

**E-Commerce Diffusion in High-Income Developing Countries:
Determinants of E-Commerce Adoption and Post-Adoption of
Saudi Enterprises**

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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

September 2012

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ABSTRACT

The ubiquitous nature of e-commerce in developing countries demands an innovative conceptualisation of its adoption and post-adoption that responds to various contextual circumstances. Despite efforts made to investigate e-commerce adoption in developing countries, the literature suggests that the focus is mostly on a single perspective of a single adoption stage and concentrates on specific locations. To extend our understanding of the phenomenon, an exploratory phase is undertaken through a literature review as well as an exploratory investigation. Consequently, a holistic framework is integrated that includes organisational and environmental factors, in addition to innovation attributes.

The framework is empirically validated using a statistically representative sample size of 384 enterprises of various sizes and industries in a high-income developing country from a poorly investigated region. The empirical analysis shows that perceived benefits as well as mimetic pressure are more influential for the adoption of e-commerce and scope of use than the utilisation amongst adopter organisations. In addition to coercive pressure, the readiness of financial institutions, IT industry and the government affect the scope of e-commerce use. For adopter firms, the extent of e-commerce adoption is influenced by business process readiness, government readiness and security. Commitment, especially from top managers, is a key determinant that links e-commerce adoption to the extent of adoption and the scope of e-commerce use. The findings indicate that the proposed models are sufficiently reliable in discriminating not only adopters from non-adopters, but also the extent of adoption and use across the value chain.

Together, this research offers a multi-perspective framework of e-commerce adoption and post-adoption in high-income developing countries and identifies the factors that affect e-commerce adoption, and how these effects vary across adoption stages. It presents insight into various issues that influence e-commerce adoption and post-adoption in this little-explored region, which will be of interest to researchers, practitioners and policy makers.

Keywords: Innovation diffusion; e-commerce adoption; e-readiness; developing countries; Saudi Arabia.

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Acknowledgements

First and foremost, I give praise, honour and glory to Allah the Lord of the universe, 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, who has been of 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.

I would truly like to thank all those who took part and participated in this research, especially those who were interviewed in the exploratory study and those involved in the questionnaire evaluation (judgement) and pre-testing process. In particular, special thanks go to Mr. Abdullah M. Al-Dossari and Mr. Abdullah F. Al-Ruhaili 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, translation and distribution. I would also like to express my thanks to Prof. Stuart Barnes, Dr. Peter Moffatt, Dr Stephanie Aspin and Dr Sreeparna Ghosh from the UEA for their valuable consultations in the questionnaire and its analysis. For those whom I have not acknowledged directly, I am very grateful to you all and wish you the success and pleasure you desire.

Last but not least, my gratitude and love to my mother, my wife and my children, whose patience, prayer and faith that my work would be completed sustained me and were a great comfort to me. As he passed away during my PhD study, I dedicate this work to the soul of my father, who was my biggest supporter and best friend. May Allah have mercy upon his soul and grant him the highest level in Paradise.

CHAPTER 1: Research Introduction

1.1 Overview

This chapter provides an introduction to this research. It introduces the research context and addresses general background about developing countries. It then provides general background about Saudi Arabia and its ICT development and initiatives, as it represents the research context. The next section gives an overview of the research problem as well as the research objectives. It then briefly discusses the research design and scope. A brief description of the research outline is provided towards the end of this chapter.

1.2 Background

The Internet has changed the mode of communication and created opportunities for businesses throughout the world. The progress made in Information and Communications Technologies (ICT) development in many countries has motivated organisations to move towards the "e" era, introducing the electronic commerce (e-commerce) phenomenon. In the last two decades, many enterprises have started to use the Internet to overcome the disadvantages of distance and be closer to their customers and to compete with other companies not only nationally, but also internationally. Despite the global diffusion of e-commerce worldwide, firms in many developing countries have not taken this opportunity to gain benefits from e-commerce. The uneven diffusion of the Internet and e-commerce creates the so called digital divide concern, which leads to widening the gap between the rich, developed world and poor, developing countries (Franda, 2002).

1.2.1 Developing Countries

Based on the level of development, the world is generally divided into developed and developing countries although no conclusive definition of these terms can be recognised (Bell, 1996). As some countries have more advanced and developed economies but less than those in the developed world, they could not be appropriately placed into these two categories. These nations have emerged as a new category called Newly Industrialised Countries (NICs), which includes Brazil, China, Malaysia, South Africa and Turkey (Bozyk, 2006; Mankiw, 2007). Some researchers introduced another group called Least Developed Countries (LDCs), which is part of the developing world, but with the lowest indicators of development and suffer from long-term growth constraints, including low development of human resources and severe weakness of structural, economical, social and political frameworks (Austin, 1990). The United Nation (UN) classified 48 countries as LDCs, from which 33 countries are in Africa, 13 countries in Asia and the Pacific, Haiti from the Americas and Yemen from the Arab world.

According to Annan, a former Secretary General of the United Nations (UN), a developed country is a nation that provides its citizens with a life that is safe, healthy and enjoyable (UNIS, 2000). It is common practice for the level of country development to be assessed using various statistical indexes, such as infrastructure development, life expectancy, literacy rate, and Gross Domestic Product (GDP), which is the total value of all goods as well as services produced in an economy (GDP, 2012). The World Bank classifies the development of a nation based on the Gross National Product (GNP) per capita, which measures the average income of a country's citizens, such that nations with low or middle income are classified as developing countries (Worldbank, 2011a). On average, the GDP per capita of the Gulf Cooperation Council (GCC) states is high and exceed the global average (Aladwani, 2003). Although Saudi Arabia and other GCC states have been classified as high-income economies, they are generally less advanced than developed countries in the same income group, as illustrated in Table 1.1.

Table 1.1: Digital divide between developed and developing countries

Country	Developed Countries			Developing Countries		
	USA	UK	Canada	Bangladesh	Egypt	Saudi Arabia
Income group category ^a	High	High	High	Low	Lower-middle	High
Population (millions) ^a	311.59	62.64	34.48	150.49	82.53	28.08
Secure Internet servers per one million ^a	1,563	1,590	1,369	1.0	3	22
Personal computers per 100 population ^b	79	80	94	2.2	3.9	68
Telephone lines per 100 population ^a	47	53	53	1.0	11	16
Mobile subscriptions per 100 population ^a	93	131	80	56	101	191
Internet users per 100 population ^a	77.9	82.0	83.0	5.0	38.7	47.5
Broadband monthly fee tariffs (US\$) ^b	14.95	22.51	16.50	155.05	24.39	57.73

a. WorldBank (2011b); b. World Economic Forum (2010)

It has been argued that income classification does not necessarily reflect an accurate ICT diffusion in a country (Hafez, 2006). Hence, the UN has developed compound indicator statistics, called the Human Development Index (HDI), while the International Monetary Fund (IMF) applies a different classification index to gauge the level of both social and economic development by assessing per capita income level, export diversification and the extent of integration into the global financial system (IMF, 2011). Such a classification excludes an oil exporter country from being a developed country if around 70% of its exports are oil even if it has high GDP (IMF, 2011). From a broad perspective, developing countries are characterised by a highly dependent economy, rural social structure and widespread poverty (Chaliand, 1998).

As far as ICT is concerned, developing countries tend to have poor development of their ICT infrastructure (Uzoka et al., 2007). For the adoption of e-commerce, e-readiness is an essential component, which represents the capability of a country “*to create, diffuse, adopt and use various components of the networked economy*” (Uzoka et al., 2007, p. 2). Mutula and Brakel (2006) state that e-readiness in developing nations is low compared with the developed world, which could result in a low e-commerce adoption and utilisation in the developing world. In association with the poor development of their ICT infrastructure, developing countries tend to lack essential frameworks for e-commerce development, such as economic and socio-political frameworks (Uzoka et al., 2007). In particular, developing countries have poor infrastructure and less productive human capital and business models essential for the transformation to digital economies (Dewan and Kraemer, 2000). Hence, policy-makers in developing countries need to consider the general difficulties related to ICT access and usage that organisations encounter (UNCTAD, 2008). This is of high importance to developing economies, where the literature suggests that the likelihood of IT project failure is very high (Heeks and Bhatnagar, 1999).

Many countries nowadays are e-ready and have great investment in the ICT development, even though it is, according to Bell (1996), a complicated process. This motivated many organisations all over the world to consider aligning their strategies in order to maximise opportunities provided by the Internet (Chan and Lu, 2004). However, it has been argued that the majority of e-commerce studies have been on the developed world, and only a few efforts have been focused on investigating the adoption and diffusion of e-commerce in developing economies (Uzoka et al., 2007; Hawk, 2004). While taken for granted in the

developed world, the e-readiness perspective motivated many researchers to consider e-commerce research in developing countries as a very active research area that is growing rapidly “*with a vibrant future, both from an academic and from a practitioner-engagement perspective*” (Boateng et al., 2009, p. 31). Molla and Licker (2005b) argue that the e-readiness state in the context of developing countries can offer a new perspective for investigating and understanding e-commerce adoption and utilisation. This is especially important for countries that are 'e-ready' to move toward e-commerce and can help responsible authorities in devising the proper plans.

1.2.2 The Saudi Arabian Context

Saudi Arabia is one of the Middle Eastern Arab countries and has an area of approximately 2.149 million square kilometres of the Arabian Peninsula, with a population of around 27 million (MOFA, 2012). It is one of the six high-income GCC states and has been recorded as having one of the highest population growth rates (1.52%) in the world, with a median age of 25.7 years and a literacy rate of 86.6 percent (CIA, 2012). According to the US Department of State (2011), Saudi Arabia joined the UN in 1945 and joined the World Trade Organization in 2005. Saudi Arabia has an oil-based economy with the largest oil production capacity in the world and has roughly one-fifth of the world's proven oil reserves (EIA, 2010). It is the world's first oil producing nation, which accounts for about 90% of its exports and 75% of the government revenues (Reuters, 2011; MOFA, 2011).

Being aware that oil is a depleting natural resource, the Saudi government has used these revenues to spend on public and private sector programmes (Al-Sudairy, 2000). In particular, a five-year economic development plan was designed in 1970 by the Saudi government to achieve most of its basic infrastructure and social projects as well as the emergence of a dynamic private sector (Al-Sudairy, 2000). Due to this vast oil resource, Saudi Arabia has emerged from being an insular and underdeveloped desert to become one of the wealthiest countries in the region (BBC, 2012). In the last few years, the Saudi government has taken various measures to improve the investment climate by removing barriers for foreign investors (Rao, 2006). Accordingly, Saudi Arabia has been rated by the International Finance Corporation (IFC) as the best investment location in the Arab world (Rao, 2006). As part of its effort to attract foreign investment, Saudi Arabia has recently initiated a large-scale economic development plan between 2010 and 2014 on social development and infrastructure projects that is worth around \$370 billion (CIA, 2012).

According to the IT Report by Business Monitor International (BMI), Saudi Arabia has the largest IT market in the Gulf region, with an estimated value of US\$3.6 billion in 2011 and expected to reach US\$4.9 billion by 2015 (BMI, 2011). The report has also predicted an increased spending on ICT infrastructure and massive investments in hardware and software, which could also be translated into long-term investment growth in IT services (BMI, 2011). In addition to government support, the growing youth population in Saudi Arabia is expected to drive demand for IT spending, as the BMI predicts that per-capita IT spend will rise to US\$186 by 2015 (BMI, 2011). According to the US-Saudi Arabian Business Council, Saudi Arabia is expected to invest more than \$10 billion between 2005 and 2020 in new data information technologies (US-SABC, 2005). Another recent survey revealed that more than 80% of firms in Saudi Arabia are IT adopters (MCIT, 2011a).

Due to its increasing role in the economy, Saudi Arabia has recently placed high priority on ICT development, which has spread rapidly to cover most sectors in order to enhance productivity and advance performance (MCIT, 2011a). At the beginning of this century, the Statute of Telecommunications was approved and the Communications and Information Technology Commission (CITC) was established as the official regulator for the telecom sector to ensure the provision of telecom services all over the country (MCIT, 2011b). The Ministry of Communications and Information Technology (MCIT), on the other hand, has the responsibility for setting up policies, developmental plans and laws related to ICT (MCIT, 2011c). As an important element of ICT development, the Saudi Network Information Center (Saudi NIC) was established and the National Center for Digital Certification (NCDC) was initiated for managing the Public Key Infrastructure (PKI), on which secure online services are based (MCIT, 2011d).

As part of its ICT plan, MCIT formulated the National Communications and Information Technology Plan (NCITP), aiming for “*the transformation into an information society and digital economy*” (MCIT, 2009, p. 9). Accordingly, many ICT initiatives and awareness programmes have been instigated by the Saudi government, particularly for citizens and the public sector. Alfuraih (2008) found the use of credit cards, as a payment method, is low with a ratio of 1:10 credit cards to debit cards in Saudi Arabia. To motivate businesses over the Internet, Saudi Arabia was one of the earliest in the region to develop and adopt a local, specified e-payment system, i.e. SADAD. The Saudi Arabian Monetary Authority (SAMA) launched SADAD in 2004 to serve as an e-payment system to electronically transfer money, particularly to pay bills to registered organisations through standard

banking channels, such as ATMs, phone banking and Internet banking (SADAD, 2011). In 2007, the Saudi government established the Cyber Crime Act for digital crimes, such as online hacking, fraud and privacy violations (CITC, 2012). To spur the growth of e-commerce, e-mall is amongst e-marketplace initiatives that have recently been introduced to support and facilitates shipping and payment in order to serve enterprises as well as individuals who wish to do business over the Internet (eMall, 2011).

The Saudi government allowed public access to the Internet in 1999, although it was officially made available in 1997 (Alharby, 2006). As one of the fastest growing rates of Internet use, statistics from MCIT in Saudi Arabia shows that the number of Internet users within the country increased from around one million users in 2001 to reach more than 9.3 million by the end of 2008 with a penetration rate of 36% of the population (CITC, 2011). Recent figures show that the Internet users in Saudi Arabia exceeded 13 million users in 2011, as illustrated in Table 12, which is a relatively high Internet penetration rate (47%) compared with other Middle Eastern countries. Other statistics from Internet World Stats (2011) indicate an increased number of non-transactional activities over the Internet within the country, such as online discussion forums as well as image sharing and social network applications. For instance, there are more than 4.5 million (around 16% of the population) Facebook users in Saudi Arabia according to Internet World Stats (2011).

Table 1.2: Key indicators of ICT sector in Saudi Arabia (MCIT, 2012)

Indicator	2008	2009	2010	2011	2012-Q1
# working land lines (millions)	4.10	4.17	4.13	4.60	4.60
# working mobile phones (millions)	36.00	44.80	51.60	53.70	54.30
# Internet users (millions)	9.30	10.30	11.40	13.60	14.20
# mobile broadband subscriptions (millions)	0.29	1.13	2.70	11.34	11.95
# fixed broadband subscriptions (millions)	1.04	1.44	1.74	1.95	2.16
% land lines penetration (line/100 population)	15.8%	15.5%	15.0%	16.2%	16.0%
% mobile phones penetration (user/100 population)	138.0%	167.0%	186.0%	188.0%	188.5%
% Internet penetration (user/100 population)	36.0%	38.0%	41.0%	47.5%	49.1%
% mobile broadband penetration (user/100 population)	1.1%	4.9%	9.7%	39.6%	41.4%
% fixed broadband penetration (user/households)	17.0%	24.0%	27.0%	33.0%	36.0%

Recent e-readiness statistics by the Economist Intelligence Unit (EIU) revealed that Saudi Arabia has been ranked the 51st amongst seventy countries with an e-readiness score of 4.75 (in a 10-point scale) (EIU, 2010). The growth of e-commerce in Saudi Arabia, as reported by the Arab Advisors Group (AAG), has exceeded other Arab nations, motivated by government support as well as Internet penetration growth (AAG, 2009). According to

Visa, Saudi Arabia is one of the largest markets for e-commerce in the region with online shopping spending that reached \$520 million in 2010 and was expected to increase (Arabnews, 2011). Recent statistics related to the use and trends of the Internet in Saudi Arabia by AAG (2011) revealed that around 39% of Saudi Internet users are involved in e-commerce activities, particularly electronics, software, hotel reservations and airline tickets. The survey also estimates the number of those users to be around 3.1 million (around 12% of the population), who have spent an estimated US\$3 billion on online transactions in 2010. Interestingly, around one-fifth of those respondents who have a broadband connection share it with their neighbours (AAG, 2011).

Motivated by the increasing percentage of Internet penetration and ICT development, various businesses over the Internet have recently started to appear in Saudi Arabia. Recent statistics revealed an increased number of registered Saudi domains that reached 29,987 by the end of 2012, with 63% being commercial (com.sa) websites (SNIC, 2012). While various types of online businesses and e-marketplaces started to appear within the country, e-marketplaces via online discussion forums have emerged as the most common type of business over the Internet, where contacts are usually through forum negotiations and then via mobile phones. Interestingly, new business activities via social network and photo sharing applications have recently started to appear in the region, in which many sellers can advertise their products and offers not only through social networks (e.g. facebook.com; twitter.com), but also via photo sharing applications (e.g. instagram.com; flickr.com). In this type, sellers market their items in these web and mobile applications and contacts usually take place via free mobile messaging applications (e.g. WhatsApp). Surprisingly, some of these Internet services have been banned by the government and some e-marketplaces could not continue their services (BBC, 2013; Alriyadh, 2013).

1.3 Problem Statement and Motivation

The implementation of information systems (IS) usually takes into account the differences that may exist on economic, social, cultural, political and legal contexts (Shore, 1998; Stiglitz, 1998; Spanos et al., 2002). Austin (1990) argues that theories developed in the context of industrialised as well as developed countries need further examination in the developing world, due to differences in economic and regulatory environments as well as cultural conditions that exist between markets in the developed world and developing countries (Dunphy and Herbig, 1995; Jarvenpaa and Leidner, 1998; Zhu et al., 2003). The literature indicates that differences in country-contexts may result in differences in the

adoption and use of ICT and its impact (Dewan and Kraemer, 2000; Clarke, 2001). In a cross-country study, Ein-Dor et al. (2004) state that differences in culture, attitudes toward ICT and socio-economic status impact the adoption of e-commerce.

