction of a consumer may vary across different country contexts; however, one cannot deny the fact that the intent to use m-transaction is definitely shaped by these factors.

Chapter 12 Conclusion

12.1 Introduction

In the recent decade, advancement in the e-service technology has created a pool of opportunities, as well as threats for different service sectors and businesses. In agreement with Al-Ghaith et al. (2010), the qualitative assessment shows that as a distribution channel, the internet is one of the "trendy" technologies embraced by different businesses to achieve market share or competitiveness. In the context of Saudi Arabia, data analysis from earlier chapters indicates that it may not always be easy to attract and capture consumer attention towards a particular electronic service such as mobile transactions. The review of evidence gathered in the earlier chapters of this research suggests that there are certain factors that influence the acceptance and adoption of m-transactions amongst Saudi Arabian communities and users.

In this last chapter, findings from different review techniques, data interpretation and analysis methods are summarized together to understand the idea of Saudi users' acceptance of m-transactions. In addition, the chapter draws interpretations on the developed conceptual framework of Saudi users' acceptance of m-transactions. In support of prior literature, the chapter summarizes the main findings of all qualitative assessment studies conducted to examine different factors such as social, personal and technological factors that shape Saudi consumers' adoption of mobile transactions. The chapter also elaborates key limitations of the present research work that constrains reliability of research findings; therefore creating room for future research work.

Based on the path coefficient and the *t* values, Table 12.1 summarizes the research findings and orders them according to their importance.

Table 12.1: Summary of the Research Findings and Their Importance.

Order of Importance	***Research's Factors***	***Path Coefficients (β)***	**T Statistics Values**	**Significant**
1	Ease of Use	0.3031	15.2731	Yes
2	Individualism Collectivism	0.233	17.5068	Yes
3	Usefulness	0.1218	7.1189	Yes
4	Uncertainty Avoidance	0.1167	6.7664	Yes
5	Power Distance	0.0942	6.6933	Yes
6	Visual Appeal	0.0857	5.4148	Yes
7	Social Influence	0.0701	4.75	Yes
8	Navigational Structure	0.0497	2.9636	Yes
9	Masculinity Femininity	0.0349	2.4574	Yes
10	Security	0.0243	2.0735	Yes
11	Telecommunication Infrastructure	0.021	1.6892	Yes
12	Government E Readiness	0.0214	1.6304	No
13	Cost	0.0128	1.2776	No
14	Trust	0.0116	1.1629	No

12.2 Summary of Findings

Analysis of data collected through primary and secondary sources (i.e. *Chapters 2, 4, 5, 6, 9 and 10*) shows that in contrast to other developing countries, use of advancing technologies is relatively high in Saudi Arabia. In this new age of information technologies, the findings of the present study suggest that advancing technology has a strong association with certain demographic factors such as gender, income and computer skills amongst the Saudi people. Results of the validation study 1 indicate that gender difference affects a user's perception of m-transactions; similar to the findings of the research conducted by Burke (2002), the present research concludes that the adoption of m-transactions amongst consumers is considerably influenced by gender differences. Moreover, the income level of the people affect the intention to use technology based m-transaction. The higher the income, the greater the use of m-transactions amongst Saudi people. Similarly, greater computer skills also positively affect the usage of mobile transactions in Saudi Arabia. However, the study found no impact of age of people and their qualification on their intention to use m-transaction. Similarly, Al-Somali et al. (2009) found that age did not have any effect on attitudes towards using internet banking in Saudi Arabia. The use of this technology based facility is similar in different age groups and with different qualifications and there is no significant effect of different age groups and qualification on intention to use m-transactions in Saudi Arabia.

Corresponding to the research objectives, relevant literature helps to understand human behaviour and consumer intention to use online services. Corresponding to the planned behaviour theory and reasoned action theory, the research finds that social pressure, may directly affect a consumer to use online transactions (Sun et al., 2009). In cases when a person has a neutral attitude towards a particular technology, social influence is a reason that can convince him/her to use that technology (Dahlberg et al., 2008). In an attempt to achieve the research objectives, a detailed review of relevant literature helped to create a list of factors that can directly or indirectly affect consumer intentions to use m-transactions. In agreement with the literature, the present research finds that the intention of Saudi consumers to use m-transactions is vulnerable to a decent security mechanism, and a robust network with good IT infrastructure (Jaradat and Al Rababaa, 2013).

It is true that the trend towards mobile banking and mobile commerce is proliferating these days; however, in Saudi Arabia, e-commerce and m-commerce services still seem to face reluctance (Aldwsry, 2012). Amongst Arab countries, Saudi Arabia has managed well to stand as the fastest and largest growing marketplace for information and communication technologies (ICTs) (Orloff, 2012); however, research shows that the adoption rate of electronic commerce activities is not that same (AlGhamdi et al., 2012a). For example, Al-Ghaith et al. (2010) argue that in Saudi Arabia, it is hard to find a local reliable producer of hardware or software hence acquisition of overseas technologies seems to be a common practice to satisfy the increasing local demand for ICTs.

In support of these interpretations, the qualitative assessment of the research problem indicates that the unclear regulatory system with issues of network failure and difficulty in gaining service licenses are amongst the reasons for the slow acceptance rate of m-transactions in Saudi Arabia. From an interpretation of opinions generated in the exploratory study 2, Saudi consumers' low acceptance of m-transactions is attributable to poor enforcement of cyber-laws and little or no consideration to information and data privacy of consumers. In relation to this, research findings show that little political intent is also the reason why ICT businesses lacking behind in gaining consumer acceptance of m-transactions.

A study of consumer behaviour enabled the researcher to recognize that there are users who intend to accept and adopt m-transactions and related online services; however, the failure of the government in protecting the privacy and data of consumers is the reason that makes them nervous

of m-transactions. In Saudi Arabia, the research finds that weak security against hacking and fraudulent activities are amongst the reasons that affect consumer acceptance of m-transactions. In contrast to Saudi Arabia, m-transaction is rapidly becoming one of the favourite choices of online transactions across the globe as consumers' tend to use it as a replacement for heavy computers (Jaradat and Al Rababaa, 2013). This research, however, understands that accessibility factor of m-transactions is another factor influencing Saudi users' acceptance and adoption of m-transactions. Based on these literature-supported findings, the research developed a conceptual framework to identify and test factors that affect the intention of Saudi consumers to accept m-transactions.

According to interpretations drawn from the above empirical studies (i.e. Chapters 4, 5 and 6), growing popularity of the internet is attributable to the fact that it allows consumers to directly connect with web stores for the purchase of products/services. In the case of mobile transactions, the situation becomes even easier due to movability/portability and ubiquitous connectivity. Empirical investigations suggest that Saudi users' acceptance of m-transactions remain vulnerable to eleven main variables. Outcomes drawn from the exploratory study indicate that infrastructure of the telecommunication sector is one of these identified factors that affect Saudi users' acceptance of m-transactions. Data findings show that if telecommunication infrastructure is well established and effective, and internet is available at different locations of the country (including remote areas) this is surely a motivational factor for Saudi users to adopt m-transactions; however, poor telecommunication infrastructure prevents users from gaining the benefits of m-transactions. In Saudi Arabia, wireless technology and other fast speed telecommunication services such as 3G and 4G have been introduced and are well accepted by users; however, performance consistency and delivery speed are the reasons that affect Saudi consumers' intention to use m-transactions. A summary of the research findings states that the Saudi government currently lacks the ability to maintain steadfast services of ICT. Research outcomes of the exploratory and validity studies indicate that Saudi consumers have high concerns for wireless services and overall mobile network performance. It can be argued that telecommunication infrastructure is a combination of different reasons such as connection speed, network performance, accessibility, and wireless service that contribute to the Saudi communities' intention to use m-transactions. Empirical results depict user concerns regarding loss of money and data in case of network failure or service disconnection. Research findings encourage the researcher to adopt the notion that Saudi government lacks sincere initiatives to improve the ICT infrastructure. Consonant with Jaradat and Al Rababaa (2013), the present research concludes that telecommunication infrastructure is one of the key factors that affect Saudi users' intention of accepting m-transactions.

Exploratory study components in chapters 4 and 5 also recognize awareness as a factor that influences Saudi users' acceptance of m-transactions. A common perception that mobile serves as a convenient source of conducting online transactions is identified as a perceived usefulness that if known can attract consumers towards m-transactions. In the Saudi context, Saudi communities are less aware of the key benefits associated with m-transactions, and this low level of awareness leads towards low intention of users to accept m-transactions. In agreement with Dass and Pal (2011), the research findings show that the low awareness is proliferated due to weak government intentions to organize training and educational programmes regarding the features and characteristics of new technologies. Al-Somali et al. (2009) who studied the acceptance of internet banking in Saudi Arabia stated that, "The implication is that low awareness of online banking is a critical factor in causing customers not to adopt or use online banking.". Another important reason that identifies awareness as a key factor to affect user intention of accepting m-transactions is the prevalence of misconception about internet services. In Saudi Arabia, consumers have a negative perception of internet facility; as a result, low awareness of technological benefits associated with the internet increasingly prevents users from the acceptance of m-transactions. In addition, findings of the present research indicate

that low adoption of m-transactions in Saudi Arabia is due to a lack of awareness of the usefulness of this technology.

Amongst the factors which motivate Saudi people to adopt m-transactions, perceived ease of use and usefulness are the most important factors to help determine the behaviour of users and their acceptance of m-transactions. Theoretical findings on the research problem indicate that perceived ease of use is a source of motivation; a consumer prefers to choose a service or product, if he/she perceives that it is easy to use. It is a common human behavioural characteristic that it likes to be associated with a product/service, which is easy to adopt and easy to use (Dahlberg et al., 2008). In the light of empirical results drawn from exploratory and validation studies, consumer acceptance of m-transactions is directly affected by usefulness and usability in the form of visual appeal, navigational structure, and perceived ease of use. In m-transactions, supportive web design, user-friendly interface and easy navigation can be recognized as motivational factors to encourage users towards the adoption of this technology. On the basis of data collected through interviews during the exploratory study, Saudi users avoid using m-transactions due to complex design and convenience issues. In agreement with Al-Jabri and Sohail (2012), empirical findings show that m-transaction is an advancing technology that allows users to gain independent access to time-constrained information, but usefulness is a factor that motivates them to gain the benefits of m-transactions. Therefore, in support of prior literature, the research finds that ease of use is the most important factor found. These results are not only based upon the quantitative analysis but also a further study was conducted to focus on the level of ease of use (usability) of m-transactions amongst the Saudi people, and this factor has been found to be the most important factor amongst all the factors affecting intention to use m-transactions amongst Saudi people.

Empirical evaluation (i.e. Chapter 6 and 9) of the developed model suggests that security is another important factor that affects intention to use m-transactions. In Saudi Arabia, one of the growing concerns of users that affect users' intentions towards m-transaction is related to security. Empirical results support this notion by showing that the likelihood of fraud or money scams in online transactions are the reasons that magnify user concerns over mobile transaction as a less secure technology medium. The research also summarizes that in Saudi Arabia, government policies and regulations related to online content and censorship are practically weak and less responsive to the growing concerns of users; hence, resulting in low acceptance of m-transactions. The research claim i.e. security is an important factor to determine user acceptance in Saudi Arabia can be backed up with the outcomes of the research conducted by Al-Jabri and Sohail (2012) in which they found that perception of risk is an underlying driver of the low adoption rate of m-transactions. Interpretations drawn from the qualitative assessment suggest that an experienced or non-experienced users' acceptance and adoption of m-transaction is affected by his/her perception of the risk associated with this transaction. For example, if a user believes that m-transaction is highly risky because weak network security can result in loss of money and confidential data; then he/she is less likely to accept the use of such technology. To support these conclusions, Petrova and Mehra (2010a) argue that the fraudulent behaviour of online retailers is one of the reasons that result in low acceptance of m-transactions. Hence a summary of research findings depict security as an important influential factor that encourages Saudi consumers to move towards electronic transactions instead of mobile transactions.

A review of the empirical results in chapters 6 and 9 suggests that culture with unique characteristics is one of the highly influential factors to affect user acceptance of m-transactions. Theoretical understanding indicates that a person's behaviour and actions remain under the influence of his/her cultural values. Saudi Arabia is a Muslim country where Aldraehim et al. (2012) recognize culture as an impediment to the use of information technologies. Quantitative evaluation shows that individualism-collectivism is a cultural dimension that draws negative influence from the

relationship between user intention, trust and security. In contrast to developed countries, Saudi Arabia is an Arab state that portrays a homogeneous culture and society. Therefore, acceptance of m-transactions by a Saudi user is found to be strongly driven by his/her cultural beliefs. Contrary to this, empirical findings indicate that uncertainty avoidance being a cultural dimension draws positive impact on the association between security, trust and user intention. In the Saudi context, the development of the electronic society remains under significant influence from cultural pressures as a key factor to affect a user's intention of adopting online services. Saudi users are provided with a highly homogeneous environment; hence, their acceptance and adoption of m-transactions is mainly shaped by their cultural values. In line with the findings of Zhang et al. (2012), the present research concludes that culture is undoubtedly an important and highly influential factor that shapes Saudi users' acceptance and adoption of m-transactions.

Corresponding to the earlier stated research objectives, empirical testing of the developed conceptual framework highlights social influence as an increasingly important factor. Review of the quantitative assessment under validation study 1 indicates that social influence is also a highly important factor for determining Saudi users' intention of adopting m-transactions. A summary of the research findings indicate that Saudi users' acceptance of m-transactions is directly and positively affected by social influence. As quoted earlier, theoretical understanding of social influence supports these interpretations with the notion that regardless of a person's attitude towards a technology; user's acceptance of m-transactions is highly driven by the social influence factor. In Saudi Arabia, social connections and acquaintance plays an important role in proliferating the scope and usage of a new technology, for example, research findings show that a person is likely to adopt an innovative technology if it is already accepted in his/her social circle or group of people. In addition, the research also finds that the homogenous characteristics of Saudi society also play important role in promoting social influence as a lead variable to shape consumer acceptance and adoption of m-transactions. Based on these findings, the research summarizes that social participation of Saudi people is another important factor which affect the intention to use m-transactions in Saudi Arabia. If a group of people or an individual who is using m-transactions is possess such characteristics; this group or individual is likely to act as a socially influential group or individual to convince their pairs, friends or colleagues (groups/individual) to adopt m-transactions. In the case of Saudi Arabia, it is recommended that the government and ICT companies pay close attention to attract and retain these user groups with early adoption characteristics of new technology.

The framework of the present research study highlights cost as another important variable that can shape consumer acceptance and adoption of m-transactions. According to the evaluation of results gathered through the exploratory and validity studies, the expensive of an innovative technology is a reason that prevents users from adopting it such as m-transactions. The cost associated with such technologies can be determined in terms of hidden charges, subscription fee and service price, and increases in these costs is likely to result in a lower adoption rate of m-transactions amongst users. In Saudi Arabia, results show that users prevent or limit the use of m-transactions due to high telecom charges and other related costs. In order to facilitate growing concerns of users regarding service costs, there are Saudi telecom companies engaged in efforts to deliver internet services at affordable rates; hence, encouraging users to accept m-transactions. Evidence of such initiatives can be taken from the launch of 3G and 4G services that promise to provide users with better speed and connectivity; yet the research still finds a low rate of user acceptance. The reason behind low acceptance of such services is found in terms of hidden charges such as sales taxes that discourage users to adopt m-transactions. Therefore, in support of AlGhamdi et al. (2011), summary of the present research findings explain cost as another crucial factor that influences user acceptance of m-transactions.

Amongst all these identified factors, the role of government is also integral and directly associated with earlier identified factors such as telecommunication infrastructure, security issues, and low awareness. Qualitative assessment of results extracted from the interviews indicates that the Saudi government plays a vital role in the development of ICT services in the country. Therefore, it may not be wrong to state that the government plays a role of facilitator to promote a positive relationship amongst IT companies and their consumers. For example, lucrative government policies related to licensing and online service providence enable ICT companies to increase their outreach to consumers in different areas of the country while government regulations regarding online data privacy and information sharing help to protect users against fraudulent and hacking issues. Therefore, the role of government in promoting user acceptance of m-transactions is highly important. Review of data interpretations and analysis indicates that the Saudi government lacks motivation and the intention to develop e-commerce; as a consequence of low government willingness, m-transactions have not gained the popularity and acceptance that it actually has in other countries of the world. The present research finds that low government support and promotion are one of the reasons for the current slow speed of development of electronic and mobile commerce in the country. Hence a summary of the research findings indicate that low government e-readiness is amongst the lead factors due to which Saudi users' acceptance and adoption is growing at a slow pace.

In the world of electronic and mobile commerce, trust is an important variable that fosters or blockades a link between the service provider and its users. The model also recognizes trust as measure of user acceptance of m-transactions in Saudi Arabia. Evaluation of results extracted from qualitative and quantitative assessment shows that trust is an important determinant of user acceptance of m-transactions. In Saudi Arabia, likelihood of steal and loss of money due to weak security and privacy policies is the main reason that weakens the trust relationship between an online service provider and its users. Nevertheless, summary of the research findings indicates that technical perception may be important but not the sufficient motivational factor to build user trust on a particular m-transaction service provider. In case of Saudi Arabia, the research finds that remote access without face-to-face interaction is amongst the underlying reasons that portray trust as an important variable to shape user acceptance of m-transactions.

Corresponding to the research objectives, a summary of interpretations drawn from the evaluation of the framework suggests that navigational structure and visual appeal are also amongst the factors that influence user acceptance and adoption of m-transaction in the Saudi context. The quantitative assessment finds a positive association between navigational structure and users' acceptance of m-transactions in Saudi Arabia. Consonant with these findings, the research highlights that in an online medium of communication, navigational structure, visual interface and web-based resources are the key variables that affect a user's decision to purchase from an online source (Burke, 2002; Hossain, 2012; Tsygankov, 2004). In Saudi Arabia, weak internet connectivity or frequent network failure are the reasons that urge users to disconnect their web-based services. Therefore, a summary of the research findings indicate that if this infrastructure improves, there would be more inclination from Saudi people to adopt m-transactions.

In addition to this, the model identifies that visual appeal has the potential to shape user acceptance of e-transactions (Montoya-Weiss et al., 2003; Vance et al., 2008). Review of empirical evidence collected on the research problem indicates that attractiveness or visual appeal is a factor that can affect user acceptance of m-transactions; however, the degree of influence may not be very strong. In Saudi Arabia, consumers do consider visual appeal as an important factor while making their decision regarding the purchase of a particular product/service. However, the research summarizes that visual appeal and product characteristics are factors to be considered when determining the user acceptance of m-transactions as it is an element with the potential to attract a user towards online

services. To summarise, all of the above elaborated factors are highlighted and well supported as the key factors with the potential to influence acceptance and adoption of m-transactions amongst Saudi users. Each of the identified factors is found to play a distinctively and important role in attracting users towards m-transactions.

12.3 Limitations and Future Work

The main objective of this research is to examine what influences user intent for m-transactions in Saudi Arabia; however, the research is limited to the main cities of Saudi Arabia; hence, it may not be possible to generalize research results for the regions of Middle East and North Africa (MENA). In addition, the researcher used an online survey and a social network to gather participant responses on the research problem; since these mediums prevent face-to-face interaction hence there are chances that the data collected through these mediums is less reliable. The research has used up-to-date software such as IBM SPSS Statistics 19 and SmartPLS 3.0; yet there are chances of precision errors; thus the research findings based on quantitative measures are vulnerable to estimation errors. Furthermore, the research founds difficulties in recruiting female participants as Saudi Arabia is a conservative society, hence, the female sample size is not equal to the male sample size which may lead to missing some of Saudi females' point of view.

Furthermore, this study includes only the Saudi citizens in the sample size and has overlooked the foreigners (e.g. expats). As those living in Saudi Arabia, including their point of view, could contribute to a better understanding of the results. A further study, could pay attention to their perception and compare the results against the current research. With regards to the focus group sample size, although the researcher has made his best to collect a representative sample size in order to obtain accurate outcomes and decisions for developing the research conceptual framework. There are a number of limitations in the sample itself. Firstly, almost all of them have a similar education level (master degree), where a variety of education levels could give different point of views and enrich the study discussion. Secondly, although, most of the participants have an experience in m-transactions (i.e. 6 participants), they may not consider as experts in the field, where having an expert could give the discussion more valuable ideas, comments and arguments. Finally, the focus group participants were all males, where having females members could provide a different point of view and provides more realistic outcomes to represent both males and females. Therefore, the focus group study took a critical role to scope down the important factors from the research previous study to 11 factors. The previous limitations could negatively affect the focus group decisions and may affect the constructions of the research conceptual framework. This means that the unconsidered factors from previous studies in this research may be still important to discuss. This limitation can be considered in a further study to only focus on those neglected factors by the focus group.