Molla and Licker (2005b, p. 85) argue that “*businesses in developed and developing countries differ in respect to information technology and e-commerce context*”. They further pointed out that, due to internal and external challenges, companies in developing countries encounter higher risks with regard to e-commerce utilisation than those in the developed world. In another cross-country study of the adoption of business activities conducted over the Internet, Xu et al. (2004) state that there is a quick spread of business activities over the Internet in many developing countries. They further pointed out that enterprises in developing countries encounter technical, managerial and cultural obstacles. The differences that exist in different economic contexts, as well as the lack of rigorous studies in the developing world, limit our understanding of e-commerce drivers amongst organisations in such a world (Molla and Licker, 2005a). Therefore, rigorous research is needed to enhance our understanding of what drives as well as inhibits the adoption of e-commerce in developing-economy contexts.

Despite the fact that there have been some recent efforts to address e-commerce issues in the context of developing economies (e.g., Janom and Shanudin, 2008; Uzoka et al., 2007; Tan et al., 2007), the available literature indicates that such research activity is usually concentrated on specific locations, such as Latin America, Asia and Africa to some extent (Molla et al., 2006). It has been affirmed that developing countries in the Middle Eastern region lack social studies and organisational analysis, suggesting that this region has not yet received enough attention from scholars and researchers and that Internet-based innovation adoption remain a largely unexplored research area (Al-Yahya, 2009; Parker and Castleman, 2006; Yasin and Yavas, 2007). E-commerce in the GCC region in general, and Saudi Arabia in particular, has not been sufficiently researched, leaving a significant gap for research (Al-Somali, et al., 2011; Alrawi and Sabry, 2009; Sait et al., 2004; Al-Otaibi and Al-Zahrani, 2003). The empirical evidence from different environments increases the chances of generalising findings of e-commerce adoption in the developing-country context (Spanos et al., 2002).

The Saudi government has recently been moving strongly towards developing its IT vision starting with its large-scale e-government project. The large youth population in Saudi

Arabia compared to other GCC countries as well as the existence of branded IT companies within the country gives Saudi Arabia the advantage and competitive strength of electronic business (e-business) in the region (Al-Otaibi and Al-Zahrani, 2003). In a study of e-commerce adoption from a consumer perspective, Sait et al. (2004) pointed out that Saudi Arabia held a number of conferences, seminars and workshops organised by the Ministry of Commerce and other private and governmental bodies, aiming to introduce e-commerce initiatives throughout the country. Even though Internet usage is growing dramatically and enterprises in Saudi Arabia have always been innovators in adopting new technologies (Alharby, 2006; CITC, 2008), Aleid et al. (2009) claim that Saudi companies that have an online presence and are involved in e-commerce through their own websites are mostly large organisations, particularly banks and airline companies, while most other companies do not show any commitment towards e-commerce. Given the global widespread adoption of e-commerce and the slower than anticipated growth of e-commerce amongst Saudi companies (KACST, 2006), there is undoubtedly a need for understanding determinants that influence organisations towards e-commerce adoption and use.

According to the Saudi NCITP, *"As for e-commerce, the general observation is that its use in the Kingdom is still very limited. This may be mainly due to the incompleteness of the underlying infrastructure and related regulations"* (MCIT, 2009, p. 34). Although clearly addressing the limited use of e-commerce within the country, the NCITP gave no clear explanation for such limitation, calling for more efforts to contribute in setting plausible solutions. An empirical study of e-readiness assessment methods in developing nations conducted in Saudi Arabia found that 99% of participants interviewed believed that e-commerce is a new phenomenon that has been recently introduced in Saudi society (Al-Solbi and Mayhew, 2006). Alharby (2006) claims that e-commerce is a subject of deep debate in Saudi Arabia, and research addressing e-commerce barriers in the country is underway. Considering the limitation of e-commerce research in the region as well as the fact that e-commerce is a relatively new phenomenon for Saudi society, an argument may arise that the findings from research conducted in other regions may not be applicable to the GCC states due to differences in many circumstances, such as wealth and culture. Interestingly, Saudi Arabia is the only country from the Middle Eastern region that is amongst the Group of Twenty Finance Ministers and Central Bank Governors (G20, 2012), which makes it a unique developing nation. Taking into account the conservative nature of Saudi society as well as its gender-based segregation policy at all levels of everyday life, this research forms an interesting case study.

1.4 Research Aim and Objectives

Although there has been progress in ICT development and implementation in high-income developing countries in the last few years, the literature indicates that the adoption and diffusion of e-commerce in such countries is lower than anticipated. To shed some light on such a phenomenon, the overall aim of this research is to investigate e-commerce adoption in high-income developing countries at an organisational level, taking Saudi Arabia as a case study. Taking into account different perspectives, the objectives of this research are: (1) to devise a multi-perspective framework and specify what theoretical perspectives can be used to examine e-commerce adoption and post-adoption in high-income developing countries; (2) to explore the e-commerce situation in Saudi Arabia at an organisational level and to gain insight into various issues that may affect e-commerce adoption and post-adoption within the country; (3) to identify the particular factors that affect e-commerce adoption and post-adoption, and how these effects vary at the different stages; (4) to identify managerial and policy implications related to e-commerce adoption and post-adoption in this little-explored country.

The current Saudi Arabian situation as well as the global movement towards e-commerce gives a vital impetus to the conduct of such research. Business managers and policy makers may need assistance in enhancing organisational capabilities and providing valuable knowledge to facilitate the widespread adoption and use of the technology throughout the country. Technology vendors and service providers may also need help in identifying potential enterprises that are more likely to adopt and utilise e-commerce technologies. The present research attempts to extend IT innovation adoption literature in developing countries and evaluate the applicability of innovation theories by providing a comprehensive view of e-commerce adoption and post-adoption at an organisational level in a high-income developing country while it pursues its IT vision.

Studying e-commerce and assessing the progress made in the last few years is essential not only to disclose challenges that Saudi firms are facing, but also to offer an accurate picture to motivate solutions and highlight recommendations that would help in guiding the development and implementation of e-commerce, especially at this time of globalisation and openness of global markets. Evaluating components and requirements related to e-commerce would assist firms to determine their possible strengths and weaknesses, which in turn would help with proper planning for e-commerce adoption and utilisation to achieve its benefits. This research attempts to contribute to knowledge by

presenting new insights into determinants, both drivers and inhibitors, of e-commerce adoption and post-adoption in a developing country from a poorly investigated region that will be of interest to researchers, business managers and policy makers.

1.5 Introduction to Research Design

Investigating e-commerce in developing countries is challenging, as multiple perspectives and interpretations may need to be taken into consideration. Firms in developing countries are still facing lots of challenges to the adoption and utilisation of e-commerce, hence more exploratory processes are needed to identify these challenges. For complex social phenomena, Giddens (1984) has suggested three understanding stages of exploration, interpretation and confirmation. In the exploratory stage, the study is intended to elicit the understanding of participants' perceptions so that the main issues of the phenomenon can be identified. In the second stage, based on the interpretation of participant understanding, the main issues are identified; hence research hypotheses or propositions are generated. In the third stage, a testing of research hypotheses is conducted by empirically assessing the study framework. This design seems appropriate for studying e-commerce in developing countries, in which multiple perspectives may need to be taken into consideration.

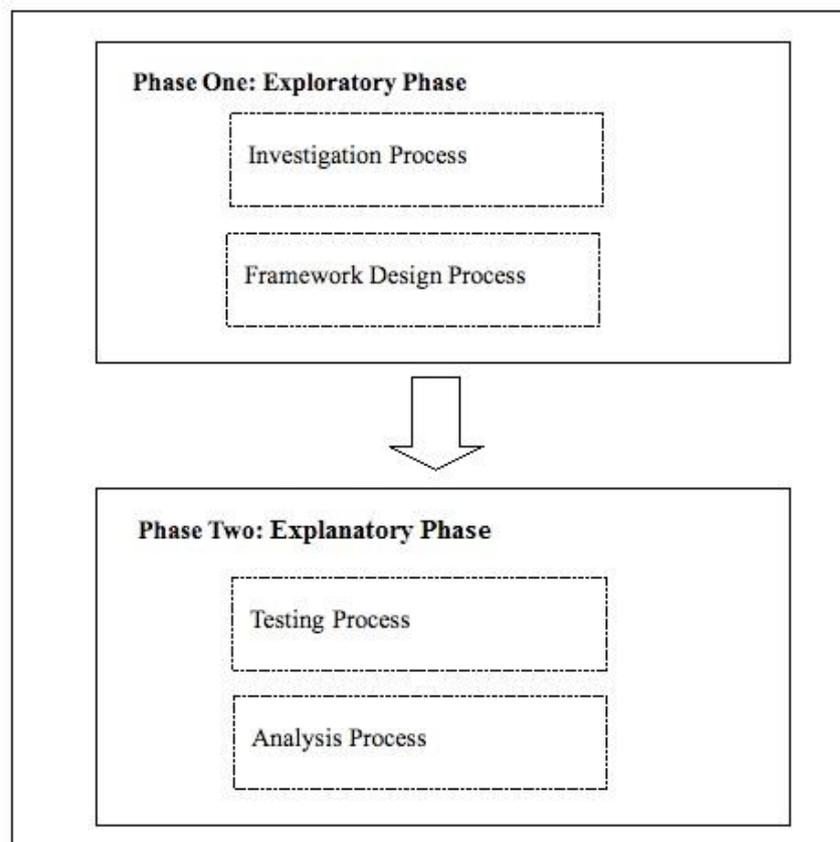


Figure 1.1: Introduction to research design

In the present research, the understanding stages of Giddens' (1984) framework were reflected in the research design, in which two main research phases are conducted, namely, an exploratory phase as well as an explanatory phase, as shown in Figure 1.1. At the first (exploratory) phase, an investigation process is conducted to gain a deep understanding of the phenomenon via a literature review and an exploratory investigation. Based on the exploratory phase's findings, research constructs are identified, and the study framework is formulated in a designing process. At the second (explanatory) phase, a testing process intends to empirically test the research framework. It is followed by an analysis process, in which various analytical techniques are conducted. Further discussion and justification of the research design is addressed in Section 3.5 of Chapter 3.

1.6 Research Scope and Delimitations

Like any research, many restrictions and limitations can exist that need to be addressed. Although there are many areas of interest for investigating the e-commerce phenomenon in developing countries, the adoption and diffusion of e-commerce in developing countries is very important research. In particular, investigating factors that influence e-commerce adoption at both individual and organisational levels needs more consideration especially in the GCC countries, where only limited studies are available. Due to variations that may exist amongst organisations in industry and size, the choice of a sample in a specific size or a business sector can be considered as a subject for research. It might be interesting to move beyond adoption to focus on e-commerce post-adoption either from a single high-income developing country or across the GCC region or the Arab states.

Due to the broad nature of this subject and the limited resources, this research is limited to examine e-commerce adoption and post-adoption in a high-income developing country at an organisational level, but not limited in specific size or business sector. This research will contribute to the literature by presenting new insights into e-commerce adoption in high-income developing countries, taking Saudi Arabia as a case study.

1.7 Thesis Outline

Chapter One: *Research Introduction* – This chapter introduces the research context and addresses the e-readiness perspective in developing countries in general and Saudi Arabia in particular. While introducing the research problem, it gives an overview of the research motivation and objectives. The chapter briefly discusses the research design and scope and concludes with an outline of the thesis.

Chapter Two: *Literature Review* – This chapter provides an analytical review of theories and approaches in the field of innovation adoption in general and e-commerce adoption in particular, aiming to introduce a theoretical background for the present research. It starts the discussion by introducing innovation theories with emphasis given to IT innovations. It then discusses e-commerce as an IT innovation and investigates e-commerce adoption frameworks in developing nations. It concludes by theoretical development of the study's preliminary framework and briefly discussing its contextual perspectives.

Chapter Three: *Research Methodology and Design* – This chapter presents a detailed description of the research design and methodology used to conduct the current research. Following a general discussion of the underlying research paradigm, this chapter intends to justify the mixed qualitative and quantitative approach that has been chosen for this research. It describes the research design and then moves to discuss data collection and sampling techniques at each stage. It then addresses the analysis techniques at each phase and discusses research credibility.

Chapter Four: *Exploratory Study and Proposition Raising* – This chapter addresses the exploratory investigation conducted in the first phase of this research. It starts with the needs for an exploratory phase and is followed by a discussion of the study methodology and administration. Great emphasis is placed on presenting the exploratory findings. This chapter then summaries the findings and provides essential justifications for the factors presented in the research framework. It discusses the identification of the constructs and displays arguments raised from relevant literature in similar contexts; therefore, research propositions are formulated.

Chapter Five: *Empirical Settings and Data Validation* – This chapter describes the research constructs and discusses the empirical setting of the survey. Great emphasis is placed on discussing the conceptualisation, operationalisation and measurement scales for each research construct. It presents the survey design, sampling and the piloting phase. After discussing the survey administration, this chapter presents a descriptive analysis of the research variables, including a data screening process as well as missing data analysis. Descriptive statistics for demographics and organisational characteristics are presented. An examination of underlying assumptions and potential biases is also undertaken.

Chapter Six: *Quantitative Data Analysis* – In this chapter, the validity and reliability of the research constructs are assessed quantitatively using the collected data. It starts by assessing the initial reliability of the research constructs. An exploratory factor analysis is conducted to statistically identify the underlying structure of the research variables. Construct validity and reliability of the resultant factors are also assessed. After validating data and examining the underlying assumptions, logistic regression analyses are executed where factors related to e-commerce adoption, utilisation and scope of use are identified; therefore, the proposed models are analysed and findings are presented.

Chapter Seven: *Discussion of Findings* – This chapter discusses interpretations based on the study findings for e-commerce adoption and post-adoption. It justifies the research findings and links them with previous work in the field as well as with the findings of the exploratory investigation (Chapter 4).

Chapter Eight: *Research Conclusions* – This chapter offers the conclusion of this thesis and explains its contribution. It discusses the theoretical contributions to the body of knowledge and implications for both business managers and policymakers in high-income developing countries. It also discusses the study limitations and possible future work. In summary, it provides a conclusion to this research and highlights its contributions.

1.8 Summary

As more and more organisations in developing countries realise the importance of e-commerce and have the desire to commence their movement toward e-transformation, it is extremely important to identify factors that influence the adoption and diffusion of such a movement. The goal of the current research is to investigate the adoption and diffusion of e-commerce at an organisational level in the Saudi Arabian context. Identifying factors, both drivers and barriers, that influence Saudi private organisations to adopt and utilise e-commerce is useful from both academic and practitioner perspectives. This study attempts to provide guidelines for policy-makers as well as relevant businesses, given the present status of e-commerce in Saudi Arabia, particularly with the planned large-scale initiatives by the government. From a theoretical perspective, this research intends to contribute to the literature by establishing a holistic framework for the adoption and post-adoption of e-commerce in high-income developing economies. It intends to broaden knowledge in the area of e-commerce adoption and diffusion in developing countries, particularly in this poorly explored region. This thesis includes eight chapters, as illustrated in Figure 1.2.

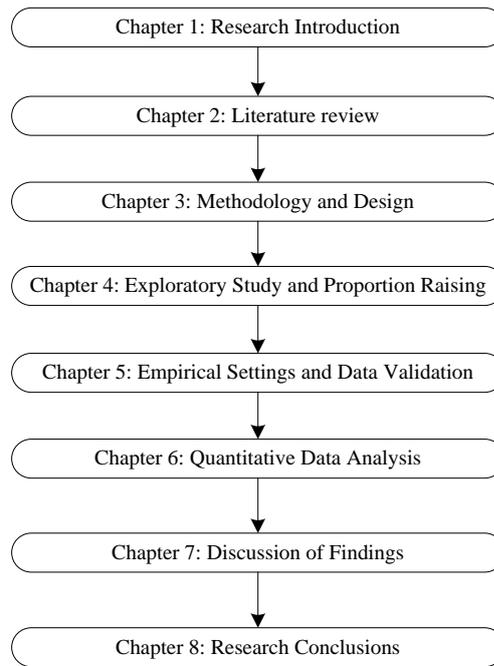


Figure 1.2: Organisation of the thesis

CHAPTER 2: Literature Review

2.1 Overview

This chapter aims to introduce the theoretical background for the research. It provides an overview of current e-commerce research themes in developing countries and discusses the adopted theme: e-commerce adoption and diffusion. It starts by briefly reviewing innovation adoption theories with emphasis given to IT innovations. It then discusses e-commerce as an IT innovation and analyse e-commerce adoption models and frameworks in the developing country context. The adoption frameworks are then critiqued and the knowledge gap is identified. To fill the gape, a preliminary framework is developed and factors represented in the framework are briefly addressed. The preliminary framework comprises: technology attributes, organisational factors, and environmental determinants.

2.2 E-Commerce Research in Developing Countries

Although e-commerce has been widely discussed in academic and practitioner literature, researchers, guided by e-commerce conceptualisation, have been investigating various e-commerce aspects, ranging from highly technical issues to management-oriented topics (Boateng et al., 2009). Consistent with Wolfe (1994), e-commerce is viewed in this study as an outcome of various antecedents or determinants. The recent progress made in ICT development and network technologies in many developing countries has motivated many organisations in such countries to start their movement to the "e" era. While studies on e-commerce have largely focused on the developed world, there has been a growing interest in studying e-commerce in developing countries (Boating et al., 2009).

Such research activities have employed several theoretical and conceptual frameworks from various disciplines in order to examine the potential of e-commerce in such nations. According to Boating et al. (2009), e-commerce research in developing countries can be classified into three e-commerce research themes: potential and constraints, adoption and diffusion, and support and implementation. The former has focused on the potential of e-commerce in developing countries and the barriers that those countries have to overcome to realise such potential, including works that focused on issues of e-readiness assessment. The second research theme has focused on various issues related to the adoption and diffusion of e-commerce in developing countries, such as technological, organisational, managerial and environmental issues. The last research theme has focused on different implementation issues related to the success of e-commerce adoption and diffusion in developing countries, such as strategy and support given to e-commerce implementation.