12.4 Recommendations

In order to encourage more Saudi users to use m-transaction applications, Mobile Application Developers/Web Designers need to consider the following:

- They are recommended to design user-friendly interfaces to create a better consumer experience even for those lacking internet skills
- They are recommended to design websites with ease of communication i.e. use SADAD (bilingual language: English-Arabic) to make website content understandable for all users
- During web and application design, they are recommended to focus on the key elements of consumer concerns related to graphics, information accuracy, usefulness, animation and font suitability

The research findings show that for the ICT Organizations interested in increasing the utilization of their services by Saudi users, they need to pay attention to:

- ICT organizations are recommended to carefully identify and understand the concerns and needs of their prospective consumers regarding m-transactions
- Existing and potential businesses are recommended to conduct intensive awareness programmes about the use of m-transactions through modern media channels such as social networks, TV programmes, advertisements, and brochure distribution
- They are recommended to work in collaboration with the ICT regulatory bodies so as to make m-commerce and e-commerce affordable and accessible for all Saudi users

If the Saudi Government would like to improve the m-transaction adoption rate by Saudi users, then they would need to consider the following:

- Saudi government is recommended to enforce supportive strategies that resolve consumer concerns regarding network failures, for instance, increase investments in ICT infrastructure to improve network quality
- Saudi government is recommended to design policies which focus on improving the ICT infrastructure along with easy and wide-scale accessibility to 3G and 4G services
- Saudi government is recommended to organize educational programmes, awareness campaigns and training sessions for users, as well as organizations so that people can be familiarized with the benefits and features of m-transactions
- At national level, Saudi government should strive to achieve high standards of quality infrastructure to promote community-wide internet usage and m-transactions
- Saudi regulatory authorities such as ICT regulatory board is recommended to issue service licenses to ICT service providers and network operators in the public, as well as private communications sectors
- The ICT regulatory board is recommended to create and maintain a healthy competitive environment to encourage ICT service providers to facilitate users with a high quality of online services at an affordable rate and at a better network speed
- In compliance with Shariah laws, Saudi government is recommended to enforce cyber laws that encourage Saudi communities towards the use of m-transactions

12.5 Research Contribution

This research is one of the very first to explore and identify the critical factors that influence the intention to use mobile transactions in Saudi Arabia, from the perspective of the users. It is also the first study to employ and utilize a triangulation approach (i.e. qualitative and quantitative methodologies) to investigate mobile transaction use in Saudi Arabia. In this respect, the present study is a pioneering one within the Saudi Arabian context. Furthermore, this study considers the cultural background of the targeted sample, turning into a study with unique combinations. In order to ensure its maturity, the research evolved through several phases, with each phase providing results and its own contribution (see *Chapter 7: Research Conceptual Framework* for more details). Furthermore, the ultimate contribution of this study is its unique developed framework, which encompasses distinctive constructs and their specific interdependency to represent the most important preceding factors for mobile transaction usage in Saudi Arabia.

12.5.1 Contribution to Knowledge

This research contributes to knowledge and add to the relevant literature in a number of ways. These include: the outline of the key relevant literature review, the research findings and analysing of data, testing the applicability of the proposed framework and hypotheses, the research methodologies, instruments and tools; and the usability testing results and recommendations.

The research objectives were accomplished as detailed below:

(1) An exploratory phase was used at the beginning of the research; this comprised a review of the literature concerned with m-transaction adoption in developing countries, followed by exploratory studies. The results of this phase led to the development of a multi-perspective framework, which enabled the researcher to identify the theoretical perspectives that could be employed to investigate m-transaction adoption in developing countries. In line with previous studies in this field, the results of these exploratory studies were used to extend and confirm the contextual factors, enabling the researcher to refine the study's framework, and formulate the propositions (2) The qualitative findings of the exploratory studies above were valuable as they were then employed to investigate the adoption of m-transactions in Saudi Arabia from the users' perspective; they increased the researcher's understanding of the issues influencing m-transaction adoption within the country. In the explanatory phase that followed, the research problem was expressed in a testable structure, and a large survey was conducted in order to collect quantitative data. This data was analysed in (3) The objective was to discover the specific factors that affect people's decisions to adopt m-transactions. (4) The final analysis of the findings from all of the different phases revealed the system and user implications related to the adoption of m-transactions in developing countries such as Saudi Arabia. This resulted in several methodological and theoretical conclusions, which are discussed in the following paragraphs. This research has increased our comprehension of the adoption of m-transactions in developing countries in a unique way due to its mixed-method approach. Specifically, it has shown the appropriateness of beginning with a qualitative exploratory stage; this made valuable contributions to the design of the research framework, and also helped to explain the research findings. In addition, the studies within this research have shown the applicability of response-driven sampling through social networks. This clearly increased the response rate of participants, thus supporting findings by prior studies in Saudi Arabia (Al-Maliki, 2005; Aldwsry, 2012). A high response rate was also encouraged by personal visits and the social influence of peers, which highlighted the importance of this approach and social influence as a factor in the decision to participate in research. A valuable theoretical contribution has been made through the validation of the constructs employed in the research framework; these can now be employed by other researchers in this field, for example to investigate other emerging IT innovations, such as electronic commerce and social network applications.

As demonstrated above, this research has extended the innovation adoption literature and has enriched understanding of the innovation adoption process from the user's perspective. More importantly, this research is one of the few that has explored the adoption of m-transactions by focussing on and examining its issues with a multi-perspective approach, integrating determinants from different aspects. It is thus able to provide researchers in the field with a broader understanding of the factors that influence the decision to adopt this new technology. This research considers: the previous work (literature review) on m-transactions which was mainly focused on developed countries; the actual Saudi consumers' concerns and opinions; and the well-known acceptance theory (UTAUT) to develop a comprehensive framework of intention to use m-transactions within the Saudi Arabian context.

12.5.2 Contribution to Theory

Theoretically, this study examines the applicability of the proposed model/framework of the intention to use m-transactions in Saudi Arabia. This framework, as a supporting point, embraces the Technology Acceptance Model (TAM) which is well-established and has been used extensively in research on information technology acceptance (Davis, 1989). This will give a further dimension to the study, which will provide the opportunity to test one of the most cited and accessed theoretical acceptance models (cited by more than 14,400 according to *MIS Quarterly* (2012)), in a different environment from the one in which the model originated (i.e. the USA). This will give researchers further encouragement to use this framework, or to adopt it in their future studies.

12.5.3 Contribution to Practice

Practically, the outcome and developed approach of this research would be of particular interest to industries and several different parties, for example, telecommunication and mobile service providers focusing on investing in mobile commerce in general, and in m-transactions in particular. The government can also benefit from this research in its future plans and strategies, to better support and provide the necessary infrastructure for the development of m-transactions. Moreover, the findings of this research will help the market stakeholders to better understand their potential customers' needs and concerns about m-transactions, so that they can address them in their planning of future service provision, to guarantee its success. Furthermore, designers and evaluators and website owners aiming to design, develop, and evaluate mobile commerce websites for the Saudi Arabian market should benefit greatly from the research's results and recommendations.

The Figure 12.1 illustrates a set of blocks to show how this framework could be adapted to other countries. in details, each block represent factors which could be likely applied to other countries and where there is an attention needed before applying the other factors. For example, the block which got the tick mark (✓) indicates that those factors are highly applicable to most countries because those factors seems to be essential for any system to be adapted (e.g. ease of use) and the literature has supported their importance (as discussed in Chapter 7, Section 4.1). moreover, the block which got the exclamation mark (!) indicates that those factors are likely applicable to other countires, yet it may need to be checked before applying them because those factors would be different from country to another. For example, country with high income or got a variety of services providers and options (e.g. western countries) usually cost is not a concern to them. Finally the block which got a double exclamation mark (!!) indicates that those factors are usually different from one country to another. For example, the culture aspects and perceptions for Saudi is different to the western country. Saudi society tends to be a conservative society where western countries tend to be liberal societies.

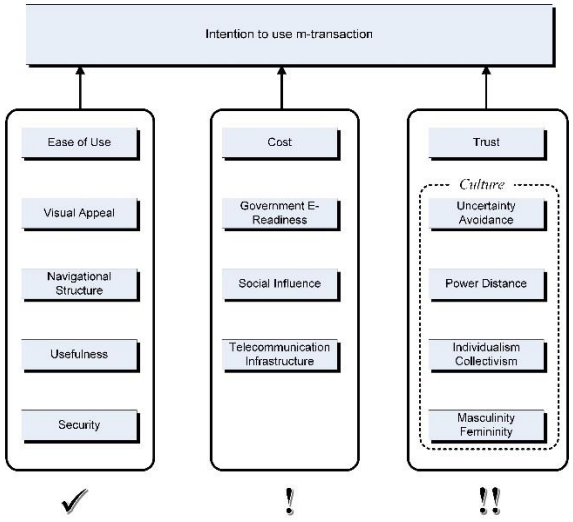

Figure 12.1: Applying The Research Framework to Other Countries.

12.6 Future Research

The research covered many aspects of the conceptual framework developed on Saudi consumers' intention to use m-transactions; however, there are areas that still need to be investigated. In the light of the above listed limitations of this research, there are some recommended areas that can help future researchers to carry out constructive investigations in this discipline. Future researchers are recommended to conduct a detailed comparative study of user acceptance in the urban and rural areas of Saudi Arabia so as to identify similar and distinct variables that shape user acceptance of m-transactions. In this discipline, future work is recommended to conduct a thorough review of government policies and identify improvements in the existing regulatory framework that can help ICT service providers to promote the use of m-transactions in Saudi Arabia. Furthermore, another study is encouraged to recruit more female' responses and to compare the results to the current research findings.

12.7 Conclusion

In conclusion, this research has developed a conceptual framework that identifies potential forces affecting Saudi communities' intentions to use mobile transactions. Qualitative assessment of data extracted from an extensive literature review indicates that the intention to use m-transactions is vulnerable to a list of variables, which can be categorized as social, technological, personal and organizational factors. In support of literature, quantitative evaluation of data collected through validation and exploratory studies shows that culture is one of the integrally important factors that affect user acceptance of m-transactions in Saudi Arabia. The research findings suggest that being an Islamic country, culture with its unique characteristics plays a significant role in affecting the use and implementation of online services and m-transactions in Saudi Arabia.

The research also concludes that weak infrastructure and less supportive regulatory frameworks are amongst the factors that discourage all those users who wish to gain the benefits of m-transactions. In Saudi Arabia, the government has indeed taken steps to improve the ICT infrastructure; however, given the pace of technological development and changing social preferences, these initiatives are not sufficient. The above summary of key findings of the research portrays ease of use, usefulness, security, trust, government e-readiness and awareness as the lead factors that influence acceptance and adoption of m-transactions in Saudi Arabia. All of the evidence collected through this mixed method research are well supported with relevant literature. Thus both exploratory and validation

studies recognized ease of use as the main and most important influential factor to shape user acceptance and adoption of m-transactions in Saudi Arabia.

The present study is expected to make multiple contributions on practical as well as theoretical aspects. The study is pioneering in its nature to identifying and evaluating factors that influence the intentions to use m-transactions in Saudi Arabia using a triangulated and mixed method approach. In addition to previously tested factors affecting m-transactions usage from earlier literature, the present study added cultural aspects of users as a critical influencing factor on technology adoption and usage. In terms of contribution to literature, the present study extended the innovation adoption literature, particularly mobile transactions, and enriches the already established understanding of the innovation adoption process from the user's perspective. As for its theoretical contribution, the present study examines the application of Technology Acceptance Model in a different context from where this model has originated. This provides a wider application of generalizibilty of the model. In practice, the study contributes towards better understanding of consumer intentions to use mobile transactions amongst Saudi people which might be helpful for mobile service providers who are investing in mobile commerce in general and mobile transactions in particular. Moreover, the government policy makers and regulators can also benefit from this research in their future plans and strategies to better support and provide the necessary infrastructure for the development of m-transactions. Furthermore, the companies providing mobile commerce services and hardware interfaces can also benefit from the findings of this study in terms of gaining a better understanding of their potential customers' needs and concerns about m-transactions, and so can design, develop, and evaluate improved mobile commerce websites for the Saudi Arabian market.

The overall aim of this research is to investigate m-transaction adoption in developing countries from the users' perspective, taking Saudi Arabia as a case study. The researcher believes that this aim is met by developing the framework which contains the significant factors that affect the intention to use m-transaction in Saudi Arabia. Furthermore, the relationships in this model were investigated, tested and analysed. The outcomes were discussed accordingly and future work was suggested. The researcher's personal view is that he believes research never finishes and always there is always something new to learn. In simple words, the researcher believes that although there are many important factors for m-transaction in Saudi Arabia, ease of use is highly significant for the Saudi user. This is because the Saudi user is very concerned with uncertainty avoidance and does not tolerate difficulty or complexity in using or adopting a new innovation.

REFERENCES

Abanumy, A N. 2006. *Developing a Framework for Assessing Quality of E-Government Websites of Saudi Ministries.* PhD, Universiy of East Anglia, Norwich.

Agarwal, R & Prasad, J 1997, 'The Role of Innovation Characteristics and Perceived Voluntariness in the Acceptance of Information Technologies'. *Decision Sciences,* vol. 28, pp. 557-582.

Aibinu, A A & Al-Lawati, A M 2010, 'Using Pls-Sem Technique to Model Construction Organizations' Willingness to Participate in E-Bidding'. *Automation in Construction,* vol. 19, no. 6, pp. 714-724.

Ajzen, I 1991, 'The Theory of Planned Behavior'. *Organizational behavior and human decision processes,* vol. 50, no. 2, pp. 179-211.

Ajzen, I & Fishbein, M 1980, 'Understanding Attitudes and Predicting Social'. *Behaviour. Englewood Cliffs, NJ: Prentice-Hall*.

Al-Badi, A 2005, 'A Framework for Designing Usable Localised Websites'. *Unpublished PhD Thesis, University of East Anglia*, pp. 1-357.

Al-Gahtani, S S, Hubona, G S & Wang, J 2007, 'Information Technology (It) in Saudi Arabia: Culture and the Acceptance and Use of It'. *Information & Management,* vol. 44, no. 8, pp. 681-691.

Al-Ghaith, W, Sanzogni, L & Sandhu, K 2010, 'Factors Influencing the Adoption and Usage of Online Services in Saudi Arabia'. *The Electronic Journal on Information Systems in Developing Countries,* vol. 40, no. 1, pp. 1-32.

Al-Jabri, I M & Sohail, M S 2012, 'Mobile Banking Adoption: Application of Diffusion of Innovation Theory'. *Journal of Electronic Commerce Research,* vol. 13, no. 4, pp. 379-391.

Al-Maghrabi, T, Dennis, C & Vaux Halliday, S 2009, 'Adapting Tam and Ect: Continuance Intention of Eshopping in Saudi Arabia'. *European and Mediterranean Conference on Information Systems*, pp. 1-19.

Al-Maliki, S a-K 2005. It/Is Evaluation in Private Organisations in the Kingdom of Saudi Arabia. Unpublished Phd Thesis. Computing Sciences, University of East Anglia.

Al-Somali, S A 2011, 'Electronic Commerce Adoption: A Study of Business-to-Business Practice in Saudi Arabia'. *PhD Theses, Aston University*.

Al-Somali, S A, Gholami, R & Clegg, B 2009, 'An Investigation into the Acceptance of Online Banking in Saudi Arabia'. *Technovation,* vol. 29, no. 2, pp. 130-141.

Aldraehim, M, Edwards, S L & Watson, J. Year. "Cultural Impact on E-Service Use in Saudi Arabia: Results from Focus Groups". In, 2012 2012. IEEE, 744-750.

Aldwsry, M 2012, 'E-Commerce Diffusion in High-Income Developing Countries: Determinants of E-Commerce Adoption and Post-Adoption of Saudi Enterprises'.

Aleid, F, Rogerson, S & Fairweather, B 2009, 'Factors Affecting Consumers Adoption of Ecommerce in Saudi Arabia from a Consumers' Perspective'. *IADIS International Conference e-Commerce*, pp. 11-18.

Algethmi, M A 2014, 'Mobile Commerce Innovation in the Airline Sector: An Investigation of Mobile Services Acceptance in Saudi Arabia'.

Alghamdi, M M. 2011. *Factors Affecting E-Commerce Adoption in Saudi Arabia from the Consumer's Prespective* Master, University of East Anglia, Norwich.

Alghamdi, R, Drew, S & Al-Ghaith, W 2011, 'Factors Influencing E-Commerce Adoption by Retailers in Saudi Arabia: A Qualitative Analysis'. *The Electronic Journal of Information Systems in Developing Countries,* vol. 47, no. 7, pp. 1-23.

Alghamdi, R, Drew, S & Alhussain, T 2012a, 'A Conceptual Framework for the Promotion of Trusted Online Retailing Environment in Saudi Arabia'. *International Journal of Business and Management,* vol. 7, no. 5, pp. 140-150.

Alghamdi, R, Drew, S & Alkhalaf, S 2012b, 'Government Initiatives: The Missing Key for E-Commerce Growth in Ksa'. *arXiv preprint arXiv:1211.2398*.

Alghamdi, R, Nguyen, J, Nguyen, A & Drew, S 2012c, 'Factors Influencing E-Commerce Adoption by Retailers in Saudi Arabia: A Quantitative Analysis'. *International Journal of Electronic Commerce Studies,* vol. 3, no. 1, pp. 83-100.

Aloul, F A. Year. "Information Security Awareness in Uae: A Survey Paper". In, 2010 2010. Citeseer, 1-6.

Alqahtani, M, Al-Badi, A & Mayhew, P 2012, 'The Enablers and Disablers of E-Commerce: Consumers' Perspectives'. *The Electronic Journal of Information Systems in Developing Countries EJISDC,* vol. 54, no. 1, pp. 1-24.

Alqahtani, M, Al-Badi, A & Mayhew, P 2014a, 'Exploratory Study of M-Transaction: User's Perspectives'. *The Electronic Journal of Information Systems in Developing Countries,* vol. 60, no. 7, pp. 1-22.

Alqahtani, M, Alroobaea, R S & Mayhew, P J, 2014b, Building a Conceptual Framework for Mobile Transaction in Saudi Arabia: A User's Perspective, in *Science and Information Conference (SAI)*, IEEE.

Alrobai, A A, Al-Badi, R & Mayhew, P 2012, 'Investigating the Usability of E-Catalogue Systems: Modified Heuristics Vs. User Testing'. *Journal of Technology Research*.

Alroobaea, R, Al-Badi, A & Mayhew, P 2013a, 'Generating a Domain Specific Inspection Evaluation Method through an Adaptive Framework: A Comparative Study on Educational Websites'. *International Journal of Human Computer Interaction (IJHCI),* vol. 4, no. 2, pp. 88.

Alroobaea, R, Al-Badi, A H & Mayhew, P J 2013b, 'Generating a Domain Specific Inspection Evaluation Method through an Adaptive Framework'. *International Journal of Advanced Computer Science and Applications (IJACSA),* vol. 4, no. 6.

Alroobaea, R & Mayhew, P J, 2014, How Many Participants Are Really Enough for Usability Studies?, in *Science and Information Conference (SAI)*, IEEE.

Alshamari, M & Mayhew, P, 2008, Task Design: Its Impact on Usability Testing, in *The Third International Conference on Internet and Web Applications and Services*, IEEE, 08-13 June.

Alshehri, H & Meziane, F 2011, 'Developing a Framework for the Implementation of E-Commerce in Saudi Arabia'.

Alshehri, H & Meziane, F. Year. "An Investigation into Saudi Online Shoppers' Behaviour Abroad". In*:* Developments in eSystems Engineering (DeSE), 2013 Sixth International Conference on, 16-18 Dec. 2013 2013. 323-327.

Alsukkar, A. 2005. *The Application of Information System in the Jordanian Banking Sector: A Study of the Acceptance of the Internet.* Ph.D., University of Wollongong, New South Wales, Australia.

Amoroso, D L & Magnier-Watanabe, R 2012, 'Building a Research Model for Mobile Wallet Consumer Adoption: The Case of Mobile Suica in Japan'. *Journal of theoretical and applied electronic commerce research,* vol. 7, no. 1, pp. 94-110.

Andam, Z R 2003, 'E-Commerce and E-Business'. *e-ASEAN Task Force and UNDP-APDIP*, pp. 1-47.

Arastehfar, S, Liu, Y & Lu, W F 2014, 'A Framework for Concept Validation in Product Design Using Digital Prototyping'. *Journal of Industrial and Production Engineering,* vol. 31, no. 5, pp. 286-302.

Arthur D. Little 2004. Global M-Payment Report 2004. Vienna.

Au, Y A & Kauffman, R J 2008, 'The Economics of Mobile Payments: Understanding Stakeholder Issues for an Emerging Financial Technology Application'. *Electron. Commer. Rec. Appl.*, vol. 7, no. 2, pp. 141-164.

Azrin, N H, Holz, W, Ulrich, R & Goldiamond, I 1961, 'The Control of the Content of Conversation through Reinforcement'. *Journal of the Experimental Analysis of Behavior,* vol. 4, no. 1, pp. 25-30.

Ba, S & Pavlou, P A 2002, 'Evidence of the Effect of Trust Building Technology in Electronic Markets: Price Premiums and Buyer Behavior'. *MIS Quarterly,* vol. 26, no. 3, pp. 243-268.

Bamasak, O 2011, 'Exploring Consumers Acceptance of Mobile Payments – an Empirical Study'. *Int. J. Information Technology, Communications and Convergence,* vol. 1, no. 2, pp. 173-185.

Bangor, A, Kortum, P & Miller, J 2009, 'Determining What Individual Sus Scores Mean: Adding an Adjective Rating Scale'. *Journal of usability studies,* vol. 4, no. 3, pp. 114-123.

Bangor, A, Kortum, P T & Miller, J T 2008, 'An Empirical Evaluation of the System Usability Scale'. *Intl. Journal of Human–Computer Interaction,* vol. 24, no. 6, pp. 574-594.

Barclay, D, Higgins, C & Thompson, R 1995, 'The Partial Least Squares (Pls) Approach to Causal Modeling: Personal Computer Adoption and Use as an Illustration'. *Technology studies*, vol. 2, no. 2, pp. 285-309.