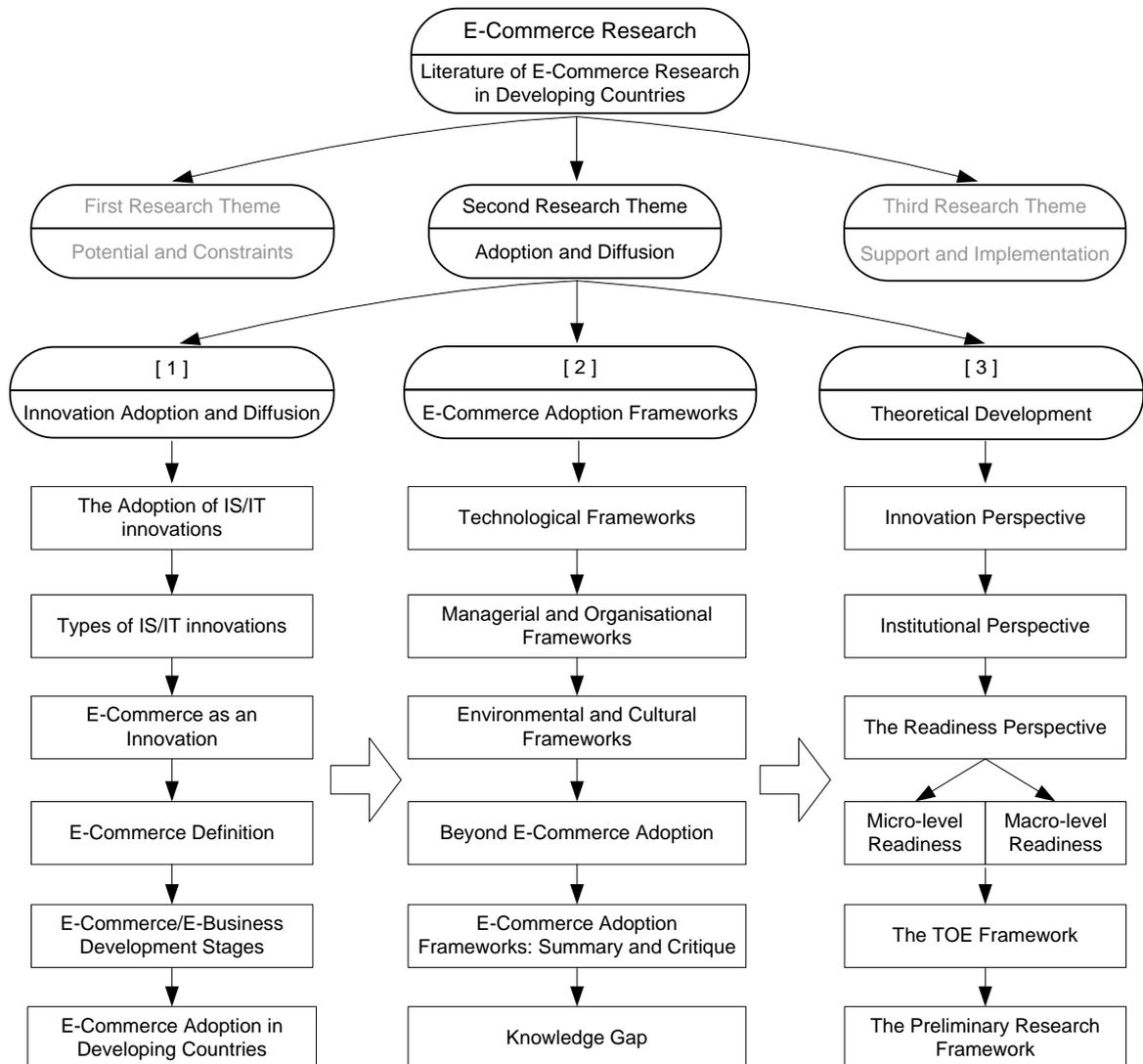


Figure 2.1: Diagrammatic representation of the literature review

This research is seen to fall into the second theme as it aims to investigate e-commerce adoption in high-income developing countries. In particular, research belonging to this theme has been conducted to understand the adoption of e-commerce as an innovation by investigating factors that influence its adoption (Boateng et al., 2009). As shown in Figure 2.1, this chapter thus starts by reviewing innovation adoption and diffusion, particularly IT innovations. It proceeds to address e-commerce as an innovation and to discuss various issues related to e-commerce adoption in the developing world. Particular attention is given to reviewing various theoretical frameworks and approaches underlying research of e-commerce adoption in developing countries. The reviewed literature is then summarised and critiqued, aiming to identify a knowledge gap with regard to the application of such frameworks and approaches. To fill the knowledge gap, a preliminary framework is then developed in order to investigate e-commerce adoption in this little-explored region.

2.3 Innovation Adoption and Diffusion

In a broad sense, an innovation refers to “*an idea, practice, or object that is perceived to be new by an individual*” (Rogers, 2003, p.12). That does not mean an innovation has to be a new discovery or invention, but it only needs to be perceived as new by the adopting unit (Zaltman et al., 1973). According to Rogers (2003, p. 5), innovation diffusion refers to “*the process in which an innovation is communicated through certain channels over time among the members of a social system*”. This definition implies four key elements that govern individual or organisational innovation diffusion process: (1) the innovation; (2) the communication channels; (3) the time; and (4) the social system. It has been suggested that the organisational adoption process is more complex, particularly for Internet-based technologies (Parker and Castleman, 2009).

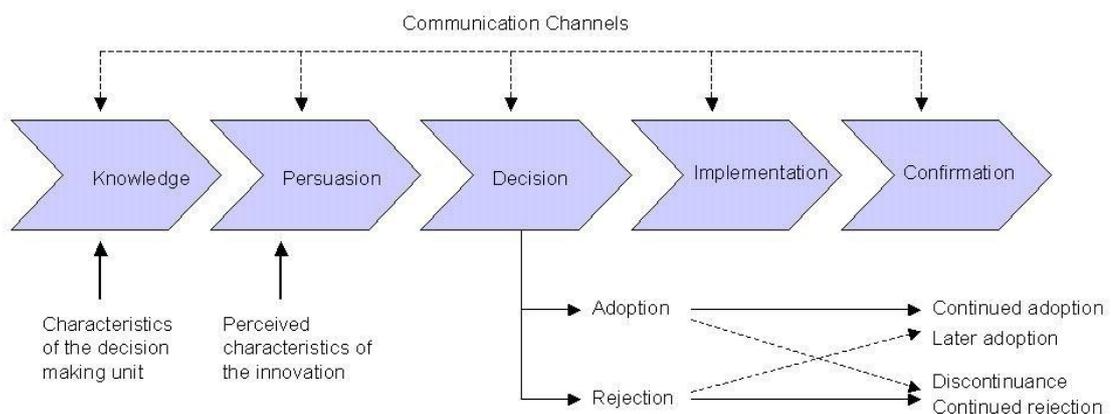


Figure 2.2: The innovation diffusion process (Rogers, 2003)

For any new innovation, it has been argued that the adoption process moves through several sequential steps (Spence, 1994). Likewise, Kwon and Zmud (1987) argue that the implementation of Information Systems (IS) goes through six stages: initiation, adoption, adaptation, acceptance, use, and incorporation, whereas Rogers (2003) proposed a five-stage innovation process and grouped them in two sub-processes: the initiation sub-process and the implementation sub-process. The innovation process, through several sequential steps, as illustrated in Figure 2.2, “*can lead to either adoption, a decision to make full use of an innovation as the best course of action available, or rejection, a decision not to adopt an innovation*” (Rogers, 2003, p. 21). Accordingly, several studies have been conducted to differentiate between adopters and non-adopters, or even different levels of adoption, introducing innovation adoption themes (Parker and Castleman, 2009).

2.3.1 The Adoption of IS/IT Innovations

The adoption and diffusion of IS/IT innovations has been of interest to researchers, industry groups, and policy makers since the early 1940s (e.g., Ryan and Gross, 1943). The literature of IS/IT innovation adoption and diffusion has been based on a set of theories and frameworks from various disciplines, e.g. psychology, sociology, economics and marketing (Gatignon and Robertson, 1989). Early studies emphasise the importance of understanding the perception of potential adopters towards an innovation (Rogers, 1983; Damanpour, 1987; Tornatzky and Klein, 1982; Moch and Morse, 1977). In the last two decades, IS researchers conducted 'quite rich but diverse' theoretical and empirical studies on IT innovation adoption at individual and organisational levels (Jeyaraj et al., 2006).

Regarding the theoretical work, the body of knowledge indicates that many innovation theories represented in different models and frameworks have been developed and employed as a theoretical foundation for investigating innovation adoption and diffusion, particularly IS/IT innovations (Molla and Licker, 2005b). Amongst these models and frameworks are Diffusion of Innovation (DOI) theory (Rogers, 1983), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Technology Acceptance Model (TAM) (Davis, 1989), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), Expectation-Confirmation Theory (ECT) (Oliver, 1980), Resource-Based Theory (RBT) (Barney, 1991), Institutional Theory (DiMaggio and Powell, 1983), Technological-Organisational-Environmental (TOE) framework (Tornatzky and Fleischer, 1990), and Perceived eReadiness Model (PERM) (Molla and Licker, 2005b). In particular, TAM and DOI are the most utilised theories in the IS adoption domain (Dwivedi et al., 2008).

In innovation adoption research, innovation theories have been applied for understanding the facilitators and inhibitors of a given innovation (Chong, 2004). Using these theories, researchers typically investigate intention to adopt (Teo et al., 2003), intention to use (Agarwal and Prasad, 2000), adoption (Thong and Yap, 1995), acceptance (Al-Somali et al., 2009), and more recently post-adoption (Zhu and Kraemer, 2005), extent of use (Gibbs and Kraemer, 2004), migration (Hong and Zhu, 2006), and continuance intentions (Al-maghrabi et al., 2011). A few efforts employed these theories to examine different stages of innovation adoption, such as assimilation (Zhu et al., 2006a) and diffusion (Kraemer et al., 2006), including different stages from initial adoption to the full use and impact.

Based on these theories, the review of the adoption and diffusion research revealed several key issues. At an individual level, these theories and models have been used to examine several IT innovations, such as electronic mail (e-mail) (Straub et al., 1997), the World Wide Web (WWW) (Agarwal and Prasad, 1997), online shopping (Al-Maghrabi et al., 2010), Internet banking (Al-Somali et al., 2009), and mobile commerce (m-commerce) (Yang, 2005). However, such research can only partially explain the phenomenon when an organisation is the adopting entity because it is more complex (Rogers, 2003). Grounded in those theories, several innovations have been studied at an organisational level, such as Database Management System (DBMS) (Grover and Teng, 1992), online payment (He et al., 2006), Electronic Data Interchange (EDI) (Ramamurthy and Premkumar, 1995), e-commerce (Uzoka et al., 2007), and e-business (Zhu et al., 2006b).

Innovation adoption studies have investigated various issues to provide insight into the adoption of an innovation. In particular, innovation characteristics are amongst the most commonly investigated factors that promote the adoption of an innovation (Parker and Castleman, 2009). In early research conducted on 75 IS studies, Tornatzky and Klein (1982) concluded that innovation attributes tend to be the main determinants of adoption. In more recent research, Jeyaraj et al. (2006) conducted a review of 99 empirical studies on IT innovation adoption at both individual and organisational levels. The review found that perceived usefulness, top management support, computer experience, behavioural intention and user support were the best predictors of individual studies. On the other hand, top management support, external pressure, professionalism of the IS unit, and external information sources were amongst predictors of IT adoption studies by firms (Jeyaraj et al., 2006). The review pointed out that relative advantage, compatibility and

complexity are amongst the innovation attributes used to examine innovation adoption at an organisational level. The review concluded that innovation attributes as well as the characteristics of the organisation *per se* are strong determinants of IT adoption.

In the e-commerce domain, Teo et al. (2004) conducted a meta-analysis of determinants affecting small and medium sized enterprises (SME) to adopt e-commerce using the TOE framework for classifying the adoption factors. The meta-analysis revealed that relative advantage, compatibility and complexity were the main determinants in the technological context. Management attitudes towards e-commerce and knowledge and expertise about e-commerce were the main determinants at the organisational context, while pressure from trading partners, pressure from competitors and external change agents were the main environmental determinants.

The majority of prior innovation adoption studies tend to assume the rationality of the innovation adoption decisions, aiming to improve technical efficiency (Teo et al., 2003). According to Molla and Licker (2005b), most studies of IT innovation adoption theories promote several dominant perspectives, i.e. technological imperatives, organisational imperatives, managerial imperatives and environmental imperatives. Even though many efforts have been made in studying innovation adoption, these authors based on their review pointed out that most prior studies attempted to demonstrate one perspective and only a few have attempted to balance the technological, organisational and environmental perspectives in a single perspective. They further claim that it is not easy to come up with “*a unifying, one-size-fits-all theory of innovation adoption*” (p. 85).

2.3.2 Types of IS/IT Innovations

In a study of IS innovations for businesses, Swanson (1994) proposed a basic typology of IS innovation types, as shown in Table 2.1. Innovations belonging to the Type I category are technical innovations, which are limited to the tasks of IS functions, such as relational database. Type II innovations apply IS products and services to support administrative tasks of the business, such as accounting and payroll systems. Innovations of Type III become imbedded in the core technology of the business, in which IS are integrated and the innovation might have an association to the organisation's strategy. In early IS research, many studies were carried out to investigate innovations of Type I and Type II, while relatively limited studies were focused on Type III innovations (Swanson, 1994).

Table 2.1: Types of IS innovations (Swanson, 1994)

Innovation Type	Definition
Type I	Process innovations restricted to the functional IS core. Innovations are confined to the IS task.
Type II	Applies IS products and services to the administrative core of the host organisation business. Innovations support administration of the business.
Type III	Integrates IS products and services with core business technology, and typically impacts upon general business administration as well.

According to Zhu and Kraemer (2005), Type III innovation studies have been introduced with research into EDI diffusion. In particular, Type III innovations were introduced in the early 1970s when Electronic Funds Transfer (EFT) was first used for transferring funds electronically (Johnston, 1998). In the early 1980s, an EFT extension, Automatic Teller Machine (ATM), was developed for computer networks to undertake financial transactions (Barnes and Hunt, 2001). Subsequently, EDI progressed later in the 1980s to enhance the scope of network applications to enable interaction between diverse computer systems with no human intervention (Johnston, 1998). Although the Internet was commercialised during the 1990s, the growth of e-commerce can be attributed to the recent popularity of the WWW (Turban et al., 2006). It has been argued that Internet-based technologies are relatively new Type III innovations (particularly in developing countries) that deserve further investigation (Zhu, 2004; Straub et al., 2002).

2.3.3 E-Commerce as an Innovation

Unlike prior innovations, e-commerce is a complex innovation in which technologies and business applications are coherently evolved (Wang and Shi, 2009). The Internet and the WWW have created opportunities for economic growth in developing strategies and new business models (Amit and Zott, 2001; Eikebrokk and Olsen, 2007). As a result of the Internet and the WWW, many applications have emerged, such as e-commerce and e-business, which provide a range of potential business activities for organisations, such as information exchange and collaboration with business partners (Thatcher et al., 2006; Moodley, 2003). Such a consideration is consistent with Swanson's (1994) taxonomy, as Internet-based innovations introduce new business, extend markets and are embedded in core business processes (Hong and Zhu, 2006; Chatterjee et al., 2002; Wu et al., 2003).

As a Type III innovation, e-commerce is often embedded in the core business processes and creates opportunities for developing strategies as well as business models (Amit and Zott, 2001; Eikebrokk and Olsen, 2007). The high dependency on the Internet and its

applications would leave advanced economies, such as the United States and the European Union, in a disastrous situation if the technology were to become unavailable (Dholakia et al., 2002). E-commerce represents a radical change and implies transformation in many aspects, such as in business processes, organisational structure, and relationships with business partners (March, 1999; Li, 2006). Therefore, the adoption of e-commerce by organisations is a complex phenomenon that modifies and/or extends the way of doing business (Hong and Zhu, 2006; Wu et al., 2003; Chatterjee et al., 2002).

2.3.3.1 E-Commerce Definition

According to Wigand (1997), “*the term electronic commerce is poorly understood and frequently used to denote different meanings*”. In simple terms, e-commerce “*refers to transactions taking place over electronic networks, particularly the Internet*” (Barnes and Hunt, 2001, p. ix). From a broad perspective, e-commerce can be defined as the use of ICT applications to the whole value chain process in order to achieve organisational goals (Wigand, 1997). Schneider and Perry (2000) define e-commerce as business activities conducted through the Internet and the WWW, whereas it has been defined by Chaffey (2009) as “*all types of electronic transactions between organizations and stakeholders whether they are financial transactions or exchanges of information or other services*” (p. xiv). Turban et al. (2008), on the other hand, address this concept from five-different perspectives: business, service, learning, collaborative and community perspectives.

After reviewing various definitions of e-commerce, Nath et al. (1998) summarised them in two key points: (1) simplifying and streamlining business processes by electronic means, and (2) enabling and facilitating the formation of electronic markets. According to Owens and Davies (2001), e-commerce can be divided into three categories, namely, business-to-business (B2B), business-to-customer (B2C), and intra-business e-commerce. They state that B2B e-commerce deals mainly with the use of ICT to facilitate procurement and supply chain activities, whereas B2C e-commerce focuses on the use of e-commerce to enable customer interaction and finance management when purchasing over the Internet. Intra-business e-commerce, on the other hand, reflects “*the use of ICT to share information internally within the business*” (Owens and Davies, 2001, p.463).

Accordingly, e-commerce is not just selling and buying processes via the Internet; it also involves other activities that support such processes (Applegate et al., 1996). The e-commerce concept has recently been supplemented by the term e-business (electronic

business). Drawing upon the literature, Zhu et al. (2006a) define e-business as Internet-based business activities conducted across the value chain. According to Turban et al. (2008), e-business refers to a broader definition which includes not only the buying and selling of goods and services, but also includes servicing consumers, collaborating with business partners, conducting e-learning, and conducting electronic transactions within an organisation. However, many scholars have suggested that e-business and e-commerce are synonymous and can be broadly equivalent (Chaffey, 2004; ESCWA, 2003).

Taking into account the diverse definitions given to e-commerce, a concise definition is needed to guide the study. Hence, and for the purpose of the study, e-commerce is defined as ‘the use of the Internet in general and organisational websites in particular to conduct business activities across value chains, including sales, procurements, information sharing, coordination with partners, customer services, and other back-office systems, allowing most business activities to be conducted online’. This definition “*involves much more than electronically mediated financial transaction*” (Chaffey, 2009, p. 10). However, it is only limited to Internet-based commerce, as it does not include non-Internet activities, such as EDI. Given e-commerce definition adopted in this research, e-commerce and e-business are considered equivalent and can be used interchangeably.

Zhu and Kraemer (2005, p. 63) argue that business activities conducted over the Internet (e-business) can be considered as a type III innovation “*in the sense that e-business is often embedded in a firm’s core business processes (e.g., making use of the open standard of the Internet protocol to streamline information sharing among various functional departments); e-business can extend basic business products and services (e.g., leveraging Internet-enabled two-way connectivity to offer real-time customer service); and e-business can streamline the integration with suppliers and customers (e.g., using XML-based communication to increase the capability of exchanging data on product demand and inventory availability throughout the supply chain)*”.

2.3.3.2 E-Commerce/E-Business Development Stages

Researchers have introduced various progressive stages to the development of e-business (Le and Koh, 2002; McKay and Marshall, 2004). Le and Koh (2002) define five different steps to the progress of e-business: brochure ware, interactions, e-commerce, c-commerce and e-business. Similar to Le and Koh’s (2002) e-business steps, McKay and Marshall (2004) introduced their six-level e-business stages of growth, as illustrated in Figure 2.3.

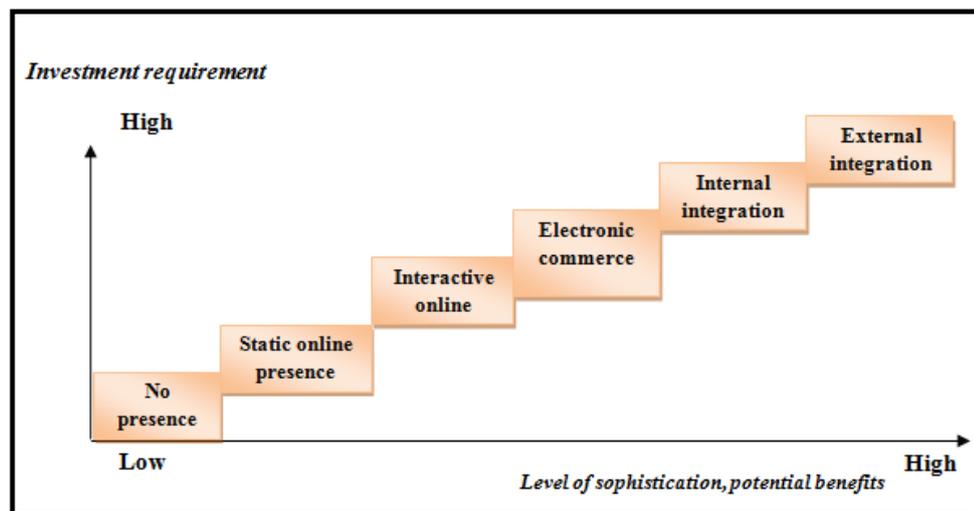


Figure 2.3: E-business stages of growth (McKay and Marshall, 2004)

The first step refers to the static status where an organisation has established its Internet-based identification and where the organisation is only spreading information and not receiving anything from consumers, i.e. making a one-way channel of information. In the next interactive step, an organisation undertakes a more communicative approach on the Internet, allowing various stakeholders to communicate with the business and to submit their comments and requests, but no exchange of products and services at this stage. In the e-commerce stage, frequent monitoring of the Internet web portal is established and distributions are kept effective. To handle the whole e-commerce process effectively, an internal integration in the fifth stage is needed where organisations start to link their online activities with their technology structure. In this stage, the organisation has already successfully linked up its online activities with its internal IT systems for effective B2C management. The final stage of e-business development is external integration, which is concerned with improving B2B activities (McKay and Marshall, 2004).

The illustration shown in Figure 2.3 emphasises the fact that if a business wants to attain a higher level, then it needs to follow a certain migration process that requires more effort, but it can expect more benefits. The benefits of e-commerce include reduction in operating costs, increasing returns on investment (ROI), increasing efficiency and productivity as the service is always available and can reach more consumers (Buckley, 2003). According to Andam (2003), e-commerce can enhance three primary processes: 1) production processes, which include procurement, stock ordering, payment processing and supplier relationship; 2) customer-focused processes, which include online marketing promotions, online sales, processing of customer orders and payments, and customer support; and 3) internal management processes, which include employee services, internal information

sharing, video-conferencing, training and recruiting. On the other hand, e-commerce has some limitations, such as: 1) it often requires high capital investment with slow ROI; 2) it often requires compatibility with the existing technological infrastructure; 3) it is generally associated with security concerns that need to be overcome (D'Cruz and Hussain, 2001).

2.3.3.3 E-Commerce Adoption in Developing Countries

While there has been an optimistic view of the potential of e-commerce in the developing world (Humphrey, 2003; Pare, 2003), the literature indicates that e-commerce diffusion is still far below expectations in such countries and firms have been slow to adopt it and have failed to reap its benefits (Dutta et al., 2004; Odedra-Straub, 2003; Tarafdar and Vaidya, 2004; Tigre, 2003; Kshetri, 2007). Such slowness has been attributed to several technological, organisational, cultural and institutional constraints that have been reported as major inhibitors of e-commerce in developing countries (Bridges.org, 2009; Cloete et al., 2002; Hadidi, 2003; Mann, 2000; Travica, 2002). Moreover, e-commerce barriers in developing countries have been classified into economic, cultural, legal, and cognitive constraints, which challenge businesses in developing countries in terms of adopting and extensively utilising e-commerce (Kshetri, 2001; 2007; Noda and Collis, 2001). The economic, cultural and legal factors focus on environmental characteristics, whereas the cognitive component reflects organisational and individual behaviours (Kshetri, 2007).

The growth of e-commerce in various countries depends on a number of factors, such as the ICT infrastructure and the willingness and ability of people to conduct transactions online (Dholakia et al., 2002). Developing countries often tend to have poor infrastructure and too few human resources and business models necessary for the transition to the information age (Dewan and Kraemer, 2000). It has been found that the low rate of ICT use in some Asian countries is attributed to lack of telecom infrastructure, affordability, economic conditions, and government control of Internet use (Zia et al., 2009). Another study by Karanasios and Burgess (2008) indicates that Internet deployment in less-developed countries is related to inadequate numbers of IT professionals in local markets. The underdeveloped state of Internet Service Providers (ISP) as well as poor Internet connectivity has been a major inhibitor to the completion of e-commerce transactions in developing countries (Kshetri, 2007; Kapurubandara and Lawson, 2006). In particular, high Internet costs, including communication fees, connection service fees and website hosting charges are found to hinder e-commerce in developing countries (Andam, 2003).

The availability of financial systems and online payment methods is another missing component in the business environment of developing countries (Kenny, 2003; Mercer, 2006; Miller, 2001; Biederman, 2000). For instance, Dholakia et al. (2002) declare that the level of credit card use is low in China, Brazil and India, suggesting that companies in these countries provide alternative payment methods for their e-commerce initiatives (Hawk, 2004; Hilbert, 2001), whereas local banks in the Caribbean do not provide any online payment systems (Fraser and Wresch, 2005; Wresch and Fraser, 2006). Unlike in developed countries, the availability of efficient delivery systems is rare in the developing world (Hawk, 2004). For instance, the lack of delivery mechanisms and logistical and technological infrastructures in the Caribbean region is hampering the growth of e-commerce (Wresch and Fraser, 2006), whereas insufficient transport networks to handle express documents and packages has been found to be a serious obstacle to e-commerce diffusion in China (Cheung, 2001).

More importantly, the lack of a legal framework and well-designed policies relating to e-commerce is likely to be one of the main obstacles that hinder e-commerce diffusion in many countries in the developing world (Andam, 2003). In particular, privacy, security and institutional trust are major constraints to e-commerce for both individuals and firms in many developing countries. For instance, the low e-commerce adoption rate amongst Brazilian consumers has been related to inadequate government regulations, such as those pertaining to privacy and security, lack of e-commerce laws, lack of Internet purchase protection, and Internet taxation concerns (Tigre and Dedrick, 2004). The major concerns negatively affecting ICT adoption in most Arab countries can be attributed to concerns relating to government policies and regulations and to privacy and security concerns (Hamade, 2009; Al Hosni et al., 2010; Khasawneh, 2009).

People in developing countries have different culture and preferences, which tend to hinder e-commerce diffusion (McKinsey, 2001). In Asian business, personal relationships are important and anonymity over the Internet is likely to weaken the establishment of online networks (Gibbs et al., 2003). In the Arab nations, people prefer face-to-face communication, establishing social relationships, and building trust and consensus (Hill et al., 1998). In China, a study of cultural e-commerce issues revealed that institutional trust, attitude toward debt, and social effects were major barriers to e-commerce (Efendioglu and Yip, 2004). Many researchers have noted a lack of awareness of e-commerce potential opportunities (as well as risks) amongst enterprises in many developing countries (Kshetri,

2007; Molla and Licker, 2005b; Moodley and Morris, 2004). According to Karanasios and Burgess (2008), customers in developing countries tend to avoid the use of the Internet for businesses and top management are unwilling to adopt the technology.

Research on e-commerce adoption and diffusion in developing countries have employed various theoretical models and frameworks to determine the facilitators of and inhibitors to e-commerce adoption and diffusion and have done so at differing levels of analysis, i.e. firm level, industry level or country level (Boateng et al., 2009). Based on these models and frameworks, several studies have been conducted to determine the means by which organisations in developing countries can overcome e-commerce obstacles and reap its benefits. The following sections analyse the main models and frameworks adopted in determining e-commerce adoption and diffusion in developing countries.

2.4 E-Commerce Adoption Frameworks

Several studies have been conducted to investigate the adoption and diffusion of e-commerce in the context of developing countries using various perspectives. Based on a comprehensive review of e-commerce literature in developing countries, Boateng et al. (2009) have recently conducted a review of e-commerce in developing countries where they classified the underlying theoretical frameworks employed in studying e-commerce adoption and diffusion into four main categories, namely, technological frameworks, organisational and managerial frameworks, environmental and cultural frameworks, and interactionism frameworks. Based on Boateng et al.'s (2009) classification, models and frameworks from different perspectives adopted for investigating e-commerce adoption in developing countries are discussed in the following sections.

2.4.1 Technological Frameworks

Frameworks belonging to this category examine technological determinants that may influence e-commerce adoption at an individual level, such as DOI and TAM. The TAM model, which is a derivative but less general than TRA, was designed as a “*concise, complete, reliable and valid model for predicting user acceptance*” (Kamel and Hassan, 2003, p.5). As illustrated in Figure 2.4, the TAM model incorporates components from the IS literature and was formulated for explaining computer-usage behaviour (Davis, 1989). According to TAM, the extent of technology acceptance is affected by two main key determinants: Perceived Usefulness (PU), which refers to “*the degree to which a person believes that using a particular system would enhance his or her job performance*” and

Perceived Ease-of-use (PEOU), which refers to “*the degree to which a person believes that using a particular system would be free from effort*” (Davis, 1989, p. 320).

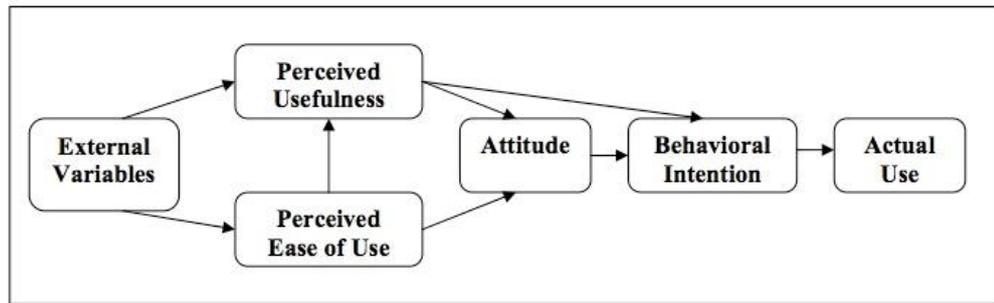


Figure 2.4: Technology acceptance model (TAM) (Davis, 1989)

The literature, however, suggests that PEOU and PU are not enough in explaining and dealing with all the various contextual influences, such as trust and culture as well as other issues arising from e-commerce complexity and compatibility (Boateng et al., 2009). Accordingly, many researchers have introduced additional external variables to TAM to improve its predictive power (Al-Sukkar and Hasan, 2005; Al-Somali, et al., 2009). Amongst these extensions are TAM2 (Venkatesh and Davis, 2000), TAM3 (Venkatesh and Bala, 2008) and UTAUT (Venkatesh et al., 2003). TAM2 is a theoretical extension to TAM that is designed to examine the role of social influences and determinants of perceived usefulness, introducing five external attributes (subjective norm, image, job relevance, output quality, result demonstrability) and two moderators (voluntariness, experience). In addition to TAM2’s five external attributes and moderators, TAM3 went further and introduced additional seven external variables (perception of external control, computer self-efficacy, computer anxiety, computer playfulness, perceived enjoyment, objective usability) (Venkatesh and Bala, 2008). UTAUT, on the other hand, is a modified version of TAM, in which TAM has been integrated with elements from other models, introducing four main attributes (performance expectancy, effort expectancy, facilitating conditions, social influence) and four moderators (gender, age, experience, voluntariness).

Innovation characteristics of the DOI theory have been applied to study the adoption and diffusion of IS/IT innovations. Although it does not address e-business directly, Parker and Castleman (2009) state that the DOI theory has the most common citation on the literature of diffusion in SME e-business. Rogers (2003) in the DOI theory assumes that the characteristics of an innovation influence its adoption and diffusion. Innovation attributes of the DOI theory are grouped into five major characteristics as follows: (1) relative advantage, which refers to “*the degree to which an innovation can bring benefits to an*

organization”; (2) compatibility, which refers to “*the degree to which an innovation is consistent with existing business processes, practices and value systems*”; (3) complexity, which refers to “*the degree to which an innovation is difficult to use*”; (4) observability, which refers to “*the degree to which the results of an innovation are visible to others*”; and (5) trialability, which refers to “*the degree to which an innovation may be experimented with*” (Zhu et al., 2006b, p. 602).

Empirically, He et al. (2006) conducted a study of the adoption of online e-payment in Chinese enterprises using DOI as a theoretical framework for their work, while Al-Somali et al. (2009) extended TAM and introduced additional external attributes (e.g., awareness, trust and Internet connection quality) in a study of the acceptance of online banking in Saudi Arabia from a consumer perspective. Using a survey administered on knowledge workers using PC applications on a voluntary basis, Al-Gahtani et al. (2007) examined the relative power of a modified version of UTAUT in determining ‘intention to use’ and ‘usage behaviour’ in Saudi Arabia. Another study by Kamel and Hussein (2004) adopted the DOI theory in line with TAM as an underlying model to examine e-commerce introduction in a medium sized enterprise in Egypt. In sum, the use of DOI and TAM showed that innovation attributes, particularly perceived benefits, compatibility and perceived ease of use, are key drivers to the adoption of e-commerce (Teo et al., 2004).

2.4.2 Managerial and Organisational Frameworks

Frameworks falling into this category assume that managerial as well as organisational factors “*underpin the explanation of innovation adoption*” (Boateng et al., 2009, p. 20). According to Boateng et al. (2009), the TPB model “*offers a theoretical basis for the consideration of managerial and organisational attributes in e-commerce adoption*” (p. 20). TPB, as illustrated in Figure 2.5, is a well-established theory that has been proven in the IS literature to explain and predict managerial behavioural intentions (Mykytyn and Harrison, 1993). TPB, as well as both its predecessor Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and its extension Decomposed TPB (Taylor and Todd, 1995), affirms that real behaviour is affected by behavioural intention, which is “*assumed to capture the motivational factors that influence behaviour*” (Ajzen, 1991, p. 181). TRA suggests that behavioural intention is a function of attitude, which refers to “*the degree to which a person has favourable or unfavourable evaluation of the behaviour*” and subjective norm, which refers to “*the perceived social pressure to perform or not perform the behaviour*”, whereas TPB and its extension DTPB add perceived behavioural control

as another factor, which assumes that there are “*personal and situational impediments to the performance of the behaviour*” (Grandon and Mykytyn, 2004, p.45).

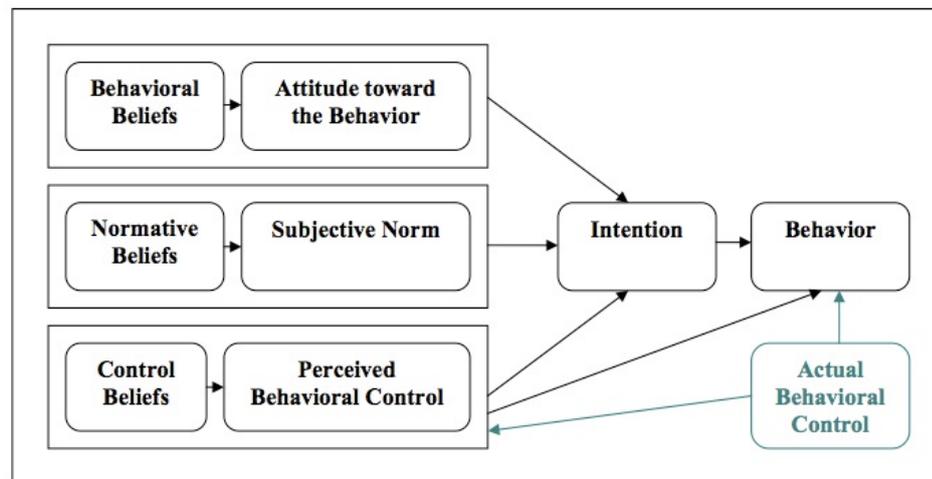


Figure 2.5: Theory of planned behaviour (TPB) (Ajzen, 1991)

Frameworks in this category are considered as managerial and organisational frameworks because they have successfully been employed to address managerial and organisational determinants that are inside the organisation *per se*. In particular, organisational readiness is amongst the frequently investigated determinants in this category. When examining organisational readiness, prior EDI adoption studies considered organisational resources (i.e. financial and technological resources) as determinants for EDI adoption (Iacovou et al., 1995; Kuan and Chau, 2001). Recent studies, on the other hand, included additional factors that comprise organisational readiness, such as organisational culture (Seyal et al., 2004), internal resources (Huy and Filiatrault, 2006), management support (Tsao et al., 2004; Molla and Licker, 2005b), governance (Molla and Licker, 2005b, Alwabel and Zairi, 2005), and IT knowledge of employees (Scupola, 2003).