Barnes, S J 2002, 'The Mobile Commerce Value Chain: Analysis and Future Developments'. *International Journal of Information Management*, vol. 22, no. 2, pp. 91-108.

Barnum, C M 2010, *Usability Testing Essentials: Ready, Set... Test!*, Elsevier.

Bbc. 2012. *Development and Health* [Online]. London: BBC. Available: http://www.bbc.co.uk/scotland/education/int/geog/health/revision/question2_physical.shtml [Accessed December 17, 2012].

Beiske, B 2007, 'Research Methods: Uses and Limitations of Questionnaires, Interviews and Case Studies'. *GRIN Verlag*, pp. 1-11.

Benbunan-Fich, R 2001, 'Using Protocol Analysis to Evaluate the Usability of a Commercial Web Site'. *Information & Management*, vol. 39, no. 2, pp. 151-163.

Bennett, C & Regan, P 2004, 'Editorial: Surveillance and Mobilities Surveillance & Society'. vol. 4, no. 449-455.

Bhalla, M R & Bhalla, A V 2010, 'Generations of Mobile Wireless Technology: A Survey'. *International Journal of Computer Applications*, vol. 5, no. 4, pp. 26-32.

Bjerke, B & Al-Meer, A 1993, 'Culture's Consequences: Management in Saudi Arabia'. *Leadership & Organization Development Journal*, vol. 14, no. 2, pp. 30-35.

Blake, B F, Valdiserri, C M, Neuendorf, K A & Valdiserri, J N 2007, 'The Online Shopping Profile in the Cross-National Context: The Roles of Innovativeness and Perceived Innovation Newness'. *Journal of International Consumer Marketing*, vol. 19, no. 3, pp. 23-51.

Bollen, K A 1998, *Structural Equation Models*, Wiley Online Library.

Braak, J V & Tearie, P 2007, 'The Computer Attributes for Learning Scale (Cals) among University Students: Scale Development and Relationship with Actual Compurter Use for Learning.'. *Computers in Human Behavior*, vol. 23, no. 2966-2982.

Breiman, L & Friedman, J H 1985, 'Estimating Optimal Transformations for Multiple Regression and Correlation'. *Journal of the American statistical Association*, vol. 80, no. 391, pp. 580-598.

Brooke, J 1996, 'Sus-a Quick and Dirty Usability Scale'. *Usability evaluation in industry*, vol. 189, pp. 194.

Brown, S A & Venkatesh, V 2005, 'Model of Adoption of Technology in Households: A Baseline Model Test and Extension Incorporating Household Life Cycle'. *MIS Quarterly*, vol. 29, no. 3, pp. 399-426.

Bryman, A 2004, *Social Research Methods*, second ed. edn, Oxford University Press, New York.

Bryman, A & Bell, E 2003, *Business Research Methods*, Oxford University Press, New York.

Bryman, A & Bell, E 2007, *Business Research Methods*, 2nd edn, Oxford University Press, Oxford New York.

Buil, I, De Chernatony, L & Martinez, E 2012, 'Methodological Issues in Cross-Cultural Research: An Overview and Recommendations'. *J Target Meas Anal Mark*, vol. 20, no. 3-4, pp. 223-234.

Buranatrived, J & Vickers, P. Year. "An Investigation of the Impact of Mobile Phone and Pda Interfaces on the Usability of Mobile-Commerce Applications". In*:* Proceedings of IEEE International Workshop on Networked Appliances, 2002 Liverpool. IEEE, 90-95.

Burke, R R 2002, 'Technology and the Customer Interface: What Consumers Want in the Physical and Virtual Store'. *Journal of the academy of Marketing Science*, vol. 30, no. 4, pp. 411-432.

Calder, B J 1977, 'Focus Groups and the Nature of Qualitative Marketing Research'. *Journal of Marketing Research*, vol. 14, no. 3, pp. 353-364.

Campbell, S W & Russo, T C 2003, 'The Cocial Construction of Mobile Telephony: An Application of the Social Influence Model to Perceptions and Uses of Mobile Phones within Personal Communication Networks'. *Communication Monographs, Routledge*, vol. 70, no. 4, pp. 317-334.

Carmines, E G & Zeller, R A 1979, *Reliability and Validity Assessment*, Sage.

Central Department of Statistics & Information. 2010. *Population Estimates by Province & Administrative Area 2010 - 2025* [Online]. Kingdom of Saudi Arabia: Central Department

of Statistics & Information. Available: http://www.cdsi.gov.sa/pdf/PopulationEstimates2010-2025-admareas.pdf [Accessed 09 November 2013].

Chang, S-H, Chou, C-H & Yang, J-M 2010, 'The Literature Review of Technology Acceptance Model: A Study of the Bibliometric Distributions'. *PACIS 2010 Proceedings*, pp. 1-8.

Chen, J J & Adams, C, 2005, User Acceptance of Mobile Payments: A Theoretical Model for Mobile Payments, in *Proceedings of the Fifth International Conference on Electronic Business*.

Chen, L-D 2008, 'A Model of Consumer Acceptance of Mobile Payment'. *International Journal of Mobile Communications*, vol. 6, no. 1, pp. 32-52.

Chen, L-D & Tan, J 2004, 'Technology Adaptation in E-Commerce:: Key Determinants of Virtual Stores Acceptance'. *European Management Journal*, vol. 22, no. 1, pp. 74-86.

Cheong, C P, Fong, S & Lei, P 2007, 'Efficient and Secure Card-Based Payment System Based on Ansi X9.59-2006'. *E-Commerce Technology and the 4th IEEE International Conference on Enterprise Computing, E-Commerce, and E-Services, 2007. CEC/EEE 2007. The 9th IEEE International Conference on*, pp. 247-254.

Cheong, J H & Park, M-C 2005, 'Mobile Internet Acceptance in Korea'. *Internet Research*, vol. 15, no. 2, pp. 125-140.

Cheong, J H & Park, M-C 2008, 'Mobile Payment Adoption in Korea: Switching from Credit Card'. *In 15th International Telecommunication SocietyEurope Regional Conference.*, pp. 1-22.

Cheong, J H, Park, M-C & Hwang, J H 2008, 'Mobile Payment Adoption in Korea: Switching from Credit Card'. *15th International Telecommunication SocietyEurope Regional Conference*, pp. 1-22.

Chin, W W 1998a. Commentary: Issues and Opinion on Structural Equation Modeling. JSTOR.

Chin, W W 1998b, 'The Partial Least Squares Approach to Structural Equation Modeling'. *Modern methods for business research*, vol. 295, no. 2, pp. 295-336.

Chin, W W & Newsted, P R 1999, 'Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares'. *Statistical strategies for small sample research*, vol. 1, no. 1, pp. 307-341.

Chong, A Y-L, Chan, F T S & Ooi, K-B 2012a, 'Predicting Consumer Decisions to Adopt Mobile Commerce: Cross Country Empirical Examination between China and Malaysia'. *Decision Support Systems*, vol. 53, no. 1, pp. 34-43.

Chong, A Y-L, Ooi, K-B, Lin, B & Bao, H 2012b, 'An Empirical Analysis of the Determinants of 3g Adoption in China'. *Computers in Human Behavior*, vol. 28, no. 2, pp. 360-369.

Choudhury, V & Karahanna, E 2008, 'The Relative Advantage of Electronic Channels: A Multidimensional View'. *MIS Quarterly*, vol. 32, no. 1, pp. 179-200.

Christozov, D G & Mateev, P S 2003, 'Warranty as a Factor for E-Commerce Success'. *Informing Science + IT Education Conference. Pori, Finland*, pp. 491-495.

Chung, I-K & Lee, M-M 2003, 'A Study of Influencing Factors for Repurchase Intention in Internet Shopping Malls'. *Parallel and Distributed Processing Symposium, 2003. Proceedings. International*, pp. 7.

Clifford, M, Lavine, C & Bishop, M 1998, 'The Solar Trust Model: Authentication without Limitation'. *Computer Security Applications Conference*, pp. 300-307.

Cohen, J 2013, *Statistical Power Analysis for the Behavioral Sciences*, Routledge Academic.

Cohen, L, Manion, L & Morrison, K 2000, 'Research Methods in Education [5 Th Edn] London: Routledge Falmer'. *Teaching in Higher Education*, vol. 41.

Compeau, D R & Higgins, C A 1995a, 'Computer Self-Efficacy: Development of a Measure and Initial Test'. *MIS Quarterly*, vol. 19, no. 2, pp. 189-211.

Compeau, D R & Higgins, C A 1995b, 'Computer Self-Efficacy: Development of a Measure and Initial Test'. *MIS quarterly*, pp. 189-211.

Conrad, E D. 2009. *Willingness to Use It Innovations: A Hybrid Approach Employing Diffusion of Innovations and Technology Acceptance Models.* PhD, Southern Illinois University, Carbondale.

Corbin, J & Strauss, A 2008, *Basics of Qualitative Research:Techniques and Procedures for Developing Grounded Theory, 3rd Ed.*, 3 edn, Thousand Oaks, Calif. ; London : SAGE Publications.

Corbitt, B J, Thanasankit, T & Yi, H 2003, 'Trust and E-Commerce: A Study of Consumer Perceptions'. *Electronic Commerce Research and Applications,* vol. 2, no. 3, pp. 203-215.

Corner, J L, Thompson, F & Thompson, F 2005, 'Perceived Risk, the Internet Shopping Experience and Online Purchasing Behavior: A New Zealand Perspective'. *Journal of Electronic Commerce in Organizations,* vol. 13, no. 2, pp. 324-326.

Creswell, J W 2003, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches,* 2nd edn, Sage Publications, Inc., Thousand Oaks, California.

Creswell, J W & Clark, V L P 2011, *Designing and Conducting Mixed Methods Research,* 2nd edn, SAGE Publications, Inc.

Cronbach, L J 1951, 'Coefficient Alpha and the Internal Structure of Tests'. *psychometrika,* vol. 16, no. 3, pp. 297-334.

Dahlberg, T, Mallat, N, Ondrus, J & Zmijewska, A 2008, 'Past, Present and Future of Mobile Payments Research: A Literature Review'. *Electronic Commerce Research and Applications,* vol. 7, no. 2, pp. 165-181.

Dahlberg, T, Mallat, N & Öörni, A 2003a, 'Trust Enhanced Technology Acceptance Model - Consumer Acceptance of Mobile Payment Solutions'. *Stockholm Mobility Roundtable,* pp. 1-10.

Dahlberg, T, Mallat, N & Öörni, A 2003b, 'Trust Enhanced Technology Acceptance Model – Consumer Acceptance of Mobile Payment Solution'. *Proceedings of the CIC roundtable 2003,* pp. 1-10.

Dai, H & Palvia, P C 2009, 'Mobile Commerce Adoption in China and the United States: A Cross-Cultural Study'. *SIGMIS Database,* vol. 40, no. 4, pp. 43-61.

Dass, R & Pal, S, 2011, Exploring the Factors Affecting the Adoption of Mobile Financial Services among the Rural under-Banked and Its Implications for Micro-Finance Institutions, in *European Conference of Information Systems -2011*, Helsinki, Finland.

Davis, F 1989, 'Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology'. *MIS Quarterly,* vol. 13, no. 3, pp. 319-340.

Davis, F D. 1986. *A Technology Acceptance Model for Empirically Testing New End-User Information System: Theory and Result.* PhD, Massachusetts Institute of Technology.

Davis, F D, Bagozzi, R P & Warshaw, P R 1989, 'User Acceptance of Computer Technology: A Comparison of Two Theoretical Models'. *Management Science,* vol. 35, no. 8, pp. 982-1003.

Davis, F D, Bagozzi, R P & Warshaw, P R 1992, 'Extrinsic and Intrinsic Motivation to Use Computers in the Workplace1'. *Journal of applied social psychology,* vol. 22, no. 14, pp. 1111-1132.

Dewan, S G & Chen, L-D 2005, 'Mobile Payment Adoption in the USA: A Cross-Industry, Cross-Platform Solution'. *Journal of Information Privacy & Security,* vol. 1, no. 2, pp. 4-28.

Ding, X, Ijima, J & Ho, S. 2004. *Unique Features of Mobile Commerce.* Graduate School of Decision Science and Technolog, TITECH, Tokyo

Dori, D 2002, *Object-Process Methodology: A Holistic Systems Paradigm; with Cd-Rom,* Springer.

Drew, S 2003, 'Strategic Uses of Ecommerce by Smes in the East of England'. *European Management Journal,* vol. 21, no. 1, pp. 79-88.

Dumas, J S & Redish, J 1999, *A Practical Guide to Usability Testing,* Intellect Books.

Easterby-Smith, M, Thorpe, R & Jackson, P 2012, *Management and Business Research,* Sage Publications, London.

Eastin, M S 2002, 'Diffusion of E-Commerce: An Analysis of the Adoption of Four E-Commerce Activities'. *Telematics and Informatics,* vol. 19, no. 3, pp. 251-267.

Eid, M I 2011, 'Determinants of E-Commerce Customer Satisfaction, Trust, and Loyalty in Saudi Arabia'. *Journal of Electronic Commerce Research,* vol. 12, no. 1, pp. 78-93.

Elliott, G & Phillips, N 2003, *Mobile Commerce and Wireless Computing Systems,* Pearson Education.

Ericsson, K A & Simon, H A 1998, 'How to Study Thinking in Everyday Life: Contrasting Think-Aloud Protocols with Descriptions and Explanations of Thinking'. *Mind, Culture, and Activity,* vol. 5, no. 3, pp. 178-186.

Erumban, A A & De Jong, S B 2006, 'Cross-Country Differences in Ict Adoption: A Consequence of Culture?'. *Journal of World Business,* vol. 41, no. 4, pp. 302-314.

Escobar-Rodríguez, T & Carvajal-Trujillo, E 2014, 'Online Purchasing Tickets for Low Cost Carriers: An Application of the Unified Theory of Acceptance and Use of Technology (Utaut) Model'. *Tourism Management*, vol. 43, no. 0, pp. 70-88.

Eysenbach, G & Till, J E 2011, 'Ethical Issues in Qualitative Research on Internet Communities'. *Bmj*, vol. 323, no. 7321, pp. 1103-1105.

Faqih, K M S & Jaradat, M-I R M 2015, 'Assessing the Moderating Effect of Gender Differences and Individualism-Collectivism at Individual-Level on the Adoption of Mobile Commerce Technology: Tam3 Perspective'. *Journal of Retailing and Consumer Services*, vol. 22, no. 0, pp. 37-52.

Farhoomand, A F, Tuunainen, V K & Yee, L W 2000, 'Barriers to Global Electronic Commerce: A Cross-Country Study of Hong Kong and Finland'. *Journal of Organizational Computing and Electronic Commerce*, vol. 10, no. 1, pp. 23-48.

Fernandes, A D 2001, 'Risking "Trust" in a Public Key Infrastructure: Old Techniques of Managing Risk Applied to New Technology'. *Decision Support Systems*, vol. 31.

Fishbein, M & Ajzen, I 1975, *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley.

Forman, C 2005, 'The Corporate Digital Divide: Determinants of Internet Adoption'. *Management Science*, vol. 51, no. 4, pp. 641-654.

Fornell, C & Bookstein, F L 1982, 'Two Structural Equation Models: Lisrel and Pls Applied to Consumer Exit-Voice Theory'. *Journal of Marketing research*, pp. 440-452.

Fornell, C & Larcker, D F 1981, 'Evaluating Structural Equation Models with Unobservable Variables and Measurement Error'. *Journal of marketing research*, pp. 39-50.

Furneaux, B. 2005. Diffusion of Innovation. Theories Used in Is Research. Available: http://www.istheory.yorku.ca/diffusionofinnovations.htm [Accessed February 2, 2012].

Gartner Inc. 2009. Gartner Group Dataquest Insight: Mobile Payment, 2007–2012. Stamford, CT.

Gaskin, J. 2012. *Some General Guidelines for the Order to Conduct Each Procedure* [Online]. Gaskination's StatWiki. Available: http://statwiki.kolobkreations.com/wiki/Main_Page [Accessed 03-April 2014].

Gefen, D, Rigdon, E E & Straub, D W 2011, 'Editor's Comment: An Update and Extension to Sem Guidelines for Administrative and Social Science Research'. *MIS Quarterly*, vol. 35, no. 2, pp. iii-xiv.

Gefen, D, Straub, D & Boudreau, M-C 2000, 'Structural Equation Modeling and Regression: Guidelines for Research Practice'. *Communications of the association for information systems*, vol. 4, no. 1, pp. 7.

Gefen, D & Straub, D W 2004, 'Consumer Trust in B2c E-Commerce and the Importance of Social Presence: Experiments in E-Products and E-Services'. *Omega*, vol. 32, no. 6, pp. 407-424.

Geisser, S 1974, 'A Predictive Approach to the Random Effect Model'. *Biometrika*, vol. 61, no. 1, pp. 101-107.

Gellman, R 1998, 'Does Privacy Law Work?', in Agre, P. & Rotenberg, M. (ed.), Technology and Privacy: The New Landscape MIT Press, Cambridge, , pp. 193-218.

Gerrard, P & Cunningham, J B 2003, 'The Diffusion of Internet Banking among Singapore Consumers'. *International Journal of Bank Marketing*, vol. 21, no. 1, pp. 16-28.

Gibbs, J, Kraemer, K L & Dedrick, J 2002, 'Environment and Policy Factors Shaping E-Commerce Diffusion: A Cross-Country Comparison'. *UC Irvine: Center for Research on Information Technology and Organizations.*, pp. 1-32.

Gibbs, J, Kraemer, K L & Dedrick, J 2003, 'Environment and Policy Factors Shaping Global E-Commerce Diffusion: A Cross-Country Comparison'. *The information society*, vol. 19, no. 1, pp. 5-18.

Giddens, A 1984, *The Constitution of Society: Outline of the Theory of Structuration*, University of California Press, Berkeley and Los Angeles.

Gillespie, D F 1995, 'Ethical Issues in Research'. *Encyclopedia of social work*, vol. 50, pp. l9th.

Goeke, L & Pousttchi, K. Year. "A Scenario-Based Analysis of Mobile Payment Acceptance". In*:* Mobile Business and 2010 Ninth Global Mobility Roundtable (ICMB-GMR), 2010 Ninth International Conference on, 13-15 June 2010 2010. 371-378.

Goyal, V, Pandey, U S & Batra, S 2012, 'Mobile Banking in India: Practices, Challenges and Security Issues'. *International Journal*, vol. 1, no. 2.

Grandon, E E & Pearson, J M 2004, 'Electronic Commerce Adoption: An Empirical Study of Small and Medium Us Businesses'. *Information & Management*, vol. 42, no. 1, pp. 197-216.

Grantham, A & Tsekouras, G 2005, 'Diffusing Wireless Applications in a Mobile World'. *Technology in Society*, vol. 27, no. 1, pp. 85-104.

Guba, E G & Lincoln, Y S 1994, 'Competing Paradigms in Qualitative Research'. *Handbook of qualitative research*, vol. 2, pp. 163-194.

Hair, J, Black, W, Babin, B & Anderson, R 2010, 'Multivariate Data Analysis: A Global Perspective: Pearson Education'.

Hair, J F, Ringle, C M & Sarstedt, M 2011, 'Pls-Sem: Indeed a Silver Bullet'. *The Journal of Marketing Theory and Practice*, vol. 19, no. 2, pp. 139-152.

Hair Jr, J F, Hult, G T M, Ringle, C & Sarstedt, M 2014, *A Primer on Partial Least Squares Structural Equation Modeling (Pls-Sem)*, SAGE Publications, Incorporated.

Harby, F A, Qahwaji, R & Kamala, M 2012, 'End-Users' Acceptance of Biometrics Authentication to Secure E-Commerce within the Context of Saudi Culture: Applying the Utaut Model'. *Globalization, Technology Diffusion and Gender Disparity: Social Impacts of ICTs*, pp. 225-246.

Hart, C 1998, *Doing a Literature Review: Releasing the Social Science Research Imagination*, Sage.

Hashemi, M R & Soroush, E. Year. "A Secure M-Payment Protocol for Mobile Devices". In*:* Electrical and Computer Engineering, 2006. CCECE '06. Canadian Conference on, May 2006 2006. 294-297.

Heckathorn, D D 1997, 'Respondent-Driven Sampling: A New Approach to the Study of Hidden Populations'. *Social problems*, vol. 44, no. 5, pp. 151-160.

Henseler, J, Ringle, C M & Sinkovics, R R 2009, 'The Use of Partial Least Squares Path Modeling in International Marketing'. *Advances in international marketing*, vol. 20, pp. 277-319.

Herman, L. Year. "Towards Effective Usability Evaluation in Asia: Cross-Cultural Differences". In, 1996 1996. IEEE, 135-136.

Hill, C E, Loch, K D, Straub, D & El-Sheshai, K 1998, 'A Qualitative Assessment of Arab Culture and Information Technology Transfer'. *Journal of Global Information Management (JGIM)*, vol. 6, no. 3, pp. 29-38.

Hobbs, R J & Norton, D A 1996, 'Towards a Conceptual Framework for Restoration Ecology'. *Restoration Ecology*, vol. 4, no. 2, pp. 93-110.

Hofstede, G 1980, *Culture's Consequences: International Differences in Work-Related Values*, Sage Publications, Beverly Hills CA.

Hofstede, G, Hofstede, G J & Minkov, M 2010, *Cultures and Organizations: Software of the Mind*, 3rd edn, McGraw-Hill USA, New York.

Hofstede, G H 2001, *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations*, 2nd edn, Sage Publications.