Based on the TPB model, Uzoka et al. (2007) proposed a study that comprises managerial and organisational factors along with technological factors, including organisational resources, management support, complexity, accessibility, perceived advantages and perceived disadvantages. Similarly, Grandon and Mykytyn (2004) used TPB to develop a theory-based instrument for measuring the intention to adopt e-commerce amongst SMEs in Chile. In summary, studies adopted TPB have successfully considered managerial and organisational factors when investigating e-commerce adoption at an organisational level (Boateng et al., 2009). Such a conclusion has been shared by other studies although TPB was not adopted (Cloete et al., 2002; Khalfan and Alshawaf, 2004). Cloete et al. (2002)

has found that e-commerce adoption is influenced by perceived benefits, organisational characteristics, and the pressure (subjective norm) to achieve the return on investment (ROI). In line with the TPB model, the intention of e-commerce adoption is influenced by attitude (perceived strategic value), subjective norm (external pressure), and perceived behavioural control (organisational characteristics) (Ajzen, 1991).

2.4.3 Environmental and Cultural Frameworks

Frameworks in this category focus on external influences and investigate external factors that are within the environment surrounding an organisation. Several environmental determinants have been identified in the literature, including institutional pressures, external readiness, and government policies and regulations (Burgess et al., 2009; Gibbs and Kraemer, 2004; Molla and Licker, 2005b; Zhu et al., 2006b). Institutional theories, cultural models, and 'First-generation' e-readiness tools fall into this category.

Several e-readiness assessment tools have recently been developed and employed to assess the e-readiness of different countries (Bridges.org, 2009; Al-Solbi and Mayhew, 2006). The underlying framework of these e-readiness studies is mainly the environmental perspective (Choucri et al., 2003). In other words, such frameworks focus on “*conditions in the external environment (often the national-state) to be determinants of e-commerce adoption at the firm level*” (Molla and Licker, 2005b, p.83). Based on a qualitative study, Josanov et al. (2009) proposed a multi-dimensional framework exploring conditions for diffusing e-commerce. Their model consists of eight layers that represent infrastructural conditions for e-commerce, which cover telecommunication infrastructure, e-commerce legislation, traffic infrastructure, delivery services, e-payment systems, software industry, customer e-commerce propensity, and technical education. Similarly, Mbarika and Okoli (2003) proposed a framework that focuses on three main areas: traditional commercial infrastructure, telecommunication environments, and the sophistication of Internet use.

In comparison with other frameworks, cultural frameworks tend to consider the cultural and political issues that are likely to influence the adoption and diffusion of e-commerce in developing countries (Boateng et al., 2009). To investigate e-commerce diffusion in the context of developing countries, Singh and Gilchrist (2002) developed a three-dimensional framework of e-commerce challenges: the availability of infrastructure, availability of commercial services (e.g. logistics and supporting services), and trust. Bajaj and Leonard (2004), on the other hand, proposed a three-layer framework to evaluate culture, policy

and technology (CPT). They argue that understanding the interrelationships between these dimensions is important in promoting solutions for e-commerce in developing countries.

Institutional theories emphasise that an institutional environment plays an important role not only in shaping organisational structure, but also in shaping their actions (Scott, 2001; Scott and Christensen, 1995). Gibbs and Kraemer (2004) argue that the adoption of the Internet and other interactive technologies by an organisation is likely to be influenced by the institutional environment surrounding the enterprise. In particular, institutional theory asserts that legitimacy and isomorphic pressures enforce firms to become more alike (DiMaggio and Powell, 1983). It has been argued that applying institutional theory in conjunction with other perspectives can deliver a broader understanding of Internet-based innovation adoption at an organisational level (Gibbs and Kraemer, 2004). Empirically, researchers have found consistent support for institutional pressures as significant predictors for innovation adoption (Teo et al., 2003).

2.4.4 Interactionism Frameworks

Even though adoption models falling into the previous categories are well established and empirically tested and validated, the focus of these frameworks is mostly on a single perspective, i.e. a technological, a managerial, an organisational or an environmental perspective (Molla and Licker, 2005a). As these models and frameworks fail to address other dominant perspectives, recent research has attempted to demonstrate a multi-perspective view in one hybrid approach (interactionism) in determining the attributes of Internet-based innovation adoption (Gibbs and Kraemer, 2004; Hong and Zhu, 2006; Zhu et al., 2006a). According to Molla and Licker (2005a), the interactionism perspective provides a better explanatory power and “*allows for treatment of all these forces and their interaction in one dynamic framework*” (p. 879). To investigate IT innovation adoption, particularly Type III innovations, several studies have adopted the interactionism approach and have proposed multi-perspective frameworks (e.g. Tornatzky and Fleischer, 1990; Grandon and Pearson, 2004; Al-Qirim, 2005; Molla and Licker, 2005a).

Amongst frameworks belonging to the interactionism approach is the TOE framework, which is a well-established model that has been considered as a comprehensive framework for identifying determinants of innovation adoption (Molla and Licker, 2005a; Boateng et al., 2009). In their TOE framework, Tornatzky and Fleischer (1990) specified three aspects of a firm's context that influence innovation adoption: technological, organisational and

environmental contexts. The technology context refers to the existing technologies in use as well as relevant new technologies; the organisational context refers to organisational characteristics and is typically evaluated using descriptive measures (e.g. firm's size and scope); and the environmental context refers to the influence of the external environment, such as competitors, partners, and the government (Tornatzky and Fleischer, 1990. pp. 152-154). According to Zhu et al. (2003), several empirical studies on the IS domain have been conducted based on the TOE framework, which was introduced by EDI adoption studies. Similarly, Iacovou et al. (1995) proposed a model by formulating three aspects of EDI adoption: technological factors, organizational factors and environmental factors.

By examining the three IS-innovation types based on the TOE framework, Swanson (1994) concluded that Type III innovators have been greatly influenced by technological, organisational and environmental contexts. To investigate EDI adoption amongst small enterprises in Hong Kong, Kuan and Chau (2001) employed the TOE framework as an underlying model. These authors considered perceived direct and indirect benefits of EDI in the technology context, while the organisation context reflects organisational readiness, which includes perceived costs and technical competence. The environment context, on the other hand, includes perceived government pressure and industry pressure. In addition to direct benefits, the study revealed that organisational readiness and environmental pressure are important factors for EDI adoption (Kuan and Chau, 2001). Researchers employing the TOE framework recognise that internal organisational factors, external environmental factors, and the characteristics of the innovation *per se* influence its adoption (Kuan and Chau, 2001). For Internet-based applications, several studies have extended the TOE framework to the Internet domain (Zhu et al., 2003). Amongst these efforts is the global e-commerce project that employed a large-scale survey for firms from different industrial sectors and country contexts (Gibbs and Kraemer, 2004). The survey covered ten countries from the developed and developing world, namely, Brazil, China, Denmark, France, Germany, Japan, Mexico, Singapore, Taiwan and the United States.

Using the TOE framework as an underlying foundation, these studies investigated various factors. For the technology context, they have investigated technology competence, which usually includes technology resources and IT professionals (Zhu et. al, 2006b; Xu et al., 2004). The most investigated factors in the organisational context are firm size and firm scope (Zhu et. al, 2006a; Zhu and Kraemer, 2005), even though perceived benefits, compatibility, and financial resources have been investigated at the organisational level as

well (Gibbs and Kraemer, 2004). Competitive pressure and regulatory environment are the most frequently investigated factors in the environmental context (Zhu and Kraemer, 2005; Xu et al., 2004). Table 2.2 illustrates some recent studies that adopted the TOE framework to investigate Internet-based innovations as well as their major findings.

Table 2.2: Some studies adopted the TOE framework to examine Internet-based innovations

Study	Investigated Factors	Major Findings
Zhu et al. (2006a)	Technology readiness, technology integration, firm size, global scope, managerial obstacles, competition intensity, regulatory environment.	Competition positively affects e-business initiation and adoption, but negatively impacts routinisation. Large firms tend to enjoy resource advantages at the initiation stage, but have to overcome structural inertia in later stages. Regulatory environment and technology readiness are strong determinants in developing countries, whereas technology integration turns out to be the strongest factors in developed countries.
Zhu et al. (2006b)	Relative advantage, compatibility, costs, security concerns, technology competence, firm size, competitive pressure, partner readiness.	Compatibility, technology competence, partner readiness, and competitive pressure significantly drive e-business usage, while security concerns and firm size tend to slow down its penetration.
Zhu & Kraemer (2005)	Technology competence, front-end functionality, back-end integration, firm size, international scope, financial commitment, competitive pressure, regulatory support.	Technology competence, financial commitment, firm size, competitive pressure, and regulatory support are important antecedents of e-business use. While front-end and back-end capabilities contribute to e-business value, back-end integration has a much stronger impact.
Hong & Zhu (2005)	Technology integration, EDI usage, Web functionalities, Web spending, partner usage, perceived obstacles, firm size and industry type	Web functionalities, Web spending, technology integration, and partner usage significantly affect e-commerce adoption. Web functionalities, Web spending, and technology are the most influential drivers for e-commerce migration, while firm size, partner usage, EDI usage, and perceived obstacles are found to negatively affect e-commerce migration.
Xu et al. (2004)	Technology competence, firm size, global scope, enterprise integration, competition intensity, regulatory environment.	Technology competence, enterprise integration, regulatory environment, and competition intensity positively influence the extent of e-business adoption. US firms make more extensive use of the Internet, whereas Chinese firms lag behind in using e-business technologies, especially inter-organisational technologies. Government regulation plays a more important role in China than in US.
Gibbs & Kraemer (2004)	Perceived benefits, compatibility, firm size, technology resources, financial resources, government promotion, legislation barriers, external pressure.	The main significant predictors of scope of e-commerce use are technology resources, perceived strategic benefits, financial resources, legislation barriers, external pressure, and government promotion. US firms had significantly higher scope of use than firms from other countries.
Zhu et al. (2004)	Technology readiness, firm size, global scope, financial resources, competition intensity, regulatory environment.	Technology readiness is the strongest factor for e-business value, with financial resources, global scope, and regulatory environment also making significant contributions. Firm size is negatively related to e-business value, while competitive pressure drives firms to adopt e-business. Financial resources and government regulation are more important in developing countries, while developed countries tend to be more concerned with technological capabilities.
Zhu et al. (2003)	Technology competence, firm size, firm industry, firm scope, competitive pressure, partner readiness, consumer readiness.	Technology competence, competitive pressure, consumer readiness, firm scope and size are significant e-business adoption drivers, whereas the lack of trading partner readiness is a significant inhibitor and industry was a controlling variable.

Even though the factors identified might vary across studies, the TOE framework has consistent empirical support. Table 2.3 illustrates the main factors investigated in the same Internet-based innovation adoption studies in Table 2.2. It is clear that some variables are considered more often than others. For example, firm size appears in all of the studies, whereas EDI usage is considered only in one study. It should be clarified that these studies have used different terminologies for a particular factor, e.g. financial commitment and financial resources, technology competence and technology readiness, regulatory support and regulatory environment, and competition intensity and competitive pressure.

Table 2.3: Contextual factors of the TOE framework in some e-commerce/e-business studies

Study	TR	FN	IT	ED	PB	CT	FR	SC	MO	PS	RG	GP	LB	PR	CR	SZ	SC	IN
Zhu et al. (2006a)	x		x						x	x	x					x	x	
Zhu et al. (2006b)	x				x	x	x	x		x				x		x		
Zhu & Kraemer (2005)	x	x	x				x			x	x					x	x	
Hong & Zhu (2005)		x	x	x			x		x					x		x		x
Xu et al. (2004)	x		x							x	x					x	x	
Gibbs & Kraemer (2004)	x				x	x	x			x		x	x			x		
Zhu et al. (2004)	x						x			x	x					x	x	x
Zhu et al. (2003)	x									x				x	x	x	x	

TR: Technology readiness; FN: front-end functionality; IT: technology integration; ED: EDI usage; PB: perceived benefits; CT: compatibility; FR: financial resources; SC: security concerns; MO: managerial obstacles; PS: external pressure; RG: regulatory environment; GP: government promotion; LB: legislation barriers; PR: partner readiness; CR: consumer readiness; SZ: firm size; SC: firm scope; IN: industry type.

To investigate e-commerce capabilities amongst SMEs, Al-Qirim (2005) incorporates technological, managerial, organisational and environmental imperatives in one hybrid framework. For technological factors, relative advantages, costs and compatibility are examined. Organisational factors focus on information intensity of products and firm size, whereas CEO innovativeness and CEO involvement are the managerial factors considered. The investigated environmental factors are competition, technology vendor support, and pressure from buyers and suppliers. Al-Qirim (2005) used this model to investigate SMEs in New Zealand. The findings reveal that CEO innovativeness is the main factor for non-adopters to adopt the Internet and email (starters), whereas manager's innovativeness, firm

size and compatibility are important factors for adopting other e-commerce technologies (adopters), e.g. extranet and websites (Al-Qirim, 2005). The latter factors, in association with competition as well as support from technology vendors, influence the extent of e-commerce technology adoption (extended adopters) (Al-Qirim, 2005).

In the developing country context, Grandon and Pearson (2004) proposed a model for e-commerce adoption amongst SMEs across industries. In such a study, the discriminating factors are decision aids, compatibility, perceived usefulness, organisational readiness (the availability of financial and technological resources), managerial productivity (improved information access, improved time management and improved communication), and external pressure (direct or indirect pressure from competitors, social referents including industry and government). The study analysis indicates that Chilean managers perceive e-commerce as useful for their firms and compatible with work practices and existing technology infrastructure. They see e-commerce as increasing managerial productivity and supporting strategic decisions and feel external pressure as an influencing factor for e-commerce adoption. The study concluded that the availability of technological and financial resources remains a major challenge for SMEs in developing countries, while educating managers is critical to e-commerce adoption (Grandon and Pearson, 2004).

Molla and Licker (2005a, p. 879), on the other hand, proposed the PERM model, which is based on the e-readiness perspective and follows the “*interactionism as the theoretical root of the model*” in order to provide a “*multi-perspective audit of managerial, internal organisation, and external contextual issues*”. PERM consists of two general components: Perceived Organisational eReadiness (POER), which consists of four constructs that are within the organisation *per se* (i.e., awareness, commitment, resources and governance), and Perceived External eReadiness (PEER), which refers to the readiness of e-commerce market forces and the level of e-commerce support given by the government as well as other supporting agencies. The PERM model investigates two stages of e-commerce adoption: initial adoption and extent of adoption (institutionalisation). The PERM model has been empirically tested in the developing country context, suggesting that it is a valid instrument for investigating e-commerce in such countries (Molla and Licker, 2005b; Tan et al., 2007). The study concluded that awareness and internal resources are the more influential factors in the initial adoption stage, whereas institutionalisation is affected by commitment, governance and external readiness (Molla and Licker, 2005b).

In short, frameworks belonging to this category are theoretical frameworks and conceptual approaches that are designed to consider all determinants from different perspectives in identifying the factors that influence e-commerce adoption and diffusion. Such models and frameworks attempt to provide an explanation for the differences in the performance of organisations operating in the same environment by examining the interrelationships between internal determinants within the organisation itself and external influences in the surrounding environment (Jarvernpaa and Leidner, 1998; Montealegre, 1999).

2.4.5 Beyond E-Commerce Adoption

The majority of the existing innovation studies has been based on a single perspective and focused on the intention or the adoption stage as a dichotomous outcome, such as ‘intend to adopt or not’ and ‘adoption versus non-adoption’ (Fichman, 2000; Zhu and Kraemer, 2005). Despite its importance, such efforts can only provide a partial understanding of the diffusion process, suggesting a need for a further exploration of the post-adoption stages (Tornatzky and Klein, 1982; DeLone and McLean, 1992; Zhu and Kraemer, 2005). In particular, innovation diffusion needs to be recognised as a multi-stage process, including adoption and post-adoption (Fichman, 2000; Cooper and Zmud, 1990; Zhu et al., 2006b).

Researchers have latterly called to move “*beyond the dichotomous ‘adoption versus non-adoption’ and accounts for the ‘missing link’ - actual usage - as a critical stage of value creation*” (Zhu and Kraemer, 2005, p.62). In response to this call, recent research has latterly recognised e-commerce diffusion as a complex process by demonstrating a multi-perspective approach and moving beyond the classical intention and adoption decision to look at determinants of extent of use (Gibbs and Kraemer, 2004), migration (Hong and Zhu, 2006), continuance intentions (Al-maghrabi et al., 2010), and impact (Zhu and Kraemer, 2005). A few innovative efforts went even further to account for various stages in the adoption process (assimilation and diffusion) from the initial adoption of an innovation to its full development and impact (Zhu et al., 2006a; Kraemer et al., 2006).

2.4.6 E-Commerce Adoption Frameworks: Summary and Critique

A wide range of studies have employed a range of frameworks in order to determine means by which firms in developing countries can overcome e-commerce obstacles and reap its potential benefits. As discussed in the previous sections, e-commerce adoption frameworks can be classified into technological, managerial and organisational, cultural and environmental, and interactionism frameworks. The first category is technological

frameworks, such as DOI and TAM, which examine the technological determinants that may influence e-commerce adoption at an individual level. While offering “*a technology-oriented understanding*” of innovation adoption, these frameworks fail to address other dominant perspectives that are likely to influence adoption, i.e. organisational, managerial, and environmental imperatives (Boateng et al., 2009, p.19).

The second category is managerial and organisational frameworks, such as TPB and its extensions. Frameworks in this category involve determinants within the organisation *per se*. In particular, they assume that managerial as well as organisational factors “*underpin the explanation of innovation adoption*” (Boateng et al., 2009, p. 20). Even though the TPB model has succeeded in addressing managerial and organisational perspectives in e-commerce adoption, “*it fails to provide the strategic means to effectively institutionalize e-commerce and exploit its benefits*” (Boateng et al., 2009, p. 21). The third category is environmental and cultural frameworks, such as 'first-generation' e-readiness tools, cultural frameworks, and institutional theories. These frameworks focus on external influences and investigate external determinants that are in the environment surrounding an organisation. In particular, they focus on “*the external environment (often the national-state) to be determinants of e-commerce adoption at the firm level*” (Molla and Licker, 2005b, p.83). However, it has been argued that firms in the same environment have different perceptions regarding the adoption of e-commerce; therefore, environmental imperatives on their own “*have not sufficiently explained e-commerce adoption variation among organisations operating in the same context*” (Molla and Licker, 2005a, p. 879).