Holzinger, A 2005, 'Usability Engineering Methods for Software Developers'. *Commun. ACM*, vol. 48, no. 1, pp. 71-74.

Hongxia, P, Xianhao, X & Weidan, L. Year. "Drivers and Barriers in the Acceptance of Mobile Payment in China". In, 2011. IEEE, 1-4.

Hoque, Z 2006, *Methodological Issues in Accounting Research: Theories, Methods and Issues*, Spiramus Press Ltd.

Hornbaek, K & Frøkjeer, E 2008, 'A Study of the Evaluator Effect in Usability Testing'. *Human-Computer Interaction*, vol. 23, no. 3, pp. 251-277.

Hossain, M S. Year. "Performance Evaluation Web Testing for Ecommerce Web Sites". In*:* Informatics, Electronics & Vision (ICIEV), 2012 International Conference on, 18-19 May 2012 2012. 842-846.

Howcroft, B, Hamilton, R & Hewer, P 2002, 'Consumer Attitude and the Usage and Adoption of Home-Based Banking in the United Kingdom'. *International Journal of Bank Marketing*, vol. 20, no. 3, pp. 111 - 121.

Hsu, C & Lu, H 2007, 'Consumer Behavior in Online Game Communities: A Motivational Factor Perspective'. *Computers in Human Behavior*, vol. 23, pp. 1642-1659.

Hu, X, Li, W & Hu, Q. Year. "Are Mobile Payment and Banking the Killer Apps for Mobile Commerce?". In*:* Hawaii International Conference on System Sciences, Proceedings of the 41st Annual, 7-10 Jan. 2008 2008. 84-84.

Huang, H, Liu, L & Wang, J 2007, 'Diffusion of Mobile Commerce Application in the Market'. *Innovative Computing, Information and Control, 2007. ICICIC '07. Second International Conference on*, pp. 485-485.

Huberman, A M & Miles, M B 2002, 'The Qualitative Researcher's Companion'. *Thousand Oaks*.

Hulland, J 1999, 'Use of Partial Least Squares (Pls) in Strategic Management Research: A Review of Four Recent Studies'. *Strategic management journal*, vol. 20, no. 2, pp. 195-204.

Hyman, H H, Cobb, W J, Feldman, J J, Hart, C W & Stember, C H 1970, *Interviewing in Social Research*, University of Chicago Press Chicago.

Internet World Stats. 2012a. *Internet Usage Statistics the Internet Big Picture* [Online]. Bogota: Miniwatts Marketing Group. [Accessed 28/09/2012.

Internet World Stats 2012b. Internet Users in the World by Geographic Regions - 2012 Q2. Miniwatts Marketing Group.

Introna, L 1997, 'Privacy and the Computer: Why We Need Privacy in the Information Society'. *Metaphilosophy*, vol. 28, no. 3, pp. 259-275.

J.P. Morgan. 2011. *Global E-Commerce Revenue to Grow by 19 Percent in 2011 to $680b* [Online]. Available: http://techcrunch.com/2011/01/03/j-p-morgan-global-e-commerce-revenue-to-grow-by-19-percent-in-2011-to-680b/ [Accessed September 28, 2012].

Jakimoski, K 2014, 'Analysis of the Usability of M-Commerce Applications'. *International Journal of U- & E-Service, Science & Technology*, vol. 7, no. 6, pp. 13-20.

Jaradat, M-I R M & Al Rababaa, M S 2013, 'Assessing Key Factor That Influence on the Acceptance of Mobile Commerce Based on Modified Utaut'. *International Journal of Business and Management*, vol. 8, no. 23, pp. p102.

Jarvenpaa, S L & Lang, K R 2005, 'Managing the Paradoxes of Mobile Technology'. *Information Systems Management*, vol. 22, no. 4, pp. 7-23.

Jarvenpaa, S L & Todd, P A 1997, 'Consumer Reactions to Electronic Shopping on the World Wide Web'. *International Journal of Electronic Commerce*, vol. 1, no. 2, pp. 59-88.

Jaworski, B J, Stathakopoulos, V & Krishnan, H S 1993, 'Control Combinations in Marketing: Conceptual Framework and Empirical Evidence'. *The Journal of Marketing*, pp. 57-69.

Jennex, M E, Amoroso, D & Adelakun, O 2004, 'E-Commerce Infrastructure Success Factors for Small Companies in Developing Economies'. *Electronic Commerce Research*, vol. 4, no. 3, pp. 263-286.

Jick, T D 1979, 'Mixing Qualitative and Quantitative Methods: Triangulation in Action'. *Administrative science quarterly*, pp. 602-611.

Jin, J, Ji, P & Liu, Y 2014, 'Prioritising Engineering Characteristics Based on Customer Online Reviews for Quality Function Deployment'. *Journal of Engineering Design*, vol. 25, no. 7-9, pp. 303-324.

Johnson, P & Clark, M 2006. ''Mapping the Terrain: An Overview of Business and Management Research Methodologies', in Johnson, P. & Clark, M. (eds.), *Business and Management Research Methodologies*, Sage, London, pp.

Johnston, L G & Sabin, K 2010, 'Sampling Hard-to-Reach Populations with Respondent Driven Sampling'. *Methodological Innovations Online*, vol. 5, no. 2, pp. 38-48.

Kabbaj, M Y. 2003. *Strategic and Policy Prospects for Semantic Web Services Adoption in Us Online Travel Industry*. Master, Massachusetts Institute of Technology, Nantes.

Kallio, T & Kaikkonen, A 2005, 'Usability Testing of Mobile Applications: A Comparison between Laboratory and Field Testing'. *Journal of Usability studies*, vol. 1, no. 4-16, pp. 23-28.

Karnouskos, S, Hondroudaki, A, Vilmos, A & Csik, B, 2004, Security, Trust and Privacy in the Secure Mobile Payment Service in *3rd International Conference on Mobile Business*.

Kauffman, R J & Techatassanasoontorn, A A 2005, 'International Diffusion of Digital Mobile Technology: A Coupled-Hazard State-Based Approach'. *Information Technology and Management*, vol. 6, no. 2, pp. 253-292.

Khodawandi, D, Pousttchi, K & Wiedemann, D G, 2003, Akzeptanz Mobiler Bezahlverfahren in Deutschland, in *In Proceedings of the 3rd Workshop on Mobile Commerce*.

Kim, C, Mirusmonov, M & Lee, I 2010, 'An Empirical Examination of Factors Influencing the Intention to Use Mobile Payment'. *Computers in Human Behavior*, vol. 26, no. 3, pp. 310-322.

Kim, D J, Ferrin, D L & Rao, H R 2009, 'Trust and Satisfaction, Two Stepping Stones for Successful E-Commerce Relationships: A Longitudinal Exploration'. *Information Systems Research*, vol. 20, no. 2, pp. 237-257.

Kim, J & Moon, J Y 1998, 'Designing Towards Emotional Usability in Customer Interfaces—Trustworthiness of Cyber-Banking System Interfaces'. *Interacting with Computers*, vol. 10, no. 1, pp. 1-29.

Kim, K K & Prabhakar, B 2004, 'Initial Trust and the Adoption of B2c E-Commerce: The Case of Internet Banking'. *SIGMIS Database*, vol. 35, no. 2, pp. 50-64.

Kim, Y H & Kim, D J. Year. "A Study of Online Transaction Self-Efficacy, Consumer Trust, and Uncertainty Reduction in Electronic Commerce Transaction". In*:* System Sciences, 2005. HICSS '05. Proceedings of the 38th Annual Hawaii International Conference on, 03-06 Jan. 2005 2005. 170c-170c.

Kjeldskov, J & Stage, J 2004, 'New Techniques for Usability Evaluation of Mobile Systems'. *International journal of human-computer studies*, vol. 60, no. 5, pp. 599-620.

Klang, M 2001, 'Who Do You Trust? Beyond Encryption, Secure E-Business'. *Decision Support Systems*, vol. 31, no. 3, pp. 293-301.

Kluckhohn, C 1951, *The Study of Culture*.

Kothari, C R 2011, *Research Methodology: Methods and Techniques*, New Age International.

Kourouthanassis, P E & Giaglis, G M 2012, 'Introduction to the Special Issue Mobile Commerce: The Past, Present, and Future of Mobile Commerce Research'. *International Journal of Electronic Commerce*, vol. 16, no. 4, pp. 5-18.

Kraemer, K L, Dedrick, J, Melville, N & Zhu, K 2006, *Global E-Commerce: Impacts of National Environments and Policy*, Cambridge University Press, Cambridge.

Krathwohl, D R 1993, *Methods of Educational and Social Science Research: An Integrated Approach*, 2nd edn, Addison Wesley Longman.

Kreyer, N, Pousttchi, K & Turowski, K 2002a, 'Characteristics of Mobile Payment Procedures'. *Published in: The Thirteenth International Symposium on Methodologies for Intelligent Sytems (2002)*, pp. 10-22.

Kreyer, N, Pousttchi, K & Turowski, K 2002b, 'Standardized Payment Procedures as Key Enabling Factor for Mobile Commerce'. vol. 2455, pp. 383-390.

Krueger, P R A & Casey, M A 2009, *Focus Groups: A Practical Guide for Applied Research*, Sage Publications, Thousand Oaks.

Krueger, R A & Casey, M A 2002, 'Designing and Conducting Focus Group Interviews'. *Social Analysis, Selected Tools and Techniques", Krueger, RA, MA Casey, J. Donner, S. Kirsch and JN Maack*, pp. 4-23.

Kuhn, T S 1969, *The Structure of Scientific Revolutions, Postscript*, 3rd edn, The University of Chicago Press, Chicago.

Kurnia, S. Year. "E-Commerce Adoption in Developing Countries: An Indonesian Study". In, 2006. 14-16.

Land, F 1992, 'The Information Systems Domain'. *Information systems research: issues, methods and practical guidelines*, pp. 6-13.

Lassar, W M, Manolis, C & Lassar, S S 2005, 'The Relationship between Consumer Innovativeness, Personal Characteristics, and Online Banking Adoption'. *International Journal of Bank Marketing*, vol. 23, no. 2, pp. 176–199.

Laudon, K C & Traver, C G 2011, *E-Commerce : Business, Technology, Society, 7th Ed*, Pearson Prentice Hall, Boston, MA.

Lawrence, J E & Tar, U A 2010, 'Barriers to Ecommerce in Developing Countries'. *Information, Society and Justice*, vol. 3, no. 1, pp. 23-35.

Lee, C Y 2003, 'A New Marketing Strategy for E-Commerce'. *Informing Science + IT Education Conference. Pori, Finland*, pp. 301-307.

Lee Heng, W, Osman, M A, Zakaria, N & Tan, B. Year. "Adoption of E-Commerce Online Shopping in Malaysia". In*:* e-Business Engineering (ICEBE), 2010 IEEE 7th International Conference on, 10-12 Nov. 2010 2010. 140-143.

Lee, Y E & Benbasat, I 2003, 'Interface Design for Mobile Commerce'. *Communications of the ACM*, vol. 46, no. 12, pp. 48-52.

Legris, P, Ingham, J & Collerette, P 2003, 'Why Do People Use Information Technology? A Critical Review of the Technology Acceptance Model'. *Information & Management*, vol. 40, no. 3, pp. 191-204.

Levy, Y & Ellis, T J 2006, 'A Systems Approach to Conduct an Effective Literature Review in Support of Information Systems Research'. *Informing Science: International Journal of an Emerging Transdiscipline*, vol. 9, no. 1, pp. 181-212.

Lewis, J R 2006, 'Sample Sizes for Usability Tests: Mostly Math, Not Magic'. *interactions*, vol. 13, no. 6, pp. 29-33.

Li, H, Kuo, C & Russell, M G 1999, 'The Impact of Perceived Channel Utilities, Shopping Orientations, and Demographics on the Consumer's Online Buying Behavior'. *Journal of Computer-Mediated Communication*, vol. 5, no. 2.

Li, Y-M & Yeh, Y-S 2010, 'Increasing Trust in Mobile Commerce through Design Aesthetics'. *Computers in Human Behavior*, vol. 26, no. 4, pp. 673-684.

Lichtenstein, S & Williamson, K 2006, 'Understanding Consumer Adoption of Internet Banking: An Interpretive Study in the Australian Banking'. *Journal of Electronic Commerce Research*, vol. 7, no. 2, pp. 50-66.

Lim, A S 2008, 'Inter-Consortia Battles in Mobile Payments Standardisation'. *Electronic Commerce Research and Applications*, vol. 7, no. 2, pp. 202-213.

Linck, K, Pousttchi, K & Wiedemann, D G 2006, 'Security Issues in Mobile Payment from the Customer Viewpoint'. *14th European Conference on Information Systems (ECIS)*, pp. 1-11.

Littler, D & Melanthiou, D 2006, 'Consumer Perceptions of Risk and Uncertainty and the Implications for Behaviour Towards Innovative Retail Services: The Case of Internet Banking'. *Journal of Retailing and Consumer Services*, vol. 13, no. 6, pp. 431-443.

Liu, C, Marchewka, J T, Lu, J & Yu, C-S 2004, 'Beyond Concern: A Privacy–Trust–Behavioral Intention Model of Electronic Commerce'. *Information & Management*, vol. 42, no. 1, pp. 127-142.

Liu, Y, Jin, J, Ji, P, Harding, J A & Fung, R Y K 2013a, 'Identifying Helpful Online Reviews: A Product Designer's Perspective'. *Computer-Aided Design*, vol. 45, no. 2, pp. 180-194.

Liu, Y, Lim, S C J & Lee, W B 2013b, 'Product Family Design through Ontology-Based Faceted Component Analysis, Selection, and Optimization'. *Journal of Mechanical Design*, vol. 135, no. 8, pp. 081007-081007.

Liu, Y, Setchi, R, Tseng, V & Wang, F 2012, 'Editorial for the Special Issue of Service Computing and Service Oriented Enterprise Systems in Design, Manufacturing and Supply Chain'. *Journal of Intelligent Manufacturing*, vol. 23, no. 4, pp. 1327-1329.

Loch, K D, Straub, D W & Kamel, S 2003, 'Diffusing the Internet in the Arab World: The Role of Social Norms and Technological Culturation'. *Engineering Management, IEEE Transactions on*, vol. 50, no. 1, pp. 45-63.

Lowry, P B & Gaskin, J 2014, 'Partial Least Squares (Pls) Structural Equation Modeling (Sem) for Building and Testing Behavioral Causal Theory: When to Choose It and How to Use It'. *Professional Communication, IEEE Transactions on*, vol. 57, no. 2, pp. 123-146.

Lu, J, Yao, J E & Yu, C-S 2005, 'Personal Innovativeness, Social Influences and Adoption of Wireless Internet Services Via Mobile Technology'. *The Journal of Strategic Information Systems*, vol. 14, no. 3, pp. 245-268.

Lu, Y, Yang, S, Chau, P Y K & Cao, Y 2011, 'Dynamics between the Trust Transfer Process and Intention to Use Mobile Payment Services: A Cross-Environment Perspective'. *Information & Management*, vol. 48, no. 8, pp. 393-403.

Lyytinen, K & Damsgaard, J 2001, 'What's Wrong with the Diffusion of Innovation Theory? The Case of a Complex and Networked Technology'. *Proceedings of the IFIP TC8 WG8*, pp. 1-20.

Madhavan, R, Tunstel, E W & Messina, E R 2009, *Performance Evaluation and Benchmarking of Intelligent Systems*, Springer.

Maguire, M 2001, 'Context of Use within Usability Activities'. *International Journal of Human-Computer Studies*, vol. 55, no. 4, pp. 453-483.

Malhotra, N K & Birks, D F 2007, *Marketing Research: An Applied Approach*, Prentice Hall/Financial Times.

Malhotra, Y & Galletta, D, 1999, Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation, in *Proceedings of the 32nd Hawaii international conference on system sciences*, IEEE Computer Society Press.

Mallat, N, 2004, Theoretical Constructs of Mobile Payment Adoption, in *27th Information Systems Research Seminar in Scandinavia (IRIS)*.

Mallat, N 2007, 'Exploring Consumer Adoption of Mobile Payments – a Qualitative Study'. *The Journal of Strategic Information Systems*, vol. 16, no. 4, pp. 413-432.

Mallat, N, Rossi, M, Tuunainen, V K & Öörni, A 2009, 'The Impact of Use Context on Mobile Services Acceptance: The Case of Mobile Ticketing'. *Information & Management*, vol. 46, no. 3, pp. 190-195.

Manochehri, N-N & Alhinai, Y S 2008, 'Mobile-Phone Users' Attitudes Towards' Mobile Commerce & Services in the Gulf Cooperation Council Countries: Case Study'. *Service Systems and Service Management, 2008 International Conference*, pp. 1-6.

Marshall, C & Rossman, G B 1999, *Designing Qualitative Research*, 3rd ed. edn, Thousand Oaks, Ca., Sage.

Massey, A P, Khatri, V & Ramesh, V. Year. "From the Web to the Wireless Web: Technology Readiness and Usability". In*:* System Sciences, 2005. HICSS '05. Proceedings of the 38th Annual Hawaii International Conference on, 03-06 Jan. 2005 2005. 32b-32b.

Mathieson, K, Peacock, E & Chin, W 2001, 'Extending the Technology Acceptance Model: The Influence of Perceived User Resources'. *The Data Base for Advances in Information Systems*, vol. 32, no. 3, pp. 86-112.

Matthew, D 2014, 'Factors That Impact Consumer Adoption of Mobile Banking within the M-Commerce Domain'.

Maxwell, J A 2009, 'Designing a Qualitative Study'. *The SAGE Handbook of Applied Social Research Methods, SAGE, Los Angeles*, pp. 214-46.

Maxwell, J A 2012, *Qualitative Research Design: An Interactive Approach: An Interactive Approach*, Sage.

Mccoy, S, Galletta, D F & King, W R 2007, 'Applying Tam across Cultures: The Need for Caution'. *European Journal of Information Systems*, vol. 16, no. 1, pp. 81-90.

Merriam, S B 2009, *Qualitative Research: A Guide to Design and Implementation*, Jossey-Bass, San Francisco.

Miles, M B & Huberman, A M 1994, *Qualitative Data Analysis: An Expanded Sourcebook*, Sage Publications.

Milgram, S 1963, 'Behavioral Study of Obedience'. *The Journal of Abnormal and Social Psychology*, vol. 67, no. 4, pp. 371.

Min, Q & Li, S 2009, 'From Usability to Adoption - a New M-Commerce Adoption Study Framework'. *Communications and Mobile Computing, 2009. CMC '09. WRI International Conference on*, vol. 3, pp. 309-313.

Min, Q, Meng, D & Zhong, Q 2008, 'An Empirical Study on Trust in Mobile Commerce Adoption'. *Service Operations and Logistics, and Informatics, 2008. IEEE International Conference*, vol. 1, pp. 659-664.

Ministry of Foreign Affairs. 2013. *About Saudi Arabia* [Online]. Kingdom of Saudi Arabia: Ministry of Foreign Affairs. Available: http://www.mofa.gov.sa/sites/mofaen/ServicesAndInformation/aboutKingDom/Pages/KingdomGeography46466.aspx [Accessed 09 November 2013].

Ministry of Higher Education. 2012. *About Government Universities* [Online]. Kingdom of Saudi Arabia: Ministry of Higher Education. Available: http://www.mohe.gov.sa/en/studyinside/government-universities/pages/default.aspx [Accessed 09 November 2013].

Misra, S K & Wickamasinghe, N 2004, 'Security of a Mobile Transaction: A Trust Model'. *Electronic Commerce Research*, vol. 4, no. 4, pp. 359-372.

Miyazaki, A D & Fernandez, A 2001, 'Consumer Perceptions of Privacy and Security Risks for Online Shopping'. *The Journal of Consumer Affairs*, vol. 35, no. 1, pp. 27-44.

Molla, A & Licker, P S 2005a, 'Ecommerce Adoption in Developing Countries: A Model and Instrument'. *Information & Management*, vol. 42, no. 6, pp. 877-899.

Molla, A & Licker, P S 2005b, 'Perceived E-Readiness Factors in E-Commerce Adoption: An Empirical Investigation in a Developing Country'. *International Journal of Electronic Commerce*, vol. 10, no. 1, pp. 83-110.

Monsuwé, T P Y, Dellaert, B G C & Ruyter, K D 2004, 'What Drives Consumers to Shop Online? A Literature Review'. *International Journal of Service Industry Management*, vol. 15, no. 1, pp. 102 - 121.

Montoya-Weiss, M M, Voss, G B & Grewal, D 2003, 'Determinants of Online Channel Use and Overall Satisfaction with a Relational, Multichannel Service Provider'. *Journal of the Academy of Marketing Science*, vol. 31, no. 4, pp. 448-458.

Moore, G C & Benbasat, I 1991, 'Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation'. *Information Systems Research*, vol. 2, no. 3, pp. 192-222.

Murthy, D N P & Djamaludin, I 2002, 'New Product Warranty: A Literature Review'. *International Journal of Production Economics*, vol. 79, no. 3, pp. 231-260.

Nachmias, R 2002, 'A Research Framework for the Study of a Campus-Wide Web-Based Academic Instruction Project'. *The Internet and Higher Education*, vol. 5, no. 3, pp. 213-229.

Nayebi, F, Desharnais, J-M & Abran, A. Year. "The State of the Art of Mobile Application Usability Evaluation". In, 2012 2012. 1-4.

Nayebi, F, Desharnais, J M & Abran, A. Year. "An Expert-Based Framework for Evaluating Ios Application Usability". In*:* Software Measurement and the 2013 Eighth International Conference on Software Process and Product Measurement (IWSM-MENSURA), 2013 Joint Conference of the 23rd International Workshop on, 23-26 Oct. 2013 2013. 147-155.

Ndou, V D 2004, 'E-Government for Developing Countries: Opportunities and Challenges'. *The Electronic Journal of Information Systems in Developing Countries*, vol. 18, no. 1, pp. 1-24.

Nielsen, J 1993, 'Usability Engineering'. *1st Ed. Cambridge: Morgan Kaufmann*.

Nielsen, J. 1995. *Severity Ratings for Usability Problems* [Online]. Available: http://www.nngroup.com/articles/how-to-rate-the-severity-of-usability-problems/ [Accessed 25-09-2014 2014].

Nielsen, J. 2001. *Success Rate: The Simplest Usability Metric* [Online]. Nielsen Norman Group. Available: http://www.nngroup.com/articles/success-rate-the-simplest-usability-metric/ [Accessed 22/09 2014].

Nielsen, J & Budiu, R 2012, *Mobile Usability*, Pearson Education.

Nir, K 2007, 'Barriers to E-Commerce and Competitive Business Models in Developing Countries: A Case Study'. *Electronic Commerce Research and Applications*, vol. 6, no. 4, pp. 443-452.

Njite, D & Parsa, H G 2005, 'Structural Equation Modeling of Factors That Influence Consumer Internet Purchase Intentions of Services'. *Journal of Services Research*, vol. 5, no. 1, pp. 43-59.

Nulty, D D 2008, 'The Adequacy of Response Rates to Online and Paper Surveys: What Can Be Done?'. *Assessment & Evaluation in Higher Education*, vol. 33, no. 3, pp. 301-314.

Nunnally, J C 1978, *Psychometric Theory*, 2nd edition edn, New York.

Nunnally, J C, Bernstein, I H & Berge, J M F T 1967, *Psychometric Theory*, McGraw-Hill New York.

Nysveen, H, Pedersen, P & Thorbjørnsen, H 2005, 'Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons'. *Journal of the Academy of Marketing Science*, vol. 33, no. 3, pp. 330-346.

O'cass, A & Fenech, T 2003, 'Web Retailing Adoption: Exploring the Nature of Internet Users Web Retailing Behaviour'. *Journal of Retailing and Consumer Services*, vol. 10, no. 2, pp. 81-94.

Odedra-Straub, M O-S M 2003, 'E-Commerce and Development: Whose Development?'. *The Electronic Journal of Information Systems in Developing Countries*, vol. 11.

Ondrus, J & Pigneur, Y 2006, 'Towards a Holistic Analysis of Mobile Payments: A Multiple Perspectives Approach'. *Electronic Commerce Research and Applications*, vol. 5, no. 3, pp. 246-257.

Onwuegbuzie, A J, Dickinson, W B, Leech, N L & Zoran, A G 2009, 'A Qualitative Framework for Collecting and Analyzing Data in Focus Group Research'. *International Journal of Qualitative Methods*, vol. 8, no. 3, pp. 1-21.

Orloff, A D K B 2012. E-Commerce in Saudi Arabia. *In:* Kerros, T. d. (ed.) *Driving the evolution, adaption and growth of e-commerce in the retail industry.* London - Dubai - Riyadh: Sacha Orloff Consulting Group.

Öztürk, Ö & Rızvanoğlu, K 2013. 'M-Commerce Usability: An Explorative Study on Turkish Private Shopping Apps and Mobile Sites', *Design, User Experience, and Usability. Web, Mobile, and Product Design*, Springer, pp. 623-630.

Pagani, M 2004, 'Determinants of Adoption of Third Generation Mobile Multimedia Services'. *Journal of Interactive Marketing*, vol. 18, no. 3, pp. 46-59.

Palmer, J W 2002, 'Web Site Usability, Design, and Performance Metrics'. *Information systems research*, vol. 13, no. 2, pp. 151-167.

Park, C-H & Kim, Y-G 2003, 'Identifying Key Factors Affecting Consumer Purchase Behavior in an Online Shopping Context'. *International Journal of Retail & Distribution Management*, vol. 31, no. 1, pp. 16 - 29.

Patton, M Q 1999, 'Enhancing the Quality and Credibility of Qualitative Analysis'. *Health services research*, vol. 34, no. 5.

Pavlou, P 2001, 'Integrating Trust in Electronic Commerce with the Technology Acceptance Model: Model Development and Validation'. *AMCIS 2001 Proceedings*.

Pavlou, P A 2003, 'Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model'. *International journal of electronic commerce*, vol. 7, no. 3, pp. 101-134.

Pavlou, P A & Gefen, D 2004, 'Building Effective Online Marketplaces with Institution-Based Trust'. *Information Systems Research*, vol. 15, no. 1, pp. 37-59.

Petrazzini, B & Kibati, M 1999, 'The Internet in Developing Countries'. *Commun. ACM*, vol. 42, no. 6, pp. 31-36.

Petrova, K & Mehra, R 2010a, 'Mobile Payment: An Exploratory Study of Customer Attitudes'. *Wireless and Mobile Communications (ICWMC)*, pp. 378-383.

Petrova, K & Mehra, R. Year. "Mobile Payment: An Exploratory Study of Customer Attitudes". In*:* Wireless and Mobile Communications (ICWMC), 2010 6th International Conference on, 20-25 Sept. 2010 2010b. 378-383.

Pham, T-T T & Ho, J C. Year. "What Are the Core Drivers in Consumer Adoption of Nfc-Based Mobile Payments?: A Proposed Research Framework". In, 2014. IEEE, 3041-3049.

Pittayachawan, S 2008. Fostering Consumer Trust and Purchase Intention in B2c E-Commerce. RMIT University. Business Information Technology.

Plant, R 2000, *Ecommerce: Formulation of Strategy*, Upper Saddle River, Prentice-Hall, NJ.

Portio Research 2012. Worldwide Mobile Industry Handbook 2012-2016. 5th ed. London: Portio Research Limited.

Pousttchi, K 2003, 'Conditions for Acceptance and Usage of Mobile Payment Procedures'. *In Second International Conference on Mobile Business*, pp. 201-210.

Pousttchi, K & Wiedemann, D G 2007, 'What Influences Consumers´ Intention to Use Mobile Payments?'. *LA Global Mobility Roundtable. Los Angeles, CA, USA.*, pp. 1-16.

Pousttchi, K & Zenker, M 2003, 'Current Mobile Payment Procedures on the German Market from the View of Customer Requirements'. *Database and Expert Systems Applications, 2003. Proceedings. 14th International Workshop on*, no. , pp. 870-874.

Prescott, M B & Conger, S A 1995, 'Information Technology Innovations: A Classification by It Locus of Impact and Research Approach.'. *ACM SIGMIS Database*, vol. 26, pp. 20-41.

Privacy International. 2002. *An International Survey of Privacy Laws and Developments* [Online]. Electronic Privacy Information Center (USA) and Privacy International (UK). Available: http://gilc.org/privacy/survey/ [Accessed October 2, 2012].

Rambo, K & Liu, K 2010, 'Culture-Sensitive Virtual E-Commerce Design with Reference to Female Consumers in Saudi Arabia'. *Virtual Worlds and E-Commerce: Technologies and Applications for Building Customer Relationships2010, IGI Global*.

Ranganathan, C & Ganapathy, S 2002, 'Key Dimensions of Business-to-Consumer Web Sites'. *Information & Management*, vol. 39, no. 6, pp. 457-465.

Ratnasingham, P & Kumar, K 2000, 'Trading Partner Trust in Electronic Commerce Participation'. *Proceedings of the twenty first international conference on Information systems, Brisbane, Queensland, Australia*, pp. 544-552.

Ringle, C M, Sarstedt, M & Straub, D W 2012, 'Editor's Comments: A Critical Look at the Use of Pls-Sem in Mis Quarterly'. *MIS quarterly*, vol. 36, no. 1, pp. iii-xiv.

Ringle, C M, Wende, S & Becker, J-M. 2014. *Smartpls 2.0* [Online]. Germany: University of Hamburg, Hamburg. Available: http://www.smartpls.com [Accessed 02-10 2014].

Riquelme, H E & Rios, R E 2010, 'The Moderating Effect of Gender in the Adoption of Mobile Banking'. *International Journal of Bank Marketing*, vol. 28, no. 5, pp. 328-341.

Robert, K Y 2003, *Case Study Research: Design and Methods*, SAGE Publications.

Rogers, E M 1995, *Diffusion of Innovations*, Free Press, A Division of Simon and Schuster, New York.

Rogers, E M 2003, *Diffusion of Innovations, 5th Edition*, Simon and Schuster.

Rose, G, Khoo, H & Straub, D W 1999, 'Current Technological Impediments to Business-to-Consumer Electronic Commerce'. *Communications of the AIS*, vol. 1, no. 5, pp. 1-47.

Sait, S, Al-Tawil, K & Hussain, S 2004, 'E-Commerce in Saudi Arabia: Adoption and Perspectives'. *Australasian Journal of Information Systems*, vol. 12, no. 1.

San Martín, S, López-Catalán, B & Ramón-Jerónimo, M A 2012, 'Factors Determining Firms' Perceived Performance of Mobile Commerce'. *Industrial Management & Data Systems*, vol. 112, no. 6, pp. 946-963.

Sarel, D & Marmorstein, H 2004, 'Marketing Online Banking to the Indifferent Consumer: A Longitudinal Analysis of Banks' Actions'. *Journal of Financial Services Marketing*, vol. 8, no. 3, pp. 231-243.

Sarstedt, M, Henseler, J & Ringle, C M 2011. 'Multigroup Analysis in Partial Least Squares (Pls) Path Modeling: Alternative Methods and Empirical Results', *Measurement and Research Methods in International Marketing*, Emerald Group Publishing Limited, pp. 195-218.

Sathye, M 1999, 'Adoption of Internet Banking by Australian Consumers: An Empirical Investigation'. *International Journal of Bank Marketing*, vol. 17, no. 7, pp. 324-334.

Saudi Post. 2013. *Products and Services* [Online]. Saudi Arabia: Saudi Post. Available: http://www.sp.com.sa/English/SaudiPost/ProductsServices/Pages/ProductsandServices.aspx [Accessed 01 Apirl 2013].

Saunders, M, Lewis, P & Thornhill, A 2009, *Research Methods for Business Students*, 5th ed edn, Pearson Education Limited, England.

Saunders, M & Tosey, P 2013, 'The Layers of Research Design'. *Research Rapport*, pp. 58-59.

Sauro, J. 2005. *Confidence Interval Calculator for a Completion Rate* [Online]. Measuring Usability LLC. Available: http://www.measuringu.com/wald.htm [Accessed 09-10-2014 2014].

Sauro, J. 2011. *Measuring Usability with the System Usability Scale (Sus)* [Online]. Denver: Measuring Usability LLC Main Offices. Available: http://www.measuringusability.com/sus.php [Accessed 24-09 2014].

Sauro, J & Kindlund, E. Year. "How Long Should a Task Take? Identifying Specification Limits for Task Times in Usability Tests". In, 2005 2012.

Sauro, J & Lewis, J R 2012, *Quantifying the User Experience: Practical Statistics for User Research*, Elsevier.

Schierz, P G, Schilke, O & Wirtz, B W 2010, 'Understanding Consumer Acceptance of Mobile Payment Services: An Empirical Analysis'. *Electronic Commerce Research and Applications*, vol. 9, no. 3, pp. 209-216.

Segars, A H 1997, 'Assessing the Unidimensionality of Measurement: A Paradigm and Illustration within the Context of Information Systems Research'. *Omega*, vol. 25, no. 1, pp. 107-121.

Serrano-Alvarado, P, Roncancio, C, Adiba, M & Labbé, C 2005, 'An Adaptable Mobile Transaction Model'. *Computer Systems Science and Engineering (IJCSSE)*, vol. 20, no. 3, pp. ISSN-0267-6192.

Shih, Y, Chen, C Y, Wu, C H, Huang, T & Shiu, S H 2010, 'Adopted Intention of Mobile Commerce from Tam Perspective: An Empirical Study of Real Estate Industry'. *Technology Management for Global Economic Growth (PICMET)*, pp. 1-3.

Shin, D-H 2009a, 'Towards an Understanding of the Consumer Acceptance of Mobile Wallet'. *Computers in Human Behavior*, vol. 25, no. 6, pp. 1343-1354.

Shin, D H 2009b, 'Determinants of Customer Acceptance of Multi-Service Network: An Implication for Ip-Based Technologies'. *Information & Management*, vol. 46, no. 1, pp. 16-22.

Shin, S K, Ishman, M & Sanders, G L 2007, 'An Empirical Investigation of Socio-Cultural Factors of Information Sharing in China'. *Information & Management*, vol. 44, no. 2, pp. 165-174.

Shivers, T. 2011. *Forecast for Global Ecommerce: Growth* [Online]. Lawrenceville: Capture Commerce. Available: http://www.capturecommerce.com/blog/general/forecast-for-global-ecommerce-growth/ [Accessed December 13, 2012].

Siau, K & Shen, Z 2003, 'Building Customer Trust in Mobile Commerce'. *Commun. ACM*, vol. 46, no. 4, pp. 91-94.

Singh, T & Hill, M E 2003, 'Consumer Privacy and the Internet in Europe: A View from Germany'. *Journal of Consumer Marketing*, vol. 20, no. 7, pp. 634-651.

Smith, A & Rainie, L 2012. The Future of Money: Smartphone Swiping in the Mobile Age. Washington D.C.: Pew Research Center's Internet & American Life Project.

Snyder, C 2003, *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces*, Morgan Kaufmann.

Solove, D J. 2002. Conceptualizing Privacy, California Law Review. *George Washington University Law School* [Online], 90. Available: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=313103 [Accessed October 02,].

Souq.Com. 2014. *About Us* [Online]. Saudi.souq.com. Available: http://saudi.souq.com/sa-en/about-us/c/ [Accessed 03/09/2014 2014].

Srite, M 2006, 'Culture as an Explanation of Technology Acceptance Differences: An Empirical Investigation of Chinese and Us Users'. *Australasian Journal of Information Systems; Vol 14, No 1 (2006)*.

Srite, M & Karahanna, E 2006, 'The Role of Espoused National Cultural Values in Technology Acceptance'. *MIS Q.*, vol. 30, no. 3, pp. 679-704.

Stone, M 1974, 'Cross-Validatory Choice and Assessment of Statistical Predictions'. *Journal of the Royal Statistical Society. Series B (Methodological)*, pp. 111-147.

Straub, D, Loch, K & Hill, C 2002, 'Transfer of Information Technology to the Arab World: A Test of Cultural Influence Modeling'. *Information Technology Management in Developing Countries*, pp. 92-151.

Straub, D W & Carlson, C 1989, 'Validating Instruments in Mis Research'. *MIS quarterly*, pp. 147-169.

Sun, Q, Wang, C & Cao, H. Year. "An Extended Tam for Analyzing Adoption Behavior of Mobile Commerce". In, 2009 2009. IEEE, 52-56.

Tabachnick, B G & Fidell, L S 2007, *Using Multivariate Statistics*, Pearson.

Tan, M & Teo, T S H 2000, 'Factors Influencing the Adoption of Internet Banking'. *J. AIS*, vol. 1, no. 1es, pp. 5.

Tashakkori, A & Teddlie, C 1998, *Mixed Methodology: Combining Qualitative and Quantitative Approaches*, Sage, Thousand Oaks, CA.

Taylor, S & Todd, P A 1995a, 'Assessing It Usage: The Role of Prior Experience'. *MIS Quarterly*, vol. 19, no. 4, pp. 561-570.

Taylor, S & Todd, P A 1995b, 'Understanding Information Technology Usage: A Test of Competing Models'. *Information systems research*, vol. 6, no. 2, pp. 144-176.

Teo, T S H & Pok, S H 2003, 'Adoption of Wap-Enabled Mobile Phones among Internet Users'. *Omega*, vol. 31, no. 6, pp. 483-498.

Thakur, R & Srivastava, M 2014, 'Adoption Readiness, Personal Innovativeness, Perceived Risk and Usage Intention across Customer Groups for Mobile Payment Services in India'. *Internet Research,* vol. 24, no. 3, pp. 369-392.

Thomas, R M 2003, *Blending Qualitative and Quantitative Research Methods in Theses and Dissertations*, Corwin Press.

Thompson, R L, Higgins, C A & Howell, J M 1991, 'Personal Computing: Toward a Conceptual Model of Utilization'. *MIS quarterly,* pp. 125-143.

Tornatzky, L & Klein, K 1982, 'Innovation Characteristics and Innovation Adoption-Implementation: A Meta-Analysis of Findings'. *IEEE Transactions on engineering management,* vol. 29, pp. 28-45.

Travica, B 2002, 'Diffusion of Electronic Commerce in Developing Countries: The Case of Costa Rica'. *Journal of Global Information Technology Management,* vol. 5, no. 1, pp. 4-24.

Tseng, S & Fogg, B J 1999, 'Credibility and Computing Technology'. *Communications of the ACM,* vol. 42, no. 5, pp. 39-44.

Tsygankov, V A, 2004, Evaluation of Website Trustworthiness from Customer Perspective, a Framework, in *Proceedings of the 6th international conference on Electronic commerce*, ACM, 1052254.

Udo, G J 2001, 'Privacy and Security Concerns as Major Barriers for E-Commerce: A Survey Study'. *Information Management & Computer Security,* vol. 9, no. 4, pp. 165-174.

Urbach, N, Smolnik, S & Riempp, G 2010, 'An Empirical Investigation of Employee Portal Success'. *The Journal of Strategic Information Systems,* vol. 19, no. 3, pp. 184-206.

Van Den Haak, M J. 2008. *A Penny for Your Thoughts. Investigating the Validity and Reliability of Think-Aloud Protocols for Usability Testing.* Twente, Universiteit Twente.

Van Den Haak, M J, De Jong, M D T & Schellens, P J 2009, 'Evaluating Municipal Websites: A Methodological Comparison of Three Think-Aloud Variants'. *Government Information Quarterly,* vol. 26, no. 1, pp. 193-202.

Van Teijlingen, E & Hundley, V 2002, 'The Importance of Pilot Studies'. *Nursing Standard,* vol. 16, no. 40, pp. 33-36.

Vance, A, Elie-Dit-Cosaque, C & Straub, D W 2008, 'Examining Trust in Information Technology Artifacts: The Effects of System Quality and Culture'. *Journal of Management Information Systems,* vol. 24, no. 4, pp. 73-100.

Vanderstoep, S W & Johnson, D D 2008, *Research Methods for Everyday Life: Blending Qualitative and Quantitative Approaches*, John Wiley & Sons.

Vazvan, B. 1996. *Real Time Tele-Payment System*. Finland patent application PCT/FI95/00591.

Venkatesh, V & Bala, H 2008, 'Technology Acceptance Model 3 and a Research Agenda on Interventions'. *Decision Sciences,* vol. 39, no. 2, pp. 273-315.

Venkatesh, V, Brown, S A & Bala, H 2013, 'Bridging the Qualitative-Quantitative Divide: Guidelines for Conducting Mixed Methods Research in Information Systems'. *MIS Quarterly,* vol. 37, no. 1, pp. 21-54.

Venkatesh, V & Davis, F D 2000, 'A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies'. *Management Science,* vol. 46, pp. 186-204.

Venkatesh, V & Morris, M G 2000, 'Why Do Not Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behaviour'. *MIS Quarterly,* vol. 24, no. 1, pp. 115-139.

Venkatesh, V, Morris, M G, Davis, F D & Davis, G B 2003a, 'User Acceptance of Information Technology: Toward a Unified View'. *MIS Quarterly,* pp. 425-478.

Venkatesh, V, Ramesh, V & Massey, A P 2003b, 'Understanding Usability in Mobile Commerce'. *Commun. ACM,* vol. 46, no. 12, pp. 53-56.

Vrechopoulos, A P, Constantiou, I D, Mylonopoulos, N & Sideris, I, 2002, Critical Success Factors for Accelerating Mobile Commerce Diffusion in Europe, in *Bled Electronic Commerce Conference, eReality: Constructing the eEconomy*.

Walsham, G 1995, 'The Emergence of Interpretivism in Is Research'. *Information systems research,* vol. 6, no. 4, pp. 376-394.

Walster, E 1965a, 'The Effect of Self-Esteem on Romantic Liking'. *Journal of Experimental Social Psychology,* vol. 1, no. 2, pp. 184-197.

Walster, E 1965b, 'The Effect of Self-Esteem on Romantic Liking'. *Journal of Experimental Social Psychology*, vol. 1, no. 1, pp. 184-197.

Webster, J & Watson, R T 2002, 'Analyzing the Past to Prepare for the Future: Writing a Literature Review'. *Management Information Systems Quarterly*, vol. 26, no. 2, pp. 3.

Wei, G, Xinyan, Z & Yue, M 2011, 'Literature Review on Consumer Adoption Behavior of Mobile Commerce Services'. *E -Business and E -Government (ICEE), 2011 International Conference on*, pp. 1-5.

Wei, L H, Osman, M A, Zakaria, N & Bo, T 2010, 'Adoption of E-Commerce Online Shopping in Malaysia'. *e-Business Engineering (ICEBE), 2010 IEEE 7th International Conference on*, pp. 140-143.

Wilkinson, S 2004. 'Focus Group Research', in Silverman, D. (ed.), *Qualitative Research: Theory, Method and Practice*, Second ed, SAGE, London, pp. 396.

Wold, H 1982, 'Soft Modelling: The Basic Design and Some Extensions'. *Systems under indirect observation, Part II*, pp. 36-37.