The last category is interactionism frameworks, e.g. TOE and PERM. These frameworks attempt to build a comprehensive overview into one hybrid approach in order to better explain the adoption of Internet-based innovations at an organisational level (Gibbs and Kraemer, 2004; Hong and Zhu, 2006; Zhu et al., 2006a). Although several interactionism frameworks have been proposed (e.g. TOE and PERM) to investigate multi-perspectives vis-à-vis Internet-based innovations, other important issues and considerations have not been captured by such models. For instance, organisational characteristics and innovation attributes as well as other industry specific considerations, such as competitive pressure and trust, have not been considered in the PERM model. In particular, “*additional items could be introduced to improve the coverage and reliability of the perceived external eReadiness measures*” (Molla and Licker, 2005a, p. 899). Similarly, “*the TOE framework does not capture interorganizational factors such as trust and trading partner readiness*”

(Gibbs and Kraemer (2004, p. 134). Boateng et al. (2009) argue that managerial factors are addressed in the organisational context within the TOE framework, making them less of a consideration as they compete with other organisational attributes. On the other hand, SME frameworks (e.g. Al-Qirim, 2005; Grandon and Pearson, 2004) usually consider the management level as a single entity and shift the focus of e-commerce adoption into an individual level instead of an organisational level. Such findings suggest the need for further refinement of these models to gain a better understanding and provide a further explanation of the phenomenon at hand.

To overcome such deficiencies, researchers tend to select constructs from different models or integrate them to build new multi-perspective frameworks. For instance, Kwon and Zmud (1987) in an early study developed an IS implementation model by integrating innovation attributes from DOI theory (Rogers, 1983), task-related factors from Hackman and Oldman (1976; 1980), and environmental factors from DiMaggio and Powell (1983). In another study, Riemenschneider et al. (2003) proposed a combined model using TPB and TAM to study the factors that influence website adoption by SMEs. Similarly, Sait et al. (2004) integrated TPB and DOI to study e-commerce adoption in Saudi Arabia from consumer perspectives. Parker and Castleman (2009) combined Social Network Theory (SNT) with DOI to undertake an examination of the complex relationships and social structures associated with e-business adoption amongst small firms. Zhu et al. (2006b) integrated innovation attributes from the DOI theory and contextual factors from the TOE framework to develop their model for e-business adoption. Likewise, Gibbs and Kraemer (2004) developed their multi-perspective framework to examine e-commerce use across countries by integrating technological and organisational factors from the TOE framework with determinants of the national environment and policy from institutional theories.

Lastly, previous research has traditionally focused on a single adoption stage to capture innovation adoption, particularly intention or adoption. However, researchers have latterly highlighted the need to move beyond adoption and to recognise e-commerce diffusion as a multi-stage process (Zhu et al., 2006b). To respond to this, research has recently moved beyond the classical adoption decision to examine e-commerce post-adoption and usage (Gibbs and Kraemer, 2004; Zhu and Kraemer, 2005). Despite their importance, most studies have focused on a single adoption stage, and too few researchers (e.g. Kraemer et al., 2006; Zhu et al., 2006a) have accounted for different stages of the adoption process in a single study; this helps in enhancing our understanding of e-commerce diffusion.

2.4.7 Knowledge Gap

Even though the studies conducted on assessing e-commerce adoption and diffusion in developing countries have significantly improved our understanding of e-commerce innovation, several gaps can be identified in the literature. Firstly, scholars have suggested viewing innovation diffusion as a multi-stage process that begins with initiation and adoption, which in turn extends to post-adoption stages, including usage and impact (Fichman, 2000; Zhu et al., 2006a). Although some investigations have been carried out in order to address these post-adoption stages (Gibbs and Kraemer, 2004; Zhu and Kraemer, 2005), most have focused on a single adoption stage. Arguing that e-commerce adoption may have different impacts across the various adoption stages, more effort is still needed to address different adoption stages in one study, particularly for developing countries.

Secondly, although studies into innovation theories have promoted several perspectives (e.g. technological, managerial, organisational and environmental imperatives), they typically focus on a single adoption domain (Molla and Licker 2005b). Despite recent efforts to consider an interactionism approach in determining Internet-based innovations at an organisational level (Gibbs and Kraemer, 2004; Hong and Zhu, 2006; Zhu et al., 2006a), other important issues and considerations have not been captured by such frameworks. To overcome such deficiencies, there is undoubtedly a need to consider a multi-perspective view and to integrate determinants from different theories to provide a broader understanding of e-commerce diffusion. Such efforts emphasise the relevance of the multi-perspective view in understanding e-commerce adoption, as innovation adoption can be better understood by combining determinants from different theories (Gibbs and Kraemer, 2004; Zhu et al., 2006b). Such a trend is consistent with Zwass's (2003) view of investigating e-commerce in its entirety and of addressing its all-important issues.

Thirdly, although frameworks based on the interactionism approach have been developed to combine multiple dimensions into a single hybrid framework, the majority were devised in the developed world. Scholars (e.g. Austin, 1990) have argued that theories developed in the context of industrialised and developed countries need further examination in developing countries, due to differences in economic and regulatory environments (Zhu et al., 2003, Jarvenpaa and Leidner, 1998). In a cross-country study of e-commerce scope of use, Xu et al. (2004) concluded that their framework, which is based on TOE, is more suitable for the developed world than the developing country context, attributing this to the effect of certain other salient factors in developing countries.

Fourthly, despite the fact that there have been some recent efforts to address e-commerce issues in the context of developing economies (e.g. Janom and Shanudin, 2008; Uzoka et al., 2007; Tan et al., 2007), most studies to date have focused predominantly on specific locations, such as on countries in Latin America and Asia (and Africa to some extent) (Molla et al., 2006). It has been argued that the Middle East region has not yet received enough attention from scholars and researchers and that Internet and e-commerce adoption remain a largely unexplored research area (Al-Yahya, 2009; Parker and Castleman, 2006; Yasin and Yavas, 2007). In particular, e-commerce in the GCC countries, particularly Saudi Arabia, has not been sufficiently researched (Al-Somali et al., 2011; Alrawi and Sabry, 2009). While there are some similarities across the Middle East, e-commerce in the high-income GCC developing countries have their own idiosyncratic characteristics and challenges that are worthy of investigation.

Motivated by these issues, the present research seeks to improve our understanding of e-commerce adoption and post-adoption in high-income developing countries by proposing a comprehensive framework that comprises different theoretical perspectives and various adoption stages. In particular, this research moves beyond those traditional locations in the developed nations to encompass the experiences of enterprises from the poorly explored GCC region, which may present different e-commerce perspectives.

2.5 Theoretical Development

Unlike earlier studies that focused on a single domain and a single adoption stage, this research recognises e-commerce diffusion as a complex process by considering a multi-perspective approach and examining various adoption stages, which are important in the process of conducting business over the Internet. To provide a broader understanding of e-commerce post-adoption, Zhu et al. (2006b) integrated the DOI theory with the TOE framework, whereas Gibbs and Kraemer (2004) combined institutional theory with the TOE framework. It can be argued that these three perspectives (DOI theory, institutional theory, and the TOE framework) can account for a broader understanding of e-commerce adoption and post-adoption at an organisational level, whereas “*the notion of e-readiness in the developing countries context can offer new perspectives for understanding the global adoption and assimilation of e-commerce*” (Molla and Licker 2005b, p. 85).

This research intends to provide insight into how enterprises in high-income developing countries may behave differently across the adoption stages. These issues can be analysed on the basis of three theoretical perspectives, namely, (1) innovation perspective, (2) institutional perspective, and (3) readiness perspective. As this research intends to develop a preliminary framework that will further be enhanced through an exploratory study, the selection of factors for the considered three perspectives will mainly be based on the well-established DOI theory, institutional theory, PERM model, and the TOE framework. In particular, the preliminary framework will encompass innovation attributes from DOI, external pressures from the institutional theory, organisational and external readiness from the PERM model, as well as other contextual factors from the TOE framework.

2.5.1 Innovation Perspective

Although many innovation theories have been developed and empirically validated, the literature shows that the DOI theory has a solid theoretical foundation and has been a useful theory for investigating a variety of IS/IT innovations, with consistent empirical support (Zhu et al., 2006b). According to a recent review, the DOI theory has been found to be amongst the most utilised theories in the IS adoption and diffusion domain (Dwivedi et al., 2008). In particular, DOI innovation attributes are amongst the most commonly investigated determinants that promote innovation adoption (Parker and Castleman, 2009). Tornatzky and Fleischer (1990) suggest that the characteristics of an innovation are “*useful starting point(s) for understanding innovation*” (p.133). In a review conducted on 75 IS studies, Tornatzky and Klein (1982) concluded that relative advantage, compatibility and ease of use tends to be amongst determinants of IS innovation adoption. Tornatzky and Klein's findings were supported by Jeyaraj et al.'s (2006) review, which concluded that relative advantage, compatibility and complexity “*are among the most well-utilised independent variables used by researchers examining organisational adoption*” (p. 9).

In the e-commerce domain, Teo et al. (2004) conducted a meta-analysis on the factors that affect e-commerce adoption by SME, using the TOE framework for classifying those adoption factors. Within the technological context, Teo et al.'s meta-analysis revealed that perceived relative advantage, perceived compatibility and perceived complexity are the main determinants of e-commerce adoption. Hence, this subset of innovation attributes (perceived benefits, compatibility and complexity) are considered in the preliminary framework, in association with security due to its importance in Internet-based innovation adoption (Alwabel and Zairi, 2005; Zhu et al., 2006b). For Internet-based innovations,

security is a unique characteristic that deserves special attention (Zhu et al., 2006b). Such an issue is of high importance in Arab countries, in which privacy and security are major constraints to the adoption of e-commerce at both individual and organisational levels (Khasawneh, 2009; Hamade, 2009; Al Hosni et al., 2010).

2.5.2 Institutional Perspective

The adoption of Internet-based innovations by an enterprise is likely to be influenced by the institutional environment surrounding the organisation (Gibbs and Kraemer, 2004). Institutional theories emphasise that the institutional environment plays an important role not only in shaping organisational structure but also in shaping its actions (Scott and Christensen, 1995; Scott, 2001). According to the institutional theory, three defining elements shape institutional isomorphic change: mimetic, normative and coercive pressures (DiMaggio and Powell, 1983). Such institutional pressures, which are also known as external pressures, encompass the influences that a business experiences from market forces, such as from competitors, customers and suppliers, in addition to their perceived success and dominance (Iacovou et al., 1995; Gibbs and Kraemer, 2004).

Institutional theory asserts that legitimacy and isomorphic pressures enforce organisations to become more similar (DiMaggio and Powell, 1983). Consequently, organisations in the same industry are likely to “*look like each other over time*”, motivated or induced by externally driven pressures from competitors, suppliers, customers or the government to imitate industry leaders “*rather than making a purely internally driven decision to adopt e-commerce*” (Gibbs and Kraemer, 2004, p. 126). That is, enterprises are more likely to be influenced by their business partners and competitors in adopting a technology (Kuan and Chau, 2001). In the knowledge-based economy, pressure from a firm’s market forces has been found to be amongst the key determinants not only for e-commerce adoption (Dossantos and Peffers, 1998), but also for the extent of e-commerce use (Gibbs and Kraemer, 2004). In an empirical study, the institutional pressures of DiMaggio and Powell (1983) were found to be strong predictors for financial EDI adoption (Teo et al., 2003). Therefore, external pressure is considered in the preliminary framework.

2.5.3 The Readiness Perspective

The slowness in making effective use of e-commerce in many developing countries has consistently been attributed in part to their level of readiness (Molla and Licker, 2005b). While ‘first-generation’ readiness has independently focused on national readiness, several

studies have recently considered external readiness when examining the environmental context (Gibbs and Kraemer, 2004; Molla and Licker, 2005b; Burgess et al., 2009). The PERM model is amongst the few efforts proposed to examine determinants of e-commerce adoption in developing countries. The model is based on the e-readiness perspective at the firm level. In particular, it encompasses both micro-level and macro-level readiness as main determinants of e-commerce adoption.

2.5.3.1 Micro-level Readiness

In association with a firm's characteristics, researchers have tended to examine micro-level readiness (organisational readiness) when investigating e-commerce adoption at an organisational level (Grandon and Mykytyn, 2004; Molla and Licker 2005b; Ramdani and Kawalek, 2008). Although it has been operationalised differently across studies, the literature emphasises the relevance of organisational readiness in e-commerce adoption (Grandon and Mykytyn, 2004; Molla and Licker, 2005a). When examining organisational readiness, EDI adoption studies focus on technological as well as financial resources as the main determinants for adoption (Iacovou et al., 1995; Kuan and Chau, 2001).

In the e-commerce domain, recent research has introduced additional factors that comprise organisational readiness, such as management support and commitment (Aghaunor and Fotoh, 2006; Molla and Licker, 2005b; Wang and Cheung, 2004) and governance (Alwabel and Zairi, 2005; Molla and Licker, 2005b). In the PERM model, organisational readiness consists of four main components: awareness, resources, commitment, and governance. In PERM, awareness reflects perceived e-commerce benefits and risks, which has already been considered within innovation attributes. Thus, commitment, governance, and resources, including technological, human, and financial resources, are considered within the organisational context of the preliminary framework.

2.5.3.2 Macro-level Readiness

Developing countries have been slow to adopt e-commerce and many researchers argue that this is partly due to their low level of readiness, i.e. macro-level readiness (Dholakia et al., 2002; Travica, 2002; Josanov et al., 2009). In the knowledge-based economy, research has revealed several environmental obstacles that are likely to hinder e-commerce adoption and diffusion in developing nations (Hadidi, 2003; Kshetri, 2007). In particular, supportive infrastructure, the regulatory framework, and the support given to e-commerce are important considerations (Kuan and Chau, 2001; Oxley and Yeung, 2001).

Unlike previous innovation generations, e-commerce depends extensively on numerous supporting industries, such as telecommunications, carrier facilities and financial payment services (Porter, 1990; Dutta et al., 2004). In the PERM model, external e-readiness refers to the readiness of e-commerce market forces and e-commerce support given by the government as well as other supporting agencies. In particular, it consists of three factors: government readiness, market-forces readiness, and supporting industry readiness. Hence, these factors are considered in the environmental context of the preliminary framework.

2.5.4 The TOE Framework

The TOE framework is designed to be used as a theoretical perspective for examining contextual factors (Tornatzky and Fleischer, 1990). As discussed in section 2.4.4, the TOE framework consists of three main contexts that influence innovation adoption, namely, technological, organisational and environmental contexts. The TOE framework has been used in many studies on Internet-based innovation adoption, as discussed in Table 2.2. Based on the TOE framework, specific factors have been identified within each context, although varying across different studies (Zhu et al., 2003).

With reference to Table 2.3, the identified factors are technology readiness, technology integration, front-end functionality, EDI usage, perceived benefits, compatibility, security concerns, financial resources, managerial obstacles, government promotion, regulatory environment, external pressure, partner readiness, legislation barriers, consumer readiness, firm size, scope, and industry sector. In the preliminary framework, perceived benefits, compatibility, and security concerns are considered within the innovation attributes, while external pressure is included within the environmental context. The remaining variables are to be considered in the other factors, as follows: technology readiness, functionality, integration and EDI usage are to be considered within technology resources; managerial obstacles is to be considered within commitment and governance; partner and consumer readiness are to be considered within market-forces readiness; legislation barriers is to be considered within supporting industry readiness; government promotion and regulatory environment are to be considered within government readiness.

In their study grounded in the TOE framework, Gibbs and Kraemer (2004) argue, “*the TOE framework does not capture interorganizational factors such as trust and trading partner readiness*” (p. 134). To respond to such a criticism, Lippert and Govindarajulu

(2012) have recently proposed a conceptual model grounded in the TOE framework to investigate determinants of web services adoption at an organisational level. In addition to competitive pressure and regulatory influence, they considered trust and partner readiness within the environmental context. The MIS Quarterly published a special issue to explore novel perspectives on trust in IS contexts, emphasising its importance in the IS domain (Benbasat et al., 2010). It has been noted that the lack of trust in business creates perceptions of vulnerability for even low-value transactions, particularly in developing countries (Efendioglu and Yip, 2004; Salleh et al., 2006). Thus, trust will be considered within the environmental context of the preliminary framework, while partner readiness is to be considered within market-forces readiness, as discussed earlier.

Returning to the DOI theory, Rogers (2003) emphasises the importance of external parties, such as technology vendors and change agents, in innovation adoption. That is, an organisation is more likely to take the risk and try a new technology if it feels that adequate support from a third-party is available (Premkumar and Roberts, 1999). The literature indicates that external IS support is amongst the most significant factors not only in IS adoption (Premkumar and Roberts, 1999; Thong, 2001), but also in e-commerce adoption research (de Berranger et al., 2001; Pollard, 2003). Thus, external support is to be considered within the environmental context of the preliminary framework.

2.5.5 The Preliminary Research Framework

The proposed preliminary framework includes factors taken from different perspectives in order to provide a holistic view of e-commerce adoption and post-adoption in high-income developing countries at an organisational level. As illustrated in Figure 2.6, the proposed framework goes beyond organisational boundaries and represents environmental factors, in addition to organisational readiness and innovation attributes. In association with the TEO framework, this research investigates various adoption stages and considers factors from the DOI theory, institutional theory, and the PERM model. Grounded in the TEO framework, the preliminary framework encompasses factors in three main contexts:

1. Innovation attributes (perceived benefits, compatibility, complexity and security);
2. Organisational context (technology resources, human resources, financial resources, commitment, governance, firm size and industry sector);
3. Environmental context (government readiness, market-forces readiness, supporting industry readiness, external pressure, external support and trust).

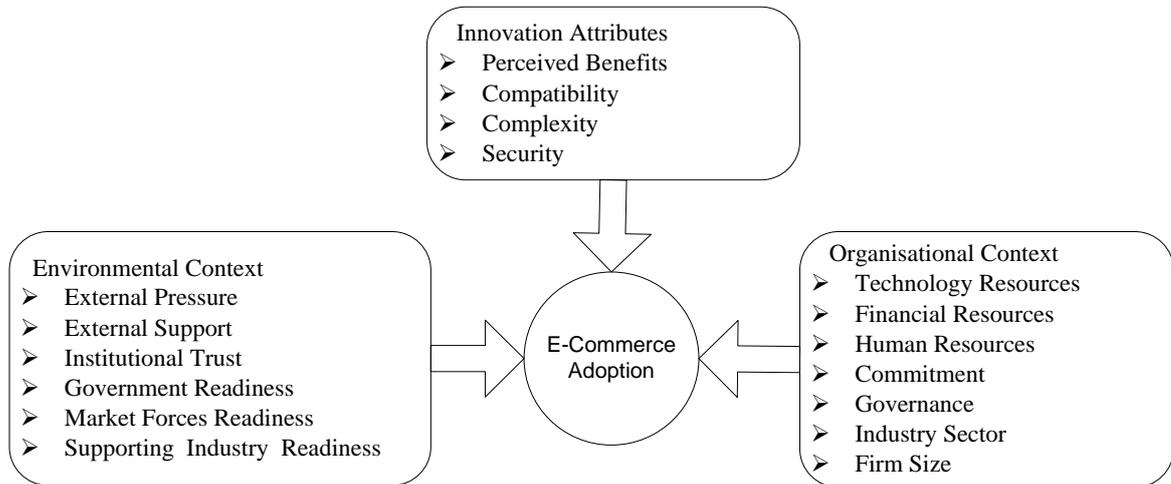


Figure 2.6: Preliminary conceptual framework for e-commerce adoption in developing countries

This preliminary framework is intended to guide an exploratory investigation in order to extend and confirm the contextual factors that are worthy of a further investigation. As many factors may emerge and others may be excluded from the research framework, further discussions of these factors will be addressed in Chapter 4.

2.6 Summary

This chapter has discussed the literature of e-commerce adoption at an organisational level in developing countries. In particular, it addressed factors from technological, managerial, organisational, and environmental dimensions, in addition to their interaction (Boateng et al., 2009). The technological dimension addressed factors such as those from the DOI theory, while the managerial category discussed factors, such as management support and governance. The organisational dimension involved factors within the organisation *per se*, while the environmental dimension addressed factors that are external to the organisation.

The last dimension addressed the interrelated factors that combine both the internal and external contexts of an organisation, such as the comprehensive TOE framework. Based on the interactionism perspective, a preliminary framework has been proposed, which is intended to guide an exploratory investigation in order to enhance the research framework. The exploratory study, as addressed in Chapter 4, intends to extend and confirm the choices of contextual factors in the enhanced study framework. Accordingly, a discussion on the factors of the enhanced study framework will be addressed later in Chapter 4.

CHAPTER 3: Research Methodology and Design

3.1 Overview

As a complex multidisciplinary field, Information Systems (IS) research can involve specific styles and utilise different research methods, meaning that “*a research approach with universal applicability is highly unlikely*” (Galliers, 1992). In other words, there is no single methodology that covers all necessary knowledge that is needed to conduct IS research (Land, 1992). In order to make the appropriate choice of research methodology, researchers need to be aware of the available research approaches, strategies, methods and techniques, in addition to the underlying paradigms.

The purpose of this research is to investigate the e-commerce phenomenon in a high-income developing country from a poorly investigated region. It attempts to develop and test a framework of a variety of factors that are likely to influence e-commerce uptake, aiming to make an effective contribution to the field of innovation adoption and diffusion in developing countries; thus the research design needs to take into account collecting, analysing and interpreting data under such circumstances. This chapter discusses research methodology and design chosen to conduct the present research. Following a general discussion of the underlying research paradigm, this chapter intends to justify the mixed approach and research strategies that have been chosen for this research. It then describes the research design, discussing techniques and methods of data collection and analysis in each phase of this research. Lastly, it discusses the sampling procedures and research credibility. In the present research, the words ‘organisation’, ‘establishment’, ‘enterprise’, ‘company’, and ‘firm’ are used interchangeably to refer to a private organisation.

3.2 Underlying Research Paradigm

A researcher's beliefs, preferences, and experiences are likely to affect the way a particular study is conducted, including the choice of research approaches and strategies. The “*basic set of beliefs that guides action*” is referred to in the research community as a research philosophy or a research paradigm (Guba, 1990, p.17). According to Kuhn (1970), a paradigm is “*a set of values and techniques which is shared by members of a scientific community, which acts as a guide or map, dictating the kinds of problems scientists should address and the types of explanations that are acceptable to them*” (p.175). In simple terms, a research paradigm is a framework that specifies the nature of reality (ontology); the relationship between the researcher and the reality (epistemology); and the techniques used to examine this reality (methodology), introducing the three major ways of thinking about research philosophy that in turn influences the way of thinking about the research process (Saunders et al., 2007; Guba and Lincoln, 1994).

Ontology refers to “*assumptions that we make about the nature of reality*”, whereas epistemology is a theory of knowing, which is “*a general set of assumptions about the best ways of inquiring into the nature of the world*” (Easterby-Smith et al., 2002, p.31). Methodology, on the other hand, refers to “*strategies that lay out the means for achieving the goals of research*” (Potter, 1996, p.65). It concerns with how the reality at issue is investigated and examined in a specific way. Accordingly, a research paradigm is the basic beliefs of the researcher about “*What is the nature of reality?*”, “*What is the relationship between the inquirer and the known?*”, and “*How do we know the world, or gain knowledge of it?*” (Denzin and Lincoln, 2000, p.19).

Scholars define different paradigms in order to guide researchers in different disciplines. The major philosophical traditional standpoints are: positivism, which assumes that “*science quantitatively measures independent facts about a single apprehensible reality*”, and constructivism, which suggests that “*truth is a particular belief system held in a particular context, and it is interested in the values which underpin the findings*” (Healy and Perry, 2000, p.119-120). Even though most scholars emphasise the importance of specifying the standpoint to be either positivist or constructivist, there are circumstances where both paradigms can be an underlying standpoint, e.g. policy and organisational research (Gable, 1994; Lee, 1991). Post-positivism is a paradigm that has components from both constructivism and positivism (Healy and Perry, 2000).

Post-positivism assumes that reality imperfectly exists and is open to different perceptions (Eason, 1998). It is also known as neopositivism (Miles and Huberman, 1994) or realism (Healy and Perry, 2000). Post-positivism was introduced to overcome the major challenges of the positivist paradigm (Guba and Lincoln, 1994). In contrast to the qualitative paradigms (e.g., constructivism), post-positivism assumes that a perception is not a reality, but “*a perception for realists is a window on to reality from which a picture of reality can be triangulated with other perceptions*” (Perry et al., 1997, p.554). Such a paradigm emphasises the importance of multiple research methods to gain a better picture of what is happening in reality (Godfrey and Hill, 1995). It has been argued that the use of multi-method support is suitable for IS research, emphasising the appropriateness of the post-positivist view in the IS field (Hirschheim, 1992).

The present research is seen to lie within the post-positivist paradigm as it seeks to gain an understanding of e-commerce adoption and post-adoption in a high-income developing country from a poorly investigated region, i.e. GCC. Bryman (1998) argues that once a research philosophy has been set out, it needs to be associated with actual works by selecting the most suitable data collection methods for the research. Accordingly, the following sections address the two main research approaches, discuss the relevance of these approaches, and suggest research methods suitable for each phase of the research.

3.3 Research Approach

Within the research community, scholars have discussed two general approaches, namely, qualitative approach and quantitative approach (Krathwohl, 1997; Denzin and Lincoln, 2000; Guba and Lincoln, 1994; Potter, 1996). According to Creswell (1994), quantitative research is defined as “*an inquiry into social or human problems, based on testing a theory composed of variables, measured with numbers and analyzed with statistical procedures in order to determine whether the predictive generalizations of the theory hold true*”, while a qualitative study, on the other hand, is “*an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting*” (cited in Leedy, 1997, p.104). From analytical perspectives, quantitative research is associated to deductive reasoning, which moves from general to specific and called top-down approach, whereas qualitative research is more likely to be associated with inductive logic, which moves from specific to general and often called bottom-up approach (Trochim, 2006).

Qualitative research involves the use of qualitative rather than discrete data, such as interviews, documents and participant observations, in order to comprehend and explain social phenomena (Myers, 2009). Although quantitative research was originally developed in the natural sciences, these methods are widely used in social science research, wherein field surveys and laboratory experiments amongst others may be employed (Straub et al., 2004). The motivation for conducting qualitative research derives from its ability to distinguish people from their environments and to understand their individual actions in those environments, which is conducted through a process of communication. In other words, qualitative research helps researchers understand people, societies and cultural issues (Myers, 1997), which are hard to otherwise quantify (Kaplan and Maxwell, 1994).

While quantitative research is considered as positivist, qualitative research, on the other hand, can be positivist, interpretive or critical depending on the underlying paradigm adopted (Chua, 1986; Guba and Lincoln, 1994). Qualitative methods are independent of underlying paradigms (Myers, 1997). For example, case study research can be positivist (Yin, 2009) or interpretive (Walsham, 1993). According to Spratt et al. (2004), quantitative research places emphasis on the measurement when collecting and analysing data and generally follows a measurement model to come up with objective knowledge, whereas qualitative research considers meanings instead of numbers when gathering and analysing data and is concerned with issues of measurement not numerical measures.

The nature of the research problem being investigated determines the choice of the study approach. The post-positivist paradigm suggests that a single correct method is mostly unlikely (Hirschheim, 1992). In other words, post-positivism calls for the use of multiple observations and measures, including qualitative and quantitative techniques (Godfrey and Hill, 1995). According to Tashakkori and Creswell (2007, p.4), a mixed-method study is “*research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry*”. The use of mixed-method research helps in building a wider picture of the phenomenon at hand, enabling the validation of research findings, and coping with inherent method limitations (Punch, 2005). As a multi-perspective field, the use of multiple techniques in IS research is essential; hence, it is supported by researchers in the IS community (Galliers, 1992; Hirschheim, 1992; Straub and Carlson, 1989). This research follows such a trend and adopts a mixed quantitative and qualitative approach.

3.4 Research Strategy

According to Marshall and Rossman (1999), a research strategy is “*a road map, an overall plan for undertaking a systematic exploration of the phenomenon of interest*” (p. 61). Depending on the problem under investigation, the choice of a research strategy is influenced by the research questions and aims, the available knowledge, the time and resources available, and the research philosophy adopted (Saunders *et al.*, 2007). Many research strategies have been identified for the social sciences, including but not limited to: ethnography, action research, grounded theory, experiment, survey, and case study.

While ethnographic research “*involves an ongoing attempt to place specific encounters, events and understandings into a fuller, more meaningful context*” (Tedlock, 2003, p. 165), action research, which is originally proposed by Lewin (1946), goes beyond traditional research of social action (e.g., describe, analyse, theorise) to act with social subjects to change or create human and social practices (Somekh, 2006). In the experimental strategy, a researcher examines, whether in a laboratory or a field, the effect of changes of one or a set of independent variables on another dependent variable to understand relationships between them (Hakim, 2000). Grounded theory, which is originally introduced by Glaser and Strauss (1967), seeks to formulate hypotheses based on conceptual ideas of ‘what is going on out there’ by a means of empirical data. In grounded theory, “*there is a need not to review any of the literature in the substantive area under study*” (Glaser, 1992, p. 32).

Case study is “*a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence*” (Robson, 2002, p. 178). The case study strategy seeks to gain insight into a phenomenon and its context (Gill and Johnson, 1997). The survey strategy, on the other hand, is amongst the most utilised strategies in social research (Babbie, 2004; Saunders *et al.*, 2007). According to Denscombe (2003), survey is a research strategy in which “*there is empirical research pertaining to a given point in time which aims to incorporate as wide and as inclusive data as possible*” (p.8). Survey is generally associated with the quantitative approach and allows gathering quantitative data that can be representative of the whole population at a low cost (Saunders *et al.*, 2007). In the present research, the case study strategy and the survey strategy seem to be appropriate for qualitative parts and quantitative parts respectively; thus, they are adopted.

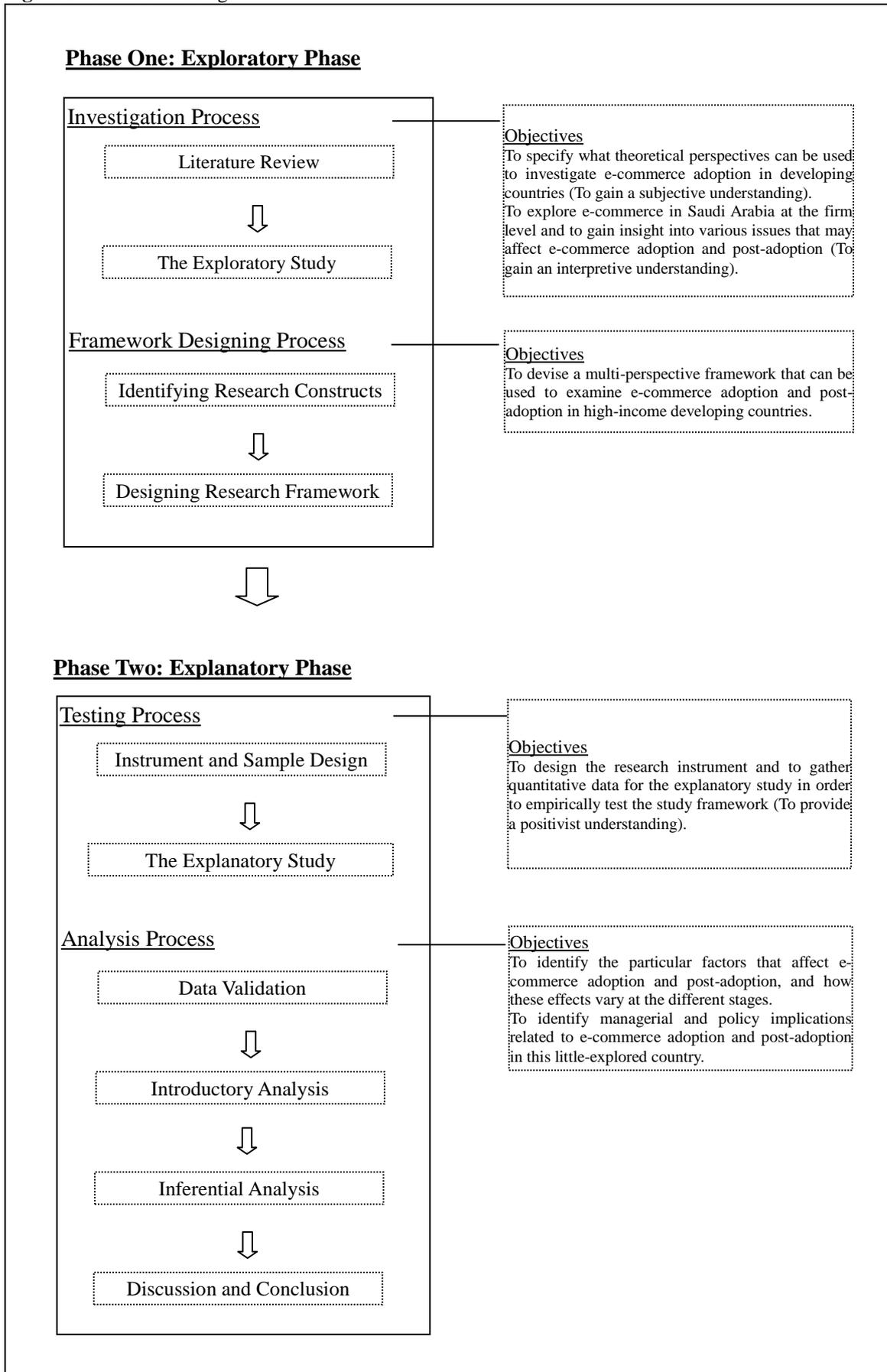
3.5 Research Design

The research design is “*the fundamental plan for a piece of research, which contains major ideas of the research, such as the framework of the research, and presents which tools and procedures the researcher will use to collect and analyse the research data*” (Punch, 2005). Punch further states that the research design involves all research aspects from its problem formulation to finalising its results. The research design shows how the research will be conducted following a systematic procedure in order to provide a reliable outcome in a specified timeframe.

The nature of the research problem being investigated determines the choice of the research design. Considering the post-positivist paradigm as an underlying philosophy, Giddens (1984) suggests three understanding stages for social phenomena, namely, subjective, interpretive, and positivist understanding stages. The first stage is a subjective understanding of the phenomenon, which can be achieved via eliciting the perceptions of participants at an exploratory phase. At the second stage, hypotheses or propositions are generated based on the interpretation of participants' understanding. At the final stage, a positivist understanding is achieved by empirically testing hypotheses or propositions. Giddens's framework seems to be suitable for investigating complex phenomena, such as e-commerce in the developing world. Given the shortage of literature that has investigated e-commerce adoption in the high-income GCC region, it is inapplicable to build the study framework based on the available fragmented literature alone. Hence, there is a need to begin the research with an interpretive understanding of the phenomenon in order to identify issues that are potentially relevant for the considered region.

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, 1997; 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's (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. Within these two phases, a mixed-method approach that involves both quantitative and qualitative techniques seems suitable as suggested by the post-positivist paradigm. An overall research design is illustrated in Figure 3.1.

Figure 3.1: Research design



3.5.1 The Exploratory Phase: Framework Development

In this research, the exploratory phase is the first stage to investigate e-commerce adoption in high-income developing countries, using Saudi Arabia as a case study. The exploratory phase helps in understanding different components as well as their perceived interaction for the phenomenon under investigation (Krathwohl, 1997). In particular, it assists in examining e-commerce adoption in high income developing countries at an organisational level and in gaining insight into various issues that may influence e-commerce adoption in such countries. In this research, the exploratory phase consists of two components: a literature review and an exploratory study, which are described in the following sections.

3.5.1.1 Literature Review

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*” (p.43). In this research, the literature review is a very important element of the exploratory phase in order to understand the topic under investigation and clarify important issues, revealing how this topic is treated and studied. It also highlights different aspects of the topic, e.g. showing the underlying assumptions behind the study, refining and redefining the research questions (Marshall and Rossman, 1999). In the exploratory phase, the literature review assists in specifying the theoretical perspectives that can be used to study e-commerce adoption in high-income developing countries; therefore, conceptualising the determinants of e-commerce adoption and post-adoption in high-income developing countries. Because the development of the research framework is based on a literature review (Chapter 2) and an exploratory study (Chapter 4), this thesis is organised such that further literature relating to the identified constructs and proposition raising is presented later in Chapter 4.

3.5.1.2 The Exploratory Investigation

Carson and Coviello (1996) argue that “*the closer the researcher gets to the phenomenon, the clearer it is understood*” (p.55). The exploratory study in phase one aims to explore the e-commerce situation in Saudi Arabia at an organisational level. It intends to gain insight into various issues that may influence e-commerce adoption and post-adoption to provide direction as to what factors are imperative to firms in high-income developing countries. Taking into account the lack of e-commerce study in the region, a qualitative approach is adopted in this exploratory investigation. The qualitative approach enables gaining rich information and obtaining a deeper understanding of the phenomenon under investigation

(Deshpande, 1983, p.103). In particular, it helps elicit information ‘in someone else's mind’ that is not otherwise observable (Patton, 1990, p. 278).