Wu, J & Wang, S 2005, 'What Drives Mobile Commerce? An Empirical Evaluation of the Revised Technology Acceptance Model'. *Information & Management*, vol. 42, no. 5, pp. 719-729.

Yang, S, Lu, Y, Gupta, S, Cao, Y & Zhang, R 2012, 'Mobile Payment Services Adoption across Time: An Empirical Study of the Effects of Behavioral Beliefs, Social Influences, and Personal Traits'. *Computers in Human Behavior*, vol. 28, no. 1, pp. 129-142.

Yin, R K 2008, 'Case Study Research: Design and Methods (Applied Social Research Methods)'. *Sage Publications, London.*

Yiu, C S, Grant, K & Edgar, D 2007, 'Factors Affecting the Adoption of Internet Banking in Hong Kong—Implications for the Banking Sector'. *International Journal of Information Management*, vol. 27, no. 5, pp. 336-351.

Yoo, Y, Lyytinen, K & Yang, H 2005, 'The Role of Standards in Innovation and Diffusion of Broadband Mobile Services: The Case of South Korea'. *The Journal of Strategic Information Systems*, vol. 14, no. 3, pp. 323-353.

Zarmpou, T, Saprikis, V, Markos, A & Vlachopoulou, M 2012, 'Modeling Users' Acceptance of Mobile Services'. *Electronic Commerce Research*, vol. 12, no. 2, pp. 225-248.

Zhang, A, Yue, X & Kong, Y. Year. "Exploring Culture Factors Affecting the Adoption of Mobile Payment". In, 2011. IEEE, 263-267.

Zhang, D & Adipat, B 2005, 'Challenges, Methodologies, and Issues in the Usability Testing of Mobile Applications'. *International Journal of Human-Computer Interaction*, vol. 18, no. 3, pp. 293-308.

Zhang, L, Zhu, J & Liu, Q 2012, 'A Meta-Analysis of Mobile Commerce Adoption and the Moderating Effect of Culture'. *Computers in Human Behavior*, vol. 28, no. 5, pp. 1902-1911.

Zhou, T 2013, 'An Empirical Examination of Continuance Intention of Mobile Payment Services'. *Decision Support Systems*, vol. 54, no. 2, pp. 1085-1091.

Zhou, T & Lu, Y 2011, 'The Effects of Personality Traits on User Acceptance of Mobile Commerce'. *International Journal of Human-Computer Interaction*, vol. 27, no. 6, pp. 545-561.

APPENDICES

Appendix A: Exploratory Study (1) Interviews

Section A: User Profile

1. Age? (العمر)
   - ❑ < 20
   - ❑ 20 – 34
   - ❑ 35 – 49
   - ❑ 50 – 64
   - ❑ > 64

2. Gender? (الجنس)
   - ❑ Male
   - ❑ Female

3. The highest current degree? (أخر مؤهل حصلت عليه؟)
   - ❑ Below Bachelor (دون البكالرويس)
   - ❑ Bachelor (البكالرويس)
   - ❑ Higher Diploma (دبلوم عالي)
   - ❑ Master (ماجستير)
   - ❑ PhD/Doctor (دكتوراه)
   - ❑ Other (أخرى):……

4. Annual Income (in SAR)? (الدخل السنوي بالريال السعودي؟)
   - ❑ < 50,000
   - ❑ 50,000 – 100,000
   - ❑ 100,001 – 150,000
   - ❑ 150,001 – 200,000
   - ❑ 200,001 – 300,000
   - ❑ > 300,000

5. Overall, how do you rate your computer skills? (بشكل عام ماهو مستوى مهاراتك في استخدام الحاسب؟)
   - ❑ No Skills (لا توجد مهارات)
   - ❑ Beginner (مبتدئ)
   - ❑ Intermediate (متوسط)
   - ❑ Advanced (متقدم)

6. Have you used electronic commerce before (via PC)? (هل سبق واستخدمت التجارة الإلكترونية من خلال الحاسب الشخصي؟)
   - ❑ No (لا)
   - ❑ Yes (نعم)

Section B: Questions

أرجوا ابداء رأيك بشكل عام فيما بتعلق بالتجارة الإلكترونية في المملكة العربية السعودية، بالنسبة للمستخدم السعودي؟

Please express your opinions/thoughts about the electronic commerce in Saudi Arabia, from the Saudi's user perspective?

ماهية العوامل المساندة التي يمكن أن تسرع عملية الأنخراط في استخدام التجارة الإلكترونية في الممكلة العربية السعودية، من وجهة نظر المستخدم السعودي؟

What are the supportive factors that accelerate the involvement in using electronic commerce in Saudi Arabia, from the Saudi user's perspective?

ماهية العوامل المانعة لتسريع عملية الانخراط في استخدام التجارة الإلكترونية في الممكلة العربية السعودية، من وجهة نظر المستخدم السعودي ؟

What are the reluctance factors that slow down the involvement in using electronic commerce in Saudi Arabia, from the Saudi user's perspective?

هل هناك أي اقتراحات تود بطرحها لتحسين أو تطوير استخدام التجارة الإلكترونية في الممكلة العربية السعودية، من وجهة نظر المستخدم السعودي؟

Do you have any suggestions to enhance or develop the use of electronic commerce in Saudi Arabia, from the Saudi user's perspective?

Appendix B: UTAUT's Constructs and the Interviews Extracted Factors.

UTAUT's Constructs	**Open questions (items)**	**Factors extracted from interviews**
Performance Expectancy Effort Expectancy Social Influence	ماهي العوامل الإيجابية المساندة التي يمكن أن تسرع عملية الانخراط في استخدام الخدمات والعمليات الإلكترونية من خلال الأجهزة المحمولة؟ From your point of view, what do you think are the encouraging factors/issues that may facilitate or accelerate the use of mobile transaction? ماهي العوامل السلبية المانعة لتسريع عملية الانخراط في استخدام الخدمات والعمليات الإلكترونية من خلال الأجهزة المحمولة؟ From your point of view, what do you think are the discouraging factors/issues that may impede or decelerate the use of mobile transaction? هل هناك أي اقتراحات تود بطرحها لتحسين أو تطوير استخدام العمليات الإلكترونية في الأجهزة المحمولة من وجهة نظر المستخدم؟ Is there any suggestion that may help to enhance and develop the use of mobile transaction, from a user point of view?	• Usability • Security, hacking and fraud • Wireless telecom infrastructure • Awareness • Usefulness • Trust • Cost • Cyber law • Payment gateway • Postal services • Arabic language support • Government E-Readiness • Privacy
Facilitating conditions	من وجهة نظرك، ما هي الامكانيات من حيث البنية التحتية المتوفرة حالياً لدعم استخدام العمليات الإلكترونية من خلال الاجهزة المحمولة؟ From your point of view, what are the facilitating infrastructures that are available to support the use of mobile transaction?	

Appendix C: Exploratory Study (2)Interviews

Section A: User Profile

1. Age? (العمر)
   - ❑ < 20
   - ❑ 20 – 34
   - ❑ 35 – 49
   - ❑ 50 – 64
   - ❑ > 64

2. Gender? (الجنس)
   - ❑ Male
   - ❑ Female

3. The highest current degree? (أخر مؤهل حصلت عليه؟)
   - ❑ Below Bachelor (دون البكالويس)
   - ❑ Bachelor (البكالويس)
   - ❑ Higher Diploma (دبلوم عالي)
   - ❑ Master (ماجستير)
   - ❑ PhD/Doctor (دكتوراه)
   - ❑ Other (أخرى):……

4. Annual Income (in SAR)? (الدخل السنوي بالريال السعودي؟)
   - ❑ < 50,000
   - ❑ 50,000 – 100,000
   - ❑ 100,001 – 150,000
   - ❑ 150,001 – 200,000
   - ❑ 200,001 – 300,000
   - ❑ > 300,000

5. Overall, how do you rate your computer skills? (بشكل عام ماهو مستوى مهاراتك في استخدام الحاسب؟)
   - ❑ No Skills (لا توجد مهارات)
   - ❑ Beginner (مبتدئ)
   - ❑ Intermediate (متوسط)
   - ❑ Advanced (متقدم)

6. Do you have internet Access via your mobile device? هل لديك إمكانية دخول الإنترنت عن طريق الجوال؟
   - ❑ Yes نعم
   - ❑ No لا

Section B: Questions

أرجوا ابداء رأيك بشكل عام فيما بتعلق العمليات الإلكترونية من خلال الهاتف المحمول في المملكة العربية السعودية، بالنسبة للمستخدم السعودي؟

Please express your opinions/thoughts about the mobile transactions in Saudi Arabia, from the Saudi's user perspective?

ماهية العوامل المساندة التي يمكن أن تسرع عملية الانخراط في استخدام العمليات الإلكترونية من خلال الهاتف المحمول في المملكة العربية السعودية، من وجهة نظر المستخدم السعودي؟

What are the supportive factors that accelerate the involvement in using mobile transactions in Saudi Arabia, from the Saudi user's perspective?

ماهية العوامل المانعة لتسريع عملية الانخراط في استخدام العمليات الإلكترونية من خلال الهاتف المحمول في المملكة العربية السعودية، من وجهة نظر المستخدم السعودي؟

What are the reluctance factors that slow down the involvement in using mobile transactions in Saudi Arabia, from the Saudi user's perspective?

من وجهة نظرك، ما هي الامكانيات من حيث البنية التحتية المتوفرة حالياً لدعم استخدام العمليات الإلكترونية من خلال الاجهزة المحمولة في المملكة العربية السعودية، من وجهة نظر المستخدم السعودي؟

From your point of view, what are the facilitating infrastructures that are available to support the use of mobile transaction in Saudi Arabia, from the Saudi user's perspective?

هل هناك أي اقتراحات تود بطرحها لتحسين أو تطوير استخدام العمليات الإلكترونية من خلال الاجهزة المحمولة في المملكة العربية السعودية، من وجهة نظر المستخدم السعودي؟

Do you have any suggestions to enhance or develop the use of mobile transaction in Saudi Arabia, from the Saudi user's perspective?

Appendix D: Focus Group Interview Questions

Section A: User Profile

1. The highest current degree? (أخر مؤهل حصلت عليه؟)
   - ❑ Below Bachelor (دون البكالرويس)
   - ❑ Bachelor (البكالرويس)
   - ❑ Higher Diploma (دبلوم عالي)
   - ❑ Master (ماجستير)
   - ❑ PhD/Doctor (دكتوراه)
   - ❑ Other (أخرى):……

2. How long is your online purchase experience?
   - ❑ 1 – 3
   - ❑ 4 – 6
   - ❑ 7 – 10
   - ❑ >10

3. How long have you used a mobile device (ماهي مدة استخدامك للجوال؟)?
   - ❑ 1 – 3
   - ❑ 4 – 6
   - ❑ 7 – 10
   - ❑ >10

4. Have you used mobile transaction (هل استخدمت العمليات الإلكترونية من خلال الجوال)?
   - ❑ Yes
   - ❑ No

5. How long have you used a mobile transaction experience (ماهي مدة استخدامك للعمليات الإلكترونية)?
   - ❑ 1 – 3
   - ❑ 4 – 6
   - ❑ 7 – 10
   - ❑ >10

Section B: Focus Group Questions

1. How often do you use mobile device to purchase products online?
2. What do you normally purchase via a mobile device?

OK, let us talk and discuss about using mobile transaction to purchase online. Suppose that you are about to purchase online using a mobile device, what criteria, concerns and preferences that you will consider in order to proceed with your purchasing? Below you will find the research's findings of prior exploratory studies and constructs for the research framework. Please feel free to discuss each factor with your friends and express your own opinions.

Security

1. How important is to consider *security* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Trust

2. How important is to consider *trust* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Cyber-Law

3. How important is to consider *cyber-Law* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Postal Services

4. How important is to consider *postal services* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Telecommunication infrastructure

5. How important is to consider Wireless telecom infrastructure in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Payment Gateway

6. How important is to consider *payment gateway* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Cost

7. How important is to consider *cost* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Awareness

8. How important is to consider *awareness* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Usefulness

9. How important is to consider *usefulness (the value added to you by using a mobile transaction)* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Ease of Use

10. How important is to consider *ease of use* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Navigational Structure

11. How important is to consider *navigational structure* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Availability

12. How important is to consider *availability* in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Privacy

13. How important is to consider Privacy in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Government E-Readiness

14. How important is to consider Government E-Readiness in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Arabic Language Support

15. How important is to consider Arabic Language Support in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Postal Services

16. How important is to consider Postal Services in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

E-Commercial presence

17. How important is to consider E-Commercial presence in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Warranty

18. How important is to consider Warranty in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Trial and Experience

19. How important is to consider Trial and Experience in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Tangibility

20. How important is to consider Tangibility in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Resistance to Change

21. How important is to consider Resistance to Change in using mobile transaction for online purchasing in Saudi Arabia, from the Saudi user's perspective?

Other

22. Is there anything more specific regarding purchasing online using mobile device that you would like to add?

Appendix E: Survey Questionnaire (English Version)

Mobile Transaction

in Saudi Arabia

Information

Thank you very much for taking the time to answer the following questions. This study aims to investigate the key factors that affect the adoption and intention of using mobile transaction from a consumer's perceptive. The answers to these questions will contribute to research in (1) issues that influence Saudi user decision to use mobile transaction and (2) developing a comprehensive framework to identify the crucial factors that can either induce or inhibit the use of mobile transaction in Saudi Arabia. Please give your opinion and/or preferences honestly and frankly; there are no right or wrong answers. This questionnaire includes two sections; the first one requires some personal information, the second one is questions about the study research.

Confidentiality

Please be assured that any information provided will not be used for any commercial purpose and no one will have access to this information apart from the researchers (Mr Mohammed Alqahtani and Dr Pam Mayhew). Also please feel totally safe, that any information provided will be treated anonymously in the strictest confidence and none of the participants will be individually identifiable in the resulting thesis, reports or other publications.

These data will be destroyed after two years on the date you submitted your answers. You are, of course, entirely free to discontinue your participation at any time or to decline to answer a particular question.

Thank you again for taking the time to respond to this questionnaire. If you have any further questions please contact the researcher (Mr. Mohammed Alqahtani) by email at m.alqahtani@uea.ac.uk or the project supervisor Dr Pam Mayhew at p.mayhew@uea.ac.uk.

Mr. Mohammed Alqahtani
School of Computing Sciences,
University of East Anglia
Norwich, NR4 7TJ
United Kingdom

Section A: User Profile

1. Gender?
   - ❑ Male
   - ❑ Female

2. Age?
   - ❑ < 20
   - ❑ 20 – 34
   - ❑ 35 – 49
   - ❑ 50 – 64
   - ❑ > 65
   - ❑

3. Annual Income (in SAR)?
   - ❑ < 50,000
   - ❑ 50,000 – 100,000
   - ❑ 100,001 – 150,000
   - ❑ 150,001 – 200,000
   - ❑ 200,001 – 300,000
   - ❑ > 300,000

4. The highest degree obtained?
   - ❑ Below Bachelor
   - ❑ Bachelor
   - ❑ Higher Diploma
   - ❑ Master
   - ❑ PhD/Doctor
   - ❑ Other:…….

5. The area you live in is considered as?
   - ❑ City
   - ❑ Town
   - ❑ Village

6. Overall, how do you rate your computer skills?
   - ❑ No Skills
   - ❑ Beginner
   - ❑ Intermediate
   - ❑ Advanced

7. Have you purchased via Internet before?
   (if "No", please choose "None" for the next question Q8)
   - ❑ Yes
   - ❑ No

8. How often to you purchase online?
   - ❑ Frequently
   - ❑ Rarely
   - ❑ None

9. Do you have a mobile phone?
   (If not, then please choose 'No' in the next two questions)?
   - ❑ No
   - ❑ Yes

10. Overall, how do you rate overall your mobile skills?
    - ❑ No Skills
    - ❑ Beginner
    - ❑ Intermediate
    - ❑ Advanced

11. Do you have/access to the Internet via your mobile device?
    - ❑ Yes
    - ❑ No

Section B: Research Questions

12. Mobile Ease of Use (Usability)
    **In general, please indicate how you feel about using transactions/payments via a mobile device.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
Interacting with the mobile transaction does not require a lot of mental effort.	❍	❍	❍	❍	❍	❍	❍
I find the mobile transaction to be easy to use.	❍	❍	❍	❍	❍	❍	❍

	I find it easy to get the mobile transaction to do what I want it to do.	❍	❍	❍	❍	❍	❍	❍
	Visual Appeal **Please indicate how you feel about the visual appeal of mobile device to conduct a mobile transaction.*							
		Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
	I like the look and feel of the mobile transaction site/application.	❍	❍	❍	❍	❍	❍	❍
	The mobile transaction site/application is attractive.	❍	❍	❍	❍	❍	❍	❍
	I like the graphics on the mobile transaction site/application.	❍	❍	❍	❍	❍	❍	❍
	Navigational Structure **Please indicate how do you feel about the navigational structure when conduction a mobile transaction.*							
		Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
	It is easy to find what I am looking for on the mobile transaction site/application.	❍	❍	❍	❍	❍	❍	❍
	It is easy to move around online using the mobile transaction site/application.	❍	❍	❍	❍	❍	❍	❍
	The mobile transaction site/application offers a logical layout that is easy to follow.	❍	❍	❍	❍	❍	❍	❍
13.	Usefulness **In general, please indicate whether you find using a mobile transaction/payment is useful for you.*							
		Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
	Mobile transaction has more advantages than internet or off-line payment because services are not limited by location.	❍	❍	❍	❍	❍	❍	❍
	Mobile transaction is more convenient than internet or offline payment.	❍	❍	❍	❍	❍	❍	❍
	Mobile transaction is more efficient than internet or off-line payment.	❍	❍	❍	❍	❍	❍	❍
	Mobile transaction is more effective than internet or offline payment in managing a payment.	❍	❍	❍	❍	❍	❍	❍
14.	Telecommunication Infrastructure **In general, please indicate how you feel about the quality of Internet and ICT infrastructure in Saudi Arabia.*							

		Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
	In Saudi Arabia, the telecommunication infrastructure is reliable and efficient to support mobile transaction.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, the technology infrastructure of commercial and financial institutions is capable of supporting mobile transactions.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, there is efficient and affordable support from the local IT industry to support the move to the mobile transaction.	❍	❍	❍	❍	❍	❍	❍

15. Cost

**In general, please indicate what you think about the cost of using mobile transaction/payment in Saudi Arabia.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
I think that using mobile transaction is expensive overall.	❍	❍	❍	❍	❍	❍	❍
I think that the price level of using mobile transaction is a burden to me.	❍	❍	❍	❍	❍	❍	❍
I think that the price level of using special (privileged) service or information through mobile transaction is expensive to use.	❍	❍	❍	❍	❍	❍	❍

16. Government e-readiness

**Please indicate how you feel about the government e-readiness for supporting/regulating mobile transaction in Saudi Arabia.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
In Saudi Arabia, I believe that there are effective laws to protect consumer privacy.	❍	❍	❍	❍	❍	❍	❍
In Saudi Arabia, I believe that there are effective laws to combat cyber crime.	❍	❍	❍	❍	❍	❍	❍
In Saudi Arabia, I believe that the legal environment is conducive to conducting business on the Internet via mobile devices.	❍	❍	❍	❍	❍	❍	❍
In Saudi Arabia, the government demonstrates strong commitment to promote mobile transaction.	❍	❍	❍	❍	❍	❍	❍

17. Intention to use

**Please indicate how you feel about the intention to use mobile transaction/payment.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree

	Assuming I have access to the mobile transaction, I intend to use it.	❍	❍	❍	❍	❍	❍	❍
	Given that I have access to the mobile transaction, I predict that I would use it.	❍	❍	❍	❍	❍	❍	❍
	I am likely to use mobile payment services in the near future.	❍	❍	❍	❍	❍	❍	❍

18.	Social influence **Please indicate how you feel about people (e.g. social networks and friends) that may influence your decision to use mobile transaction/payment.*							
		Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
	People who influence my behaviour think that I should use mobile transaction.	❍	❍	❍	❍	❍	❍	❍
	My friends think that I should use mobile transaction.	❍	❍	❍	❍	❍	❍	❍
	People around me who use mobile transaction have more prestige than those who do not.	❍	❍	❍	❍	❍	❍	❍
	People who use mobile transaction have a high profile.	❍	❍	❍	❍	❍	❍	❍
	Using mobile transaction is considered a status symbol amongst my friends.	❍	❍	❍	❍	❍	❍	❍

19.	Security **In general, please indicate how you feel about security concerns when using mobile transactions/payments in Saudi Arabia.*							
		Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
	In general, I feel secure in using mobile transaction in Saudi Arabia.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, I feel safe in transaction, downloading contents, and accessing sites via mobile devices.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, mobile transaction is well protected against security-related concerns such as hacking, unauthorized uses, theft of data, interception of transmission, and virus.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, the risk of an unauthorized third party overseeing the payment process is low.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, the risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile transaction services.	❍	❍	❍	❍	❍	❍	❍

20. Trust (in the service provider)

**Please indicate how you feel about trusting the services provider when using mobile transaction/payment in Saudi Arabia.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
In Saudi Arabia, the service provider has the necessary skills and ability to fulfil its tasks.	❍	❍	❍	❍	❍	❍	❍
In Saudi Arabia, the service provider keeps its promises.	❍	❍	❍	❍	❍	❍	❍
In Saudi Arabia, the service provider keeps customer interests in mind.	❍	❍	❍	❍	❍	❍	❍

21. Culture (*Masculinity/Femininity*)

**With regards to Masculinity/Femininity in Saudi Arabia please indicate how you feel about the following statements.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
In Saudi Arabia, there are some jobs in which a man can always do better than a woman.	❍	❍	❍	❍	❍	❍	❍
In Saudi Arabia, it is more important for men to have a professional career than it is for women to have a professional career.	❍	❍	❍	❍	❍	❍	❍
It is preferable to have a man in high level position rather than a woman in Saudi Arabia.	❍	❍	❍	❍	❍	❍	❍

Culture (*Individualism/Collectivism*)

** With regards to Individualism/Collectivism in Saudi Arabia please indicate how you feel about the following statements.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
In Saudi Arabia, being accepted as a member of a group is more important than having autonomy and independence.	❍	❍	❍	❍	❍	❍	❍
In Saudi Arabia, being loyal to a group is more important than individual gain.	❍	❍	❍	❍	❍	❍	❍
Group success is more important than individual success in Saudi Arabia.	❍	❍	❍	❍	❍	❍	❍

Culture (*Power Distance*)

** With regards to Power Distance in Saudi Arabia please indicate how you feel about the following statements.*

	Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
In Saudi Arabia, employees should not question their manager's decisions.	❍	❍	❍	❍	❍	❍	❍

	In Saudi Arabia, managers should not ask subordinates for advice, because they might appear less powerful.	❍	❍	❍	❍	❍	❍	❍
	Managers should be careful not to ask the opinions of subordinates too frequently, otherwise the manager might appear to be weak and incompetent in Saudi Arabia.	❍	❍	❍	❍	❍	❍	❍
	Culture (*Uncertainty Avoidance*) ** With regards to Individualism/Collectivism in Saudi Arabia please indicate how you feel about the following statements.*							
		Strongly Disagree	Disagree	Disagree Somewhat	Not Applicable	Agree Somewhat	Agree	Strongly Agree
	In Saudi Arabia, rules and regulations are important because they inform workers of what the organization expects of them.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, order and structure are very important in a work environment.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, it is important to have job requirements and instructions spelled out in detail so that people always know what they are expected to do.	❍	❍	❍	❍	❍	❍	❍
	It is better to have a bad situation that you know about, than to have an uncertain situation which might be better in Saudi Arabia.	❍	❍	❍	❍	❍	❍	❍
	In Saudi Arabia, providing opportunities to be innovative is more important than requiring standardized work procedures.	❍	❍	❍	❍	❍	❍	❍

22. If you have any suggestions please let us know:

23. If you like to enter the prizes draw, please enter you contact details:

Appendix F: **Survey Questionnaire (Arabic Version)**

العمليات الإلكترونية عبر الهاتف المتنقل (الجوال)

في المملكة العربية السعودية

معلومات وخلفية عن الموضوع:

أدّى التقدم الكبير في مجال تقنية الهواتف المحمولة وانتشارها إلى تحويل النظام الهاتفي من مجرد أداة اتصال بسيطة إلى أجهزة حاسوبية متعددة الأنظمة، وتعتبر العمليات الإلكترونية عبر الهاتف المتنقل أحد التطبيقات الهامة للتجارة الإلكترونية، والتي تعمل على تسهيل إجراء المعاملات التجارية عن طريق تزويد العميل بوسيلة مريحة وملائمة للدفع.

وتهدف هذه الدراسة إلى بحث/تحديد العوامل الرئيسية المتعلقة باستخدام العمليات الإلكترونية عبر الهاتف المتنقل. الإجابة عن أسئلة الاستبيان ستساعد في (1) فهم العوامل التي تؤثر على استخدام العمليات الإلكترونية من قبل المستخدم السعودي و (2) تطوير إطار شامل يحدد العوامل الحاسمة في استخدام العمليات الإلكترونية من قبل المستخدم السعودي. لذا نأمل التكرم بإعطائنا رأيك / أو ما تفضله بصدق وصراحة، وذلك لعدم وجود إجابة بالصحة أو الخطأ في هذه الأسئلة. ينقسم هذا الاستبيان إلى قسمين: قسم يتعلق بالأسئلة العامة عن المشارك وقسم يتعلق بأسئلة البحث.

الالتزام بالحفاظ التام على السرية والخصوصية:

ونود أن نؤكد لك بعدم استخدام المعلومات المقدمة في هذا الاستبيان لأي أغراض تجارية، كما لن يستطيع أحد الاطلاع عليها بخلاف الباحث والمشرف (الأستاذ/ محمد القحطاني والدكتور/ مايهوي) كما نود أن نؤكد لجميع المشاركين بأن جميع المعلومات التي ترد في هذه الدراسة سيتم التعامل معها بسرية مطلقة ،ولن يتم الكشف عن هوية أي من المشاركين في نتائج الدراسة أو التقارير أو المطبوعات الأخرى .

ونتقدم لك بجزيل شكرنا مرة أخرى لاستجابتكم بالمشاركة في هذا الاستبيان، وإذا كان لديكم المزيد من الأسئلة والاستفسارات يرجي عدم التردد في الاتصال بالباحث عن طريق البريد الإلكتروني (m.alqahtani@uea.ac.uk) أو المشرف عبر البريد الإلكتروني (p.mayhew@uea.ac.uk).

محمد القحطاني
كلية علوم الحاسب
جامعة أيست أنجليا
*مدينة نورتش، **NR4 7TJ***
المملكة المتحدة

قسم أ: بيانات المستخدم

1. الجنس:
   - ❑ ذكر
   - ❑ أنثى

2. العمر:
   - ❑ اقل من ٢٠ سنة
   - ❑ ٢٠ ـ ٣٤ سنة
   - ❑ ٣٥ ـ ٤٩ سنة
   - ❑ ٥٠ ـ 65 سنة
   - ❑ أكثر من ٦٥ سنة

3. التعليم:
   - ❑ تحت البكالوريوس
   - ❑ بكالوريوس
   - ❑ دبلوم عالي
   - ❑ ماجستير
   - ❑ دكتوراه
   - ❑ أخرى

4. الدخل السنوي:
   - ❑ اقل ٥٠,٠٠٠ ريال
   - ❑ ٥٠,٠٠٠ ـ ١٠٠,٠٠٠ ريال
   - ❑ ١٠٠,٠٠١ ـ ١٥٠,٠٠٠ ريال
   - ❑ ١٥٠,٠٠٠١ ـ ٢٠٠,٠٠٠ ريال
   - ❑ ٢٠٠,٠٠١ ـ ٣٠٠,٠٠٠ ريال
   - ❑ أكثر من ٣٠٠,٠٠٠

5. محل الإقامة:
   - ❑ مدينة
   - ❑ بلدة (مدينة صغيرة)
   - ❑ قرية

6. مهارات استخدام الحاسب الآلي؟
   - ❑ لا توجد
   - ❑ مبتدئ
   - ❑ متوسط
   - ❑ متقدم

7. هل سبق وأن قمت بالشراء عبر الانترنت؟ *(إذا كانت الإجابة بلا اختر(لا) في السؤال* التالي (رقم 8).
   - ❑ نعم
   - ❑ لا

8. كم مرة قمت بالشراء عبر الانترنت؟
   - ❑ كثيراً
   - ❑ نادراً
   - ❑ ولا مرة

9. هل لديك جهاز هاتف متنقل (جوال)؟ *(إذا كانت الإجابة بلا فاختر (لا) في الاسئلة 10 و 11).*
   - ❑ نعم
   - ❑ لا

10. ما هو تقييمك لمهاراتك في استخدام الهاتف المتنقل (الجوال)؟
    - ❑ لا توجد
    - ❑ مبتدئ
    - ❑ متوسط
    - ❑ متقدمة

11. هل تمتلك إمكانية الاتصال بالإنترنت من الهاتف المتنقل (الجوال)؟
    - ❑ نعم
    - ❑ لا

قسم ب: أسئلة البحث

12. قابلية/سهولة استخدام الهاتف المتنقل:
*بشكل عام، أرجو ابداء رأيك فيما يتعلق بسهولة استخدام الهاتف المتنقل لإجراء العمليات الإلكترونية.

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
القيام بالعمليات الإلكترونية عبر الهاتف المتنقل لا يتطلب قدرات عقلية كبيرة.	❍	❍	❍	❍	❍	❍	❍
أجد من السهل إنجاز العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
أرى سهولة استخدام العمليات الإلكترونية عبر الهاتف المتنقل في انجاز ما أريد.	❍	❍	❍	❍	❍	❍	❍

دعم مواقع الإنترنت لاستخدام الأجهزة المحمولة/المتنقلة:
*أرجو إبداء رأيك فيما يتعلق بشكل أو مظهر المواقع عند استخدام الهاتف المتنقل.

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
يعجبني مظهر المواقع الإلكترونية من خلال الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
المواقع الإلكترونية من خلال الهاتف المتنقل جذابة.	❍	❍	❍	❍	❍	❍	❍

أجد الرسومات في المواقع الإلكترونية من خلال الهاتف المتنقل جذابة وجميلة.	❍	❍	❍	❍	❍	❍	❍
هيكلية تصفح المواقع من خلال الهاتف المتنقل: *ما رأيك بشأن هيكلية تصفح مواقع الإنترنت عند إجراء العمليات الإلكترونية عبر الهواتف المتنقلة (مثل سهولة التنقل بين الصفحات).							
	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
من السهولة الحصول على ما تبحث عنه في المواقع الإلكترونية من خلال الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
تعتبر عملية التنقل بين المواقع الإلكترونية عبر الهواتف المتنقلة عملية سهلة.	❍	❍	❍	❍	❍	❍	❍
تتميز المواقع الإلكترونية عبر الهواتف المتنقلة بتخطيطها المنطقي بالصورة التي يسهل متابعة التصفح.	❍	❍	❍	❍	❍	❍	❍

13. فوائد ومميزات استخدام العمليات الإلكترونية عبر الهاتف المتنقل:
*ما رأيك بصفة عامة مدى فائدة استخدام العمليات الإلكترونية أو سداد المعاملات المصرفية عبر الهاتف المتنقل.

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
استخدام العمليات الإلكترونية عبر الهاتف المتنقل له الكثير من المميزات عن استخدام الإنترنت على الحاسب الشخصي بسبب عدم ارتباطها بمكان معين.	❍	❍	❍	❍	❍	❍	❍
العمليات الإلكترونية عبر الهاتف المتنقل مريح أكثر من الإنترنت على الحاسب الشخصي.	❍	❍	❍	❍	❍	❍	❍
العمليات الإلكترونية عبر الهاتف المتنقل أكثر كفاءة وفاعلية مقارنة بالإنترنت على الحاسب الشخصي.	❍	❍	❍	❍	❍	❍	❍
تعتبر العمليات الإلكترونية عبر الهاتف المتنقل أكثر كفاءة وفعالية من الإنترنت على الحاسب الشخصي من ناحية الإدارة والتحكم.	❍	❍	❍	❍	❍	❍	❍

14. البنية التحتية لتكنولوجيا المعلومات والاتصالات:
*ما رأيك بصورة عامة بشأن جودة الإنترنت والبنية التحتية لتكنولوجيا المعلومات والاتصالات في السعودية.؟

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
تتميز أنظمة الاتصالات في السعودية بالثقة والكفاءة بالصورة التي تؤدي إلى دعم إنجاز العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
البينة التحتية لأنظمة الاتصالات في السعودية الخاصة بالمؤسسات التجارية والمالية قادرة على دعم العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
تقدم صناعة/قطاع تقنية المعلومات في السعودية خدمات دعم فعالة وذات أسعار مناسبة لدعم التوجه نحو استخدام العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍

15. التكلفة:
*ما رأيك بشأن تكلفة استخدام العمليات الإلكترونية والسداد (يشمل تكاليف الاشتراك في باقات الإنترنت وغيرها).

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
تكلفة استخدام العمليات الإلكترونية عبر الهاتف المتنقل في السعودية عالية.	❍	❍	❍	❍	❍	❍	❍
تعتبر أسعار إجراء العمليات الإلكترونية عبر الهاتف المتنقل عائقاً بالنسبة لي.	❍	❍	❍	❍	❍	❍	❍
أرى أن مستويات التسعير للخدمات المميزة أو المعلومات عبر العمليات الإلكترونية عبر الهاتف المتنقل مكلفة.	❍	❍	❍	❍	❍	❍	❍

16. الاستعداد الإلكتروني للحكومة/وقوانين مكافحة جرائم الانترنت:
*ما رأيك بصراحة بشأن جاهزية الحكومة الإلكترونية لدعم وتنظيم التجارة الإلكترونية عبر الهاتف المتنقل؟

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
أرى توجه الحكومة السعودية بشدة والتزامها نحو تطوير العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
أرى وجود قوانين فعالة في السعودية لمكافحة جرائم الإنترنت.	❍	❍	❍	❍	❍	❍	❍
أرى وجود بيئة قانونية تساعد على إجراء العمليات التجارية الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
اعتقد بوجود قوانين فعالة في السعودية لحماية خصوصية المستهلك.	❍	❍	❍	❍	❍	❍	❍

17. الرغبة في الاستعمال:
*اذكر مدى رغبتك في استخدام العمليات الإلكترونية عبر الهاتف المتنقل (الجوال).

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
لدى الرغبة في استخدام مثل هذه العمليات الإلكترونية في حالة حصولي على ذلك.	❍	❍	❍	❍	❍	❍	❍
أتوقع أنني سوف استخدم العمليات الإلكترونية عبر الهاتف في حال توفرها لدي.	❍	❍	❍	❍	❍	❍	❍
من المحتمل أن أقوم في المستقبل القريب باستخدام العمليات الإلكترونية والتسديد عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍

18. التأثيرات الاجتماعية:
*ما رأيك بتأثير الأشخاص (مثل شبكات التواصل الاجتماعي والأصدقاء) على قرار استعمال العمليات الإلكترونية عبر الهاتف المتنقل.

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
الأشخاص المؤثرين على سلوكي يرون بأنه يجب أن أستخدم العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
أصدقائي يرون أنه يجب أن أستخدم العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
يتميز الأشخاص من حولي الذين يستخدمون العمليات الإلكترونية عبر الهاتف المتنقل بوضع اجتماعي أفضل من غيرهم.	❍	❍	❍	❍	❍	❍	❍
الأشخاص الذين يستخدمون العمليات الإلكترونية عبر الهاتف المتنقل هم ذوي مكانة اجتماعية راقية.	❍	❍	❍	❍	❍	❍	❍
استخدام العمليات الإلكترونية عبر الهاتف المتنقل يعتبر شيء مميز بين الأصدقاء.	❍	❍	❍	❍	❍	❍	❍

19. الأمن:
*ما رأيك بشأن الأمن عند استخدام العمليات الإلكترونية عبر الهاتف المتنقل.

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
بصفة عامة أشعر بتوفر الأمن عند إجراء العمليات الإلكترونية عبر الهاتف المتنقل.	❍	❍	❍	❍	❍	❍	❍
أشعر بالأمن عند إجراء العمليات الإلكترونية وتنزيل الملفات والدخول إلى المواقع عبر الهاتف المتنقل في السعودية.	❍	❍	❍	❍	❍	❍	❍
أعتقد أن العمليات الإلكترونية عبر الهاتف المتنقل في السعودية آمنة تماماً من المهددات الأمنية مثل القرصنة أو استعمالها من قبل الأشخاص غير المصرح لهم وسرقة البيانات وتعطل الإرسال والفيروسات.	❍	❍	❍	❍	❍	❍	❍

أعتقد أن مخاطر تعرض الحسابات للدخول إليها من قبل الأشخاص الغير المصرح لهم في المملكة العربية السعودية منخفضة للغاية.	❍	❍	❍	❍	❍	❍	❍
أعتقد أن مخاطر سوء استعمال المعلومات مثل (أسماء الشركاء وأرقام المبالغ) عبر الهاتف المتنقل في السعودية منخفض.	❍	❍	❍	❍	❍	❍	❍

20. الثقة في مقدمي الخدمة:

*أرجو إبداء رأيك في مدى ثقة العميل في مقدمي الخدمة في السعودية عند استخدام العمليات الإلكترونية عبر الهاتف المتنقل.

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
أعتقد أن مقدمي الخدمة في السعودية لديهم المهارات اللازمة والقدرة على تنفيذ المهام المترتبة عليهم.	❍	❍	❍	❍	❍	❍	❍
يقوم مقدمي الخدمة في المملكة العربية السعودية بالوفاء بوعودهم.	❍	❍	❍	❍	❍	❍	❍
يهتم مقدمي الخدمة في المملكة العربية السعودية بمصالح العملاء.	❍	❍	❍	❍	❍	❍	❍

21. ثقافة الذكور/الإناث:

*من الناحية الذكورية / الأنثوية في المملكة العربية السعودي ما هو رأيك تجاه ما يلي:

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
دائما في السعودية هناك بعض الوظائف التي يمكن للرجل أدائها بصورة أفضل من المرأة.	❍	❍	❍	❍	❍	❍	❍
في السعودية تقلد الرجال للوظائف الاحترافية/المهنية يعتبر أكثر أهمية مقارنة بتقلد المرأة لنفس الوظائف.	❍	❍	❍	❍	❍	❍	❍
يفضل دائماً تعيين الرجل في المناصب العليا مقارنة بالمرأة.	❍	❍	❍	❍	❍	❍	❍

ثقافة (الفرد/الجماعة):

*فيما يتعلق بالثقافة الفردية والجماعية في السعودية نأمل إبداء رأيك فيما يلي:

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
في السعودية قبولك فرداً في مجموعة/جماعة يعتبر أكثر أهمية من الاستقلالية والفردية.	❍	❍	❍	❍	❍	❍	❍
في السعودية يكون الولاء للمجموعة/جماعة أهم من المصلحة الفردية.	❍	❍	❍	❍	❍	❍	❍
أرى أن نجاح المجموعة/جماعة أكثر أهمية من نجاح الفرد.	❍	❍	❍	❍	❍	❍	❍

ثقافة التأثيرات الاجتماعية/السُلطة:

*فيما يتعلق بموضوع السُلطة في السعودية ما هو تقييمك لما يلي:

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة
لا يحق للموظف في السعودية مناقشة قرارات المدير.	❍	❍	❍	❍	❍	❍	❍
لا يقوم المدراء في السعودية بطلب النصح من موظفيهم حتى لا يظهر ذلك بمثابة ضعف في شخصياتهم.	❍	❍	❍	❍	❍	❍	❍
على المدراء الحرص والحذر من طلب النصح من مرؤوسيهم بصورة دائمة حتى لا يفسر ذلك بمثابة ضعف وعدم كفاءة المدير.	❍	❍	❍	❍	❍	❍	❍

ثقافة تجنب الشك/الغموض:

*فيما يتعلق بموضوع تجنب الشك أو الغموض في السعودية ما هو تقييمك لما يلي:

	لا أوافق بشدة	لا أوافق	لا أوافق إلى حد ما	لا أعلم	أوافق إلى حد ما	أوافق	أوافق بشدة

اللوائح والأنظمة في السعودية تعتبر مهمة لأنها تحدد مهام والتزامات الموظف/ة تجاه جهة العمل.	❍	❍	❍	❍	❍	❍	❍
النظام والهيكلة في بيئة العمل تعتبر مهمة في السعودية.	❍	❍	❍	❍	❍	❍	❍
ضرورة إيضاح متطلبات الوظيفة ومعرفة التعليمات المتعلقة بالعمل بالتفصيل في السعودية حتى يتسنى للموظف/ة معرفة ما هو مطلوب من قبلهم للقيام به.	❍	❍	❍	❍	❍	❍	❍
أفضل أن أكون في وضع أعرفه وإن لم يكن جيداً على أن أكون في وضع لا أعرفه.	❍	❍	❍	❍	❍	❍	❍
في السعودية توفير فرص الإبداع للموظف/ة يعتبر أهم من المطالبة بالإجراءات المتبعة/القياسية.	❍	❍	❍	❍	❍	❍	❍
على الناس ضرورة تفادي التغيير لأن ذلك قد يؤدي إلى وضع أسوء.	❍	❍	❍	❍	❍	❍	❍

22. إذا كان لديك أي اقتراحات، الرجاء مشاركتنا بها:

الرجاء كتابة وسيلة التواصل في حال رغبت بالدخول في السحب على الجائزة:

Appendix G: The Tasks Used in the Usability Study

Task 1: < Registering with the Application > **You are a new user of the Souq.com application and want to be a registered user, so that you can use all the application functions. What do you do?**	
Goals / output:	Register successfully into the app, resulting in full use of all the app's functions. To find out to what extent the registering interfaces, processes and functions are easy to use.
Inputs / Assumptions:	Names (first and last) Gender Country Email address User Name Password Confirmation of Password Terms Agreement Confirmation of Email The user should have a valid email address Task 1 is completed
Steps:	Go to the Homepage Complete the registration process (several fields/steps) Log in View the application interface and its services (functions).
Time for expert:	01:37 minutes.
Instructions for user:	Please open the app in your smart phone and register as a new user, and then try to navigate through its services and functions.
Notes:	The user can sign up a new email if he/she does not have one already. The users' overall feedback about this task will be recorded/noted.
Task 2: < Find a Product to Purchase "Smart Phone" > **You have just decided to get a new mobile phone and you want to search for and buy a new smart phone. What do you do?**	
Goals / output:	Successfully locating a product to purchase, resulting in adding the product to the cart. To find out to what extent finding (Searching, navigating, filtering and browsing) the required information/product is easy.
Inputs / Assumptions:	Product specifications details (several steps) Has confirmation email as a result of task 1 Each user chooses one product to purchase (Smart phone) Completed tasks 1
Steps:	Go to the Homepage Go to Mobile and Accessories category Choose Mobiles Put in the filter the product specifications. Scroll down until locating the product Add it to the cart
Time for expert:	01:29 minutes
Instructions for user:	Please find a smart phone to purchase that has these specifications: Samsung Galaxy S4, New, Blue, 16GB, 1,799SAR.
Notes:	The users' overall feedback about this task will be recorded/noted. When you find the product that you want to buy, please add it to the cart and go to the homepage so you can continue shopping.
Task 3: < Find a Product to Purchase "Book" >	
Goals / output:	Successfully identifying a product to purchase, resulting in adding the product to the cart. To find out to what extent finding (different categories, functions, filters and interfaces and navigational structure) the required information/product is easy.
Inputs / Assumptions:	The book specifications. Tasks 1 and 2 were accomplished

Steps:	Go to the Homepage Go to browse all categories Choose books section Put in the filter the product specifications. Scroll down until locating the product Add it to the cart
Time for expert:	00:33 minutes
Instructions for user:	Please find a book to purchase. Please make sure that the book has the following specifications: Name: "من حرك قطعة الجبن الخاصة بي"type: "الاعتماد على الذات"Author: "سبنسر جون"publisher: "مكتبة جرير"Language: "العربية", and then add it to your cart.
Notes:	The user needs to consider the filters in this task. When you find the product that you want to buy, please add it to the cart and go to the homepage so you can continue shopping. The users' overall feedback about this task will be recorded/noted.
Task 4: < Find a Gift to Purchase "Football" > Your young brother has graduated recently. You want to search for and buy a football for him as a gift. What do you do?	
Goals / output:	A successful finding of a low-price product, resulting in adding the product to the cart. To find out to what extent finding the required information/product is easy (e.g. controlling the results shown and using search functions).
Inputs / Assumptions:	Logged in The product is available and in stock Previous tasks were successfully completed
Steps:	Go to the homepage Locate the cursor inside the search bar Type in"أنكري بيرد سبيس" Scroll down to locate the product Choose a product with 8SAR of cost Add it to the cart
Time for expert:	00:51 minutes
Instructions for user:	Please use the search bar to find a football called "أنكري بيرد سبيس"and make sure the price is 8SAR. Add this product to your cart.
Notes:	There are a number of similar products; the user has to choose the one that costs 8SAR. The users' overall feedback about this task will be recorded/noted.
Task 5: < Managing the Cart and a Payment Transaction > You need to remove all the items from your cart except the item that cost 8 SAR and then conduct the payment. What do you do?	
Goals / output:	A successful control of the cart, resulting in conducting the payment transaction. To find out to what extent managing the cart and conducting the payment transaction is easy.
Inputs / Assumptions:	A number of items are already in the cart Credit card
Steps:	Go to the Homepage Click the right top button Choose my cart Remove all the items except the item that cost 8SAR. Conduct the payment (several steps)
Time for expert:	02:30 minutes
Instructions for user:	Please go to your cart and check the products added to your basket. Remove all the products except the product that you added last (which cost 8SAR). Purchase this product by conducting the payment transaction.
Notes:	The users' overall feedback about this task will be recorded/noted.
Task 6: < Contact Customer Services > You have a request about the delivery time for your purchased product. What do you do?	
Goals / output:	A successful use of "Contact us" function, resulting in sending the request. To find out to what extent sending a request about a product is easy.

Inputs / Assumptions:	Has the Order ID. The product was already purchased in task 5.
Steps:	Go to “more” Click on “Contact us” Put your email address Chose the request type Type in the request in the text box Answer the challenge question Click the send button
Time for expert:	02:20 minutes
Instructions for user:	Assume you have a request about the delivery time for the product you just purchased. Please send a request to the support team via “Contact us”.
Notes:	The user will send the request about an already purchased product if he/she did not succeed in task 5.

Appendix H: Usability Introductory Page and Questionnaire

Introductory Page

User Questionnaire

Information

Thank you very much for taking the time to participate in this research. This study is a part of a PhD research and the participation of this usability test/experiment will significantly contribute to the success of this research. This study aims to evaluate the current usability level or a mobile website/application "Souq.com – سوق.كوم" from the user perspective in Saudi Arabia. Please give your opinion and/or preferences honestly and frankly; there are no right or wrong answers.

Outline

This interview includes two main sections about the underlined mobile website/application. A first section is about the user background and, the second section is a multiple choice questions to illustrate you satisfaction level about the underlined website/application.

Confidentiality

Please be assured that any information provided will not be used for any commercial purpose and no one will have access to this information apart from the researchers. Also please feel totally safe, that any information provided will be treated anonymously in the strictest confidence and none of the participants will be individually identifiable in the resulting thesis, reports or other publications.

These data will be retained securely in the University of East Anglia premises for ten years and after that it will be destroyed. You are, of course, entirely free to discontinue your participation at any time or to decline to answer a particular question.

Thank you again for taking the time to respond to this interview. If you have any further questions please contact the researcher (Mr. Mohammed Alqahtani) by email at m.alqahtani@uea.ac.uk or the project supervisor Dr Pam Mayhew at p.mayhew@uea.ac.uk.

Mr. Mohammed Alqahtani
School of Computer Science,
University of East Anglia
Norwich, NR4 7TJ

Section A: User Profile

1. Age?
   - ❑ < 20
   - ❑ 20 – 34
   - ❑ 35 – 49
   - ❑ 50 – 65
   - ❑ > 65

2. Annual Income (in SAR)?
   - ❑ < 50,000
   - ❑ 50,000 – 100,000
   - ❑ 100,001 – 150,000
   - ❑ 150,001 – 200,000
   - ❑ 200,001 – 300,000
   - ❑ > 300,000

3. Overall, how do you rate your mobile skills?
   - ❑ No Skills
   - ❑ Beginner
   - ❑ Intermediate
   - ❑ Advanced

4. How long have you been using mobile internet?
   - ❑ Less than a year
   - ❑ 1-2 years
   - ❑ 3-5 years
   - ❑ More than 5 years

5. How often to you use mobile transactions?
   - ❑ Every day
   - ❑ Weekly
   - ❑ Monthly
   - ❑ Hardly ever
   - ❑ Never

6. The highest degree obtained?
   - ❑ Under Bachelor
   - ❑ Bachelor
   - ❑ Higher Diploma
   - ❑ Master
   - ❑ PhD/Doctor
   - ❑ Other:…….

Section B: Questionnaire

7. System Usability Scale (SUS)
   **After using the website/application, please indicate your opinion accordingly.*

	Strongly Disagree				Strongly Agree
	1	2	3	4	5
I think that I would like to use this application frequently	❍	❍	❍	❍	❍
I found the application unnecessarily complex	❍	❍	❍	❍	❍
I thought the application was easy to use	❍	❍	❍	❍	❍
I think that I would need the support of a technical person to be able to use this application	❍	❍	❍	❍	❍
I found that the various functions in this application were well integrated	❍	❍	❍	❍	❍
I thought that there was too much inconsistency in this application	❍	❍	❍	❍	❍
I would imagine that most people would learn to use this application very quickly	❍	❍	❍	❍	❍
I found the application very awkward to use	❍	❍	❍	❍	❍
I felt very confident using the application	❍	❍	❍	❍	❍
I needed to learn a lot of things before I could get going with this application	❍	❍	❍	❍	❍

8. Overall, I would rate the user-friendliness of this product as:

Worst Imaginable	Awful	Poor	OK	Good	Excellent	Best Imaginable
❍	❍	❍	❍	❍	❍	❍

Appendix I: The Modified SUS Questionnaire

Original SUS Statements	**The Modified SUS Statements**	**The SUS Statements used in this Study**
I think that I would like to use this system frequently	I think that I would like to use this product frequently	I think that I would like to use this application frequently
I found the system unnecessarily complex	I found the product unnecessarily complex	I found the application unnecessarily complex
I thought the system was easy to use	I thought the product was easy to use	I thought the application was easy to use
I think that I would need the support of a technical person to be able to use this system	I think that I would need the support of a technical person to be able to use this product	I think that I would need the support of a technical person to be able to use this application
I found that the various functions in this system were well integrated	I found that the various functions in this product were well integrated	I found that the various functions in this application were well integrated
I thought that there was too much inconsistency in this system	I thought that there was too much inconsistency in this product	I thought that there was too much inconsistency in this application
I would imagine that most people would learn to use this system very quickly	I would imagine that most people would learn to use this product very quickly	I would imagine that most people would learn to use this application very quickly
I found the system very cumbersome to use	I found the product very awkward to use	I found the application very awkward to use
I felt very confident using the system	I felt very confident using the product	I felt very confident using the application
I needed to learn a lot of things before I could get going with this system	I needed to learn a lot of things before I could get going with this product	I needed to learn a lot of things before I could get going with this application

Appendix J: Usability Problems Discovered

Problems Severity
0: Not a problem
1: Cosmetic: need not be fixed unless extra time is available on project
2: Minor: fixing this should be given low priority
3: Major: important to fix, so should be given high priority
4: Catastrophic: imperative to fix this before product can be released

Relevance	Severity
The registration form has too many fields that the user does not find it necessary to fill up and most of the fields are not marked with (*) meaning is not important to fill (Home telephone number).	2
The "Select issue type" in "Contact us" form is complicated and has many details that confuse the user.	2
After clicking "Contact us" an intrusive popup message showed up "SOUQ: We are contacting Souq.com….." which confuses the user.	3
Different types of mobile phones in the same classification (LG & Apple).	4

Data entry	Severity
Text editing not easy in changing the name in the registration form, using the keyboard and small screen.	3
Inserting the card details is not easy for conducting the payment as the payment card has long number and the buttons are small to click quickly.	3
Very difficult to fill the forms fields as there is no Next/Tap button to move on to the next filed.	4
Small area to click, the user presses the "name" text filed few times to get the curser inside.	1
Changing the username was difficult (e.g. Select the text and deleting).	1
Choosing the birthday was difficult and not easy to fill, small area to click the numbers.	3
Low input solution, it's hard to operate GUI widgets without a mouse, and it takes longer and are more error prone. Test entry is particularly slow and littered with typos.	3

Design/Layout	Severity
Choosing gender was confusing because the menu appeared from the bottom and not from where the user press the button.	3
The yes button in the pop up message after choosing log out is confusing as it located in the left where it should be in the right, as the language is Arabic.	1
Doesn't Automatically go to the main page after the user finished registration.	3
The registration button has no eye-catching colour or design so the user can easily locate and press.	1
The message "Move the page from the edges to browse other offers" confuses the user (intrusive popup pages) while looking for a product of mobile phone.	2
The buttons "Buy now" confuses the user when trying to add an item to the basket as the name does not reflect the function.	2
The product information/description and specifications can't be browsed easily as their links is not clearly presented for the user.	2
The user finds the content display/Navigation in the main page is not easy to browse through for the user to find what he/she is looking for.	2
The user can't easily locate the author name in the author list after putting all the specification via the filter button.	4
The user can't find the authors name in the author section as there are too many author names.	4
Using the filter is difficult and confuses the user because there are a lots of options.	3
The keyboard window cover the Email text field while filling in the registration form.	2
The user can't easily find the Basket button after he/she find the product.	3
The user can't easily add a product to the Basket as there is no "add to the basket" button.	3
The authors' names list contains some names written in English and some others written in Arabic which really confuses me.	2
The filter button has only a symbol and has no a name to reflect the function which usually lead the user to miss it.	2
The cancel button is written in English after typing in the search bar, although the chosen language was Arabic.	2
The cancel button placed in the right position (where it should be place in the right, Arabic format).	1
Cancel button remove the whole typed texted completely.	1

The results were not sorted by price after using the search function.	3
When writing in the search bar, the writing direction is towards the right, where it should be toward the left as Arabic language format.	3
The button "Slide to pay securely" Should be written in Arabic in the payment page.	3
The “Processing ..." page is written in English after entering the payment details.	3
The "Payment Confirmation" page is written in English after the "processing" page.	4
The "Continue" button is written in English in the "Payment Confirmation" page.	2
The final "Payment Confirmation" page is written in English.	4
Button for increase and decrease the amount doesn't handle the '0' amount.	3
Choosing the city is confusing while filling a new address as the menu appears from the bottom not from where the button was pressed.	3
Intrusive popup pages "Souq… An error has occurred. Please try again later in few minutes..." while trying to add an address confuses the user.	2
After filling all the payment information the user lost all the entered data by mistakenly visiting another page.	2
The "the verified by VISA" page was written in English.	1
Choosing the district was not easy (Scroll down a long list to find the user's district).	2
The user can't delete more than one item at a time in the basket page.	2
Putting the Card dates was confusing as the drop menu showed up from the bottom.	2
The option to make the address as a main address is confusing as there is no labels or text to explain whether it is "On" or "OFF" in add new address page.	2
The message about the house number is confusing as it says the "house number" in English where the rest of the message is Arabic.	2
The user can't buy only one product from basket.	2
The number in challenge question is written in English in "contact us" page.	3
The Challenge question doesn't accept Arabic numbers where the question is written in Arabic.	2
The user can't copy the "Order ID" from "Track your order" page.	2
The user Lost all the data entered in "Contact us" after getting out the page.	2
The Challenge question doesn't accept the answer while the keyboard is Arabic.	3
The user find it difficult to find the colour for the product mobile phone (Galaxy) as it's not clearly stated or presented.	3
The user couldn’t easily find the description of a mobile product (Galaxy) after entering a product page.	3
The user can't locate the filter button as its button is small and its place not clear.	3
Using the filter options are complicated as the user needs to press "Apply" for each specification.	2

Completeness	**Severity**
Difficult to choose the username, there is no guidance or suggestions especially when the username is already taken by another user.	3
The system doesn't tell me what was wrong with my username and I have to change and guess the problem myself (e.g. does not accept the symbol "&").	2
After the user finishes the registration, no activation code was sent to the email, in this case anyone would register on behalf the user using his/her email.	3
The user can't find the previous account name, in case the username was already registered before.	2
The popup message "WRONG_VALUE_OF:lastname" does not give enough information about the mistake and how to solve it.	3
There is no enough information in the product list when looking for a mobile phone (Galaxy) (e.g. colour).	2
The user can't find the necessary information in the thumbnails view list to find the product he/she looking for.	2
The user finds the presentation of the products has not been effectively used the area of small screen of the smart phone (e.g. to present as much as possible).	2
There is no ability to search within the category of Mobile devices.	2
There is no advance search option so the user can search for a particular mobile phone with specified characteristics.	3
There is no filter option after the user used the searches function for a Samsung mobile.	2
The user can't use the filter after the search function in the main page.	2
The results were not sorted by price after using the search function in the main page.	2
There is no option to search mobile by colours or storage sizes.	2
The system doesn't show similar items while browsing an item.	2
Can't use a search function inside the book category.	3
Can't use a search function inside the publisher section.	2
After adding the address there is no confirmation message or email to the user.	4

The label text for Landline was missing and not clear for the user.	2
Choosing the district in the registration form confuses the user as there is no classification by area or county and there is no search function.	3
The "Payment Options" page gives only one choice "The user account" and cannot choose to pay by card or anything else.	4
The Challenge question is confusing the user as no justification/description for its purpose.	2
The user didn't get a feedback after sending the request through "contact us" form.	3
There is no Date for the Order ID in the page of "Track your Order".	3
Can't use a search function inside the Author section.	2

Visibility	**Severity**
Registration option/button was difficult to find from the main page of the application (e.g. the user has to visit many pages to find it).	3
Can't find the Mobile section easily from the homepage and had to search different pages to find it.	3
Can't find the filter option/button inside the "Samsung" category/section in order to set the mobile specifications (e.g. model, colour and storage size).	3
Can't locate the Book sections from the main page of the application and from the categories page.	2
Can't find the filter option/button inside the "Book" category/section in order to choose the book specifications (e.g. author name, publisher and the type).	3
Can't easily Locate the Filter option/button from the main page.	3
Can't find the "Order ID" for the purchased product, in order to track the product or to send a request about it.	4
Can't easily find the "Contact us" option/button from the main page, in order to contact the support team.	3
Can't find the correct request type in the "Select issue type" in the "Contact us" page form.	2

Download delays	**Severity**
Slow loading time after pressing the registration button in the registration page.	3
Slow loading time when the user open pages through the application (especially Main & Basket Page).	3
Adding the item to the basket took very long.	3
Slow page Loading time when trying to visit the page "Review Order/مراجعة الطلب".	3
Slow page Loading time after clicking the '+' to increase the quantity of the product.	3
Slow page Loading time after clicking the "The user account" in the payment page.	3
Slow loading for The "Payment Confirmation" page.	3
Slow page loading when pressing the button "more".	3

Correctness	**Severity**
The Basket named as "Shopping" which confuses the user MP.	2
The system doesn’t allow the user to register and show a message "The server is not working".	2
Although the user choose the sup-category Samsung, an apple phones showed in the list.	3
The search engine fails to provide relevant information ("inaccurate results") in the homepage of the application when trying to search for a product (e.g. football).	3
The user can't find the publisher, although the name was entered مكتبة جرير أو جرير	2
Deleting button was labelled as editing in the basket page which usually mislead the user.	3
Phone number in the "Add New Address" doesn't accept Numbers.	4
Landline number in the "Add New Address" doesn't accept Numbers and there is no guidance.	3
The first try to add an address was un successful and the system did not give any feedback.	1
The user directed to a webpage site version instead of the application after the payment went through.	3
There is no way to go back to the application after the payment was proceed successfully.	2
The "Payment Options" page doesn't response to the user (is not responsive) and all buttons cannot be clicked.	3
The application crashes after choosing the payment choice "The user account" (Three times crashes).	4
The application crashes after trying to delete an item from the basket.	4
The application crashes twice for no reason while adding a new address.	4
The delete button didn't work in the basket page.	3
The button "Add address" is not responding (none responsive) and cannot add my address.	3
Unresponsive "Card number" filed while adding the payment card details.	4
The button "Edit" is not responding while the user tries to press it many times.	3
The "Order ID" text accept any fake number in the "contact us" form.	4
The application crashes while the user was trying to look for the "Order ID".	4
The filter doesn't give relevant results in the book section.	3
The home button is not responding in the main page.	3

Comprehension	Severity
The registration button is not clear for the user whether it's for a new registration or not.	2
The user does not know which name should he/she uses, the first or second for the author name.	2
The names "جرير" and "مكتبة جرير" confuses the user as they look very similar.	2
The further information button '!' confuses the user of what it actually does.	2
The Arabic label text for Mobile was "هاتف" (Phone) is not clear for the user (e.g. mobile phone or telephone).	1
The button "Slide to pay securely" is confusing the user as the user has to slide the button instead of pressing.	2
Duplicate page titles confuses the user "Payment Confirmation" while paying for a product.	1
Filling the phone number confuses the user as he/she does not know to put a zero or not.	1
The fields City and Area are confusing as the user Could not differentiate between them.	1
The button Add address is confusing the user (e.g. is it for a new address or for a second address?).	1
The button "Revise the order" confuse the user as it doesn't mean for paying.	2
There are two buttons "Contact us" and that's confuses the user.	3
A message "The server is not working" confuses the user as he/she does not know what to do.	3
The message "we are contacting Souq.com. Thanks for your patience." after clicking "Contact us" confuses the user as there is no point of it for the user.	2

Appendix K: Observation Sheet
Usability Test Observation Sheet

Date:……

Participant's Identification Number:……

Task#

- **Time: …….**
- **Task allocated time:**

Session Starts at:…… **Session ends at: ……**

No.	Usability Problems Discovered
	…….. …….. …….. ……..

Task Completion Rate:

- ❑ **Successful**
- ❑ **Unsuccessful**

Notes:

……
……
……
……
……

Appendix L: List of Publications

List of Publications

Journals:

- Alqahtani, M., Al-Badi, A & Mayhew, P 2012, "The Enablers and Disablers of E-Commerce: Consumers' Perspectives". *The Electronic Journal of Information Systems in Developing Countries EJISDC, vol.54, no. 1, pp. 1-24.*
- Alqahtani, M., Al-Badi, A & Mayhew, P 2014, "Exploratory Study of M-Transaction: User's Perspectives". *The Electronic Journal of Information Systems in Developing Countries,* 60, no. 7, pp. 1-22.
- Alqahtani, M. and Mayhew, P. 2014, "Developing a Framework for Examining the use of Mobile Transactions in Saudi Arabia: the User's Perspective" *International Journal of Advanced Computer Science and Applications(IJACSA), Special Issue on Extended Papers from Science and Information Conference 2014, 2014. http://dx.doi.org/10.14569/SpecialIssue.2014.040309*
- Alqahtani, M. A., Alhadreti, O., Alroobaea, R. S., & Mayhew, P. J. (2014). "Investigation into the Impact of the Usability Factor on the Acceptance of Mobile Transactions: Empirical Study in Saudi Arabia". *International Journal of Human Computer Interaction (IJHCI), 6, no. 1.*

Conferences:

- Alqahtani, M, Alroobaea, R, & Mayhew, P 2014, 'Building a conceptual framework for mobile transaction in Saudi Arabia: A user's perspective', In Science and Information Conference (SAI), IEEE, London, August 2014.

Poster

- Alqahtani, M, 2014, 'Investigation into the impact of the Usability Factor on the Acceptance of Mobile Transactions: Empirical Study in Saudi Arabia', In Saudi Students Conference – UK, 8thSSC 2014, London.