According to Remenyi and Williams (1996), a case study is amongst the most frequently used research strategies in IS research. In this research, a case study is chosen as a suitable research strategy to collect qualitative data during the exploratory investigation. The qualitative findings of the exploratory phase are intended to contribute to the design of the research framework following similar studies that have used such a technique (e.g., Chong and Bauer, 2000; Scupola, 2009). After a thorough investigation of the literature on e-commerce adoption and diffusion in developing countries in general and the few efforts made in studying e-commerce in the high-income GCC region, a preliminary investigation process is conducted in order to provide an interpretive understanding of the phenomenon under investigation in real life through participant knowledge and perceptions about the phenomenon. It attempts to identify issues concerning current practices and perceptions of Saudi firms; thus, allowing the researcher to focus the research scope and set the research propositions. The exploratory investigation is presented in Chapter 4.

3.5.2 The Explanatory Phase: Framework Testing and Analysis

In the exploratory, the qualitative approach phase helps in gaining a deep understanding of e-commerce adoption in Saudi Arabian. In the explanatory phase, a quantitative approach is adopted as the main approach, as its findings can be statistically generalised, given its larger sample and significant statistics (Yin, 2009). The explanatory phase aims to give a positivist understanding of the phenomenon under investigation by empirically examining the research framework. In particular, the explanatory phase process incorporates a framework testing in order to identify the specific factors that would affect e-commerce adoption and post-adoption and how these effects vary at different adoption stages.

In the explanatory phase, the research problem is formulated in testable forms so that the relationship amongst the research constructs can be described and explained. The most popular and common research strategy, survey strategy, is adopted in the explanatory phase to gather quantitative data, which can be analysed using different statistical methods in order to provide an accurate research generalisation. To supplement the quantitative approach, the qualitative findings may need to be revisited to support and explain the quantitative results, as suggested by the mixed-method approach adopted in this research. Together, these findings can be used to identify managerial as well as policy implications

related to e-commerce adoption and post-adoption. The explanatory phase is covered in later chapters starting from Chapter 5.

3.5.3 Time Dimension

In the research community, the time dimension has two principal options that researchers may employ, namely, cross-sectional and longitudinal dimensions. Longitudinal research is based on continuous observations of a phenomenon over a period of time and involves data collection at different time, while a cross-sectional study, on the other hand, involves the observations of a phenomenon at a particular time (Babbie, 2004). Because of resource constraints (e.g., time and financial resources), the majority of research projects, especially in information systems, are cross-sectional studies. The literature also suggests that the majority of technology adoption research uses cross-sectional studies. Given the limited resources available for the researcher, this study followed common practice and employed a cross-sectional time dimension, as it involves the contemporary situation of e-commerce adoption and post-adoption amongst Saudi firms, not over a period of time.

3.5.4 Risk Assessment

Like any research, this study may face different difficulties and issues that need to be considered in order for the work to go smoothly. Prior studies conducted in Saudi Arabia reported that attempts in obtaining information from Saudi organisations have always encountered difficulties (Al-Kahtani, 1991 cited in Al-Sudairy, 2000). Amongst such issues was finding participants for the research interviews for the exploratory phases. In the exploratory study, after trying different techniques to invite participants, such as direct visits and e-mail invitations, it has been found that snowball sampling or its variation, respondent-driven sampling, via social networks is an appropriate sampling technique to invite firms to participate in the study (Heckathorn, 1997); therefore, it was adopted. Finding firms' locations was also a difficulty encountered during the exploratory study, due to the lack of postal addressing in Saudi Arabia.

Another issue is related to the response rate of the survey in the explanatory phase, which may affect the analysis phase and make it difficult to generalise the study findings. This issue is expected since prior survey studies in the country suffered from a low response rate, which is probably amongst the reasons for not conducting e-commerce research in the region. Because of the low response rate, Al-Sudairy (2000), in a study of EDI utilisation in Saudi private organisations, pointed out that a personal meeting increased the

response rate from 6 percent to 38 percent, although it was costly both in money and time. In another study on IT evaluation in Saudi private organisations, Al-Maliki (2005) pointed out that firms nowadays tend to decline to participate in survey studies as a matter of policy. Consequently, personal distribution of questionnaires via social networks is more likely to overcome such a difficulty, as suggested by prior studies in the country (Al-Sudairy, 2000; Aldwsry and Mayhew, 2011). In this research, all the aforementioned issues have been taken into account to minimise their negative impact.

3.6 Data Collection

According to Krathwohl (1997), the key activity in a research project is data collection, which depends on the study objectives and is influenced by the researcher's environmental factors. In this research, the data collection methods are selected based on the underlying philosophy and research objectives. As discussed earlier in section 3.3, the study employs a mixed-method approach, which suggests the use of mixed quantitative and qualitative data collection methods. This section discusses data collection techniques adopted for each phase of the current research.

3.6.1 The Mixed-Method Approach

Collecting qualitative data is often considered as a complementary technique to support statistics obtained from quantitative tools (Coolican, 2004). In particular, findings revealed by qualitative research can be triangulated to describe, explain and/or enrich findings of quantitative research (Gilbert, 2004). In principle, when combining both quantitative and qualitative methods to collect and analyse data separately to support the same results and investigate a particular question, one of three outcomes may occur, namely, convergence, complementary or contradictory (Erzberger and Prein, 1997; Erzberger, 1998; Kelle and Erzberger, 1999 cited in Al-Sukkar, 2005). In other words, the results of qualitative and quantitative methods may converge and support each other, diverge or contradict each other, or complement or supplement each other.

The choice of data collection methods is influenced by four issues, namely, finding credibility, researcher skills, time and cost constraints (Frechtling and Sharp, 1997). Punch (2005) argues that quantitative research allows the researcher to establish relationships amongst variables, whereas it fails to explain those relationships. Due to an inability to measure some phenomena using quantitative methods as well as the inability to explain some results collected by quantitative techniques, a demand for an alternative approach

has been raised, leading to the use of qualitative research (Streubert and Carpenter, 1999, p.1). Yin (2009) recommends the adoption of multiple data collection methods to gain a better benefit from different sources. The use of a variety of data collection methods from different sources can strengthen the validity of the results and minimise weaknesses of a single method approach. Miles and Huberman (1994) have suggested various forms of the research design process in integrating qualitative and quantitative approaches, which can be conducted either concurrently or sequentially with different orders. In a study of ERP implementation, Rajagopal (2002) used an interview method followed by a survey as sources for data collection. Barnes and Vidgen (2006), on the other hand, used a single survey to collect both qualitative and quantitative data at the same time, arguing that using the same sources would reduce problems of collecting data at different times.

This research adopts an incremental mixed-method approach, comprising of a qualitative study to help in conceptualising the study framework, followed by a quantitative study to empirically assess the conceptualised framework. In this research, each phase is made more explicit and data collected from each phase are used to synthesise the analysis and triangulate the findings from each phase. The rationale is to respond to the complexity of e-commerce adoption and diffusion at an organisational level in Saudi Arabia, given the lack of rigorous e-commerce research in the region. Due to variations in circumstances, such as cultural and economic differences, this research demands that data and tools correspond to region-oriented perceptions and experiences of e-commerce adoption and post-adoption, which can be achieved through a qualitative investigation. Qualitative techniques can give “*intricate details of phenomena that are difficult to convey with quantitative methods*” (Straus and Corbin, 1990, p. 19). Quantitative methods, on the other hand, can be used to empirically examine the theoretical model using a larger sample that its findings can be statistically generalised (Yin, 2009).

3.6.2 Data Collection Methods

As an important element in any research project, researchers typically rely on various methods for data collection, such as observations, interviews, documents, field surveys and experimental surveys. In qualitative research, personal interviews tend to be one of the most common data collection techniques (Ezzy, 2002). The personal interview technique enables a researcher to collect large amounts of data that can be clarified when needed (Marshall and Rossman, 1999). Therefore, the personal interview method is adopted as the main data collection technique in the exploratory study because it is “*both the most*

ordinary and the most extraordinary of ways you could use to explore someone else's experience – it is as ordinary as a conversation, and as amazing as a brilliant film” (Richards, 2005). It intends to explore the e-commerce situation in Saudi Arabia at an organisational level and to gain insight into various issues that may affect e-commerce adoption and post-adoption within the country. In particular, the personal interview is an appropriate technique for the intended audience because Arab societies have been defined as an oral dominant society (Zaharna, 1995). In addition to the interviews, organisational documentation, such as websites and internal documents, can also be used to support evidence and validate responses in the exploratory study.

Table 3.1: Strengths and weakness of data collection techniques and their use in this research

Method	Strengths	Weaknesses	Use in this Research
Interview	<ul style="list-style-type: none"> -Allow depth of response. -Ensure the comprehensibility of questions. -Flexible and adaptable. -Capture non-verbal responses. 	<ul style="list-style-type: none"> -High cost on time and personnel. -Require skilled and trained personnel. -Difficult to analyse and summarise. -Interviewers might influence responses. -Rely upon participants' ability to explicitly verbalise their views. 	<ul style="list-style-type: none"> -Interviews in the exploratory phase in order to explore the e-commerce situation in Saudi Arabia and to enhance the research framework.
Survey	<ul style="list-style-type: none"> -Quick and economical. -Easy to score and summarise. -Provide pictures of situations at particular time. -Can be conducted by a single researcher. -Convenient for respondent to complete. 	<ul style="list-style-type: none"> -Usually low response rate. -No assurance of comprehensibility of questions. -Responses might be subject to response sets, e.g. acquiescence set. -No opportunity to probe for additional information or to clarify answers. -Cannot be controlled when filling. 	<ul style="list-style-type: none"> -Questionnaires are distributed in the explanatory phase to empirically assess the study framework and related propositions.

(Source: Krathwohl, 1997; Galliers, 1992; Nachmias and Nachmias, 1981; Bryman, 2001).

For quantitative data, a questionnaire survey tends to be the most popular and common strategy with which researchers can get more control over the research process and can get representative findings that can be generalised to the whole population at a low cost (Babbie, 2004; Saunders et al., 2007). In the second (explanatory) phase, the questionnaire survey has been adopted as an appropriate technique to test the research framework and identify the specific factors that would affect e-commerce adoption and post-adoption and how these effects vary at the different stages. Table 3.1 illustrates the main data collection methods used in this research (i.e., personal interview and survey questionnaire) as well as their strengths and weaknesses. In short, the current study starts with a qualitative segment (i.e., personal interviews) that helps in identifying issues that should be explored in the subsequent study. The qualitative study is then followed by a quantitative segment (i.e., questionnaire survey) to help in testing the research framework and related propositions.

Together, the analysis of these data can help to draw managerial and policy implications related to e-commerce adoption and post-adoption in this little-explored country.

3.7 Sampling Procedure

In the research community, a sample is a subset of a particular population and can be used to represent the population under consideration. This section discusses the sampling procedure and explains how and where research data are collected. It addresses the target population, sample frame, sample participants, sample size and sampling techniques.

3.7.1 Target Population

According to Bryman (2001), the population refers to “*the universe of units from which the sample is to be selected*”, while the sample, on the other hand, reflects “*the segment of the population that is selected for investigation*” While it may be possible to collect and analyse data from the whole intended population, most research has a large population that is impossible to cover in a single study; therefore, a representative sample(s) is required by collecting data from this large population.

Sudman (1983) suggests that a population should be explicitly defined so that a sample can be easier and cheaper. This research attempts to develop a research framework and empirically assess e-commerce adoption amongst firms of various sizes and industries in Saudi Arabia. Thus, the Saudi private organisations, regardless of their ownership, size or business sectors, comprise the study population from which a sample is to be drawn. The sampling consideration for this research is required as the population is relatively large.

3.7.2 Sample Frame

The sampling frame is “*the listing of all units in the population from which the sample will be selected*” (Bryman, 2001). The sampling frame works as a margin that is used to limit the study population. Saunders et al. (2007) argue that the chosen sample might not be representative for the entire population, given that not every unit of the population will have the chance of being included. According to Churchill and Iacobucci (2005) “*there is rarely a perfect correspondence between the sampling frame and the target population of interest*” (p. 324). Thus, researchers need to be aware when generalising study findings.

As the objective of the present research is to investigate the adoption and post adoption of e-commerce amongst Saudi firms, the sample comprises both adopter and non-adopter

organisations. Molla and Licker (2004) argue that the lack of e-commerce experience in developing countries is a primary challenge that makes normal distribution of responses mostly unlikely to any specific question across any selected sample, but rather a uniform distribution of responses is expected. These authors further suggest that a wide variety of respondents would be appropriate in order to encompass the entire range of responses that are not limited to a particular sector or specific size.

It is assumed that a sample of establishments from different industry sectors would lead to a richer dataset than firms belonging only to a single sector. In the e-commerce domain, Gibbs and Kraemer (2004) suggest the sample to include firms from “*three major industry sectors that are known to be more advanced users of e-commerce – manufacturing, distribution (wholesale and retail) and finance (banking, insurance and financial services)*” (p.129). Moreover, other sectors that have recently been perceived as advanced users of e-commerce are information-intensive industries (e.g. IT, telecom, travel and tourism sectors), “*in which e-commerce is already playing a significant role by allowing information to flow through the Internet on a worldwide basis with virtually no entry barriers*” (Maswera et al., 2008, p. 188).

The sampling process in this study involves finding a mixture of Saudi Arabian private organisations that may vary in terms of size, business and the maturity of e-commerce adoption, while focusing on organisations from the three major sectors, i.e. manufacturing, distribution and service-based sectors. Although no official statistics for the numbers of businesses engaged in these sectors are readily available in Saudi Arabia (CITC, 2008), the Trade Dictionary of Chamber of Commerce and Industry is the most reliable source for obtaining a list of Saudi private organisations, from which the sample can be drawn. In order to find corporate representatives across the country, the study intends to include enterprises from the major Saudi cities (i.e., Riyadh, Makkah, Jeddah, Dammam, Khobar, Joubil and Maddinah), as they constitute 90% of the study population (CITC, 2008).

3.7.3 Sample Participants

Participants who are somehow involved in decisions related to e-commerce technology within organisations are needed to respond to issues related to the adoption and post-adoption process. Thus, the primary data are collected in this research from management staff of Saudi private organisations. It is assumed that management staff would possess enough knowledge regarding e-commerce adoption and post-adoption, and would have

uncomplicated access to more information related to e-commerce strategies. Management staff are assumed to be the most suitable for giving genuine responses since the research is involving issues that might be sensitive or intangible. Moreover, the focus of the sampling in this research is on organisational characteristics rather than managerial characteristics since this research investigates the adoption process at an organisational level, which is more complex than individual adoption (Rogers, 2003).

3.7.4 Sample Size

The sample size reflects the representativeness of the sample to the whole population, from which researchers can have confidence to generalise the research findings. “*The required sample size depends on two key factors: the degree of accuracy we require for the sample and the extent to which there is variation in the population in regard to the key characteristics of the study*” (Vaus, 2004). The nature of the research being investigated and its target population as well as other intractable issues such as the available time and financial resources have a clear influence on the sample size.

Although no official numbers are available for the business universe in Saudi Arabia according to the Saudi Communications and Information Technology Commission (CITC, 2008), the Saudi General Organisation for Social Insurance revealed the number of Saudi private organisations to be 241,411 companies (GOSI, 2010). While it can be determined using a statistical formula, a sample size between 30 and 250 elements are frequently used with survey studies in social science research (Denscombe, 2003). It has been agreed that a larger sample size is better, with a minimum of 200 observations for a complex model (Hulland et al., 1996; Sharma et al., 2005).

Statistically, Tabachnick and Fidell (2007) suggest the sample size to be $N \geq 104 + m$, where m is the number of independent variables. A rule of thumb of the ratio of the sample size to the independent variables is between 5:1 and 10:1 (Bentler and Chou, 1987; Hair et al., 2010). As the present study intends to generalise the research findings to the entire population, the minimum sample size is determined using a statistical formula with three measures: the degree of confidence, the specified level of precision or accepted margin of errors, and the proportion of responses relating to particular attributes (Saunders et al., 2007). To calculate the minimum sample size needed (n), the following formula is used:

$$n = p\% \times q\% \times \left(\frac{z}{e\%}\right)^2, \text{ where}$$

$p\%$: proportion of belonging to the specified category.

$q\%$: proportion of not belonging to the specified category.

z : corresponds to required confidence level.

$e\%$: corresponds to margin of accepted error.

In this study, $p\%$ and $q\%$ refer to the proportion of e-commerce adopters and non-adopters in private organisations in Saudi Arabia. As the exact proportion of adoption is unknown, 50% is selected, with 95% confidence level and 5% margin of error, as they are widely used and accepted in the research community. Based on the above formula, the minimum representative sample size is 384 enterprises. This result is also consistent with a formula available on the Internet to calculate the sample size for the given population at 95% confidence level and 5% confidence interval (Raosoft, 2004; CRS, 2012). However, as this study is unlikely to achieve a 100% response rate, it estimates the response rate to be 50%, and therefore recalculates the actual sample size (n^a) needed based on the following formula (Saunders et al., 2007):

$$n^a = \frac{n \times 100}{re\%}, \text{ where}$$

n : minimum sample size.

$re\%$: estimated response rate.

With a minimum sample size of 384 and a 50% estimated response rate, the actual sample size (n^a) is 768 firms. The sample size can also be estimated using ‘G*Power 3’, which is a software programme that covers statistical power analyses for many different statistical tests with different options. Using this software to estimate the sample size necessary to achieve for Logistic regression, a two-sided test is adopted with $\alpha = 0.05$, a power of 0.95, and assuming that the odds ratio = 1.5. The results indicate that the minimum sample size is 317 using the procedure of Hsieh et al. (1998), whereas the necessary sample size is 337 cases in the procedure proposed by Demidenko (2007) with variance correction, and $N = 355$ without variance correction. Given the research purposes and the available resources, the sample size for the survey is assumed to fall into the aforementioned range from a wide range of Saudi Arabian private organisations. To simplify the survey administration, 800 questionnaires are to be distributed. Unlike quantitative studies, qualitative research usually employs quite small non-random samples in order to gain a deeper understanding of the phenomenon under investigation. Thus, ten cases are regarded as sufficient, given its objectives and the available resources for the exploratory study.

3.7.5 Sampling Techniques

Broadly speaking, sampling techniques fall into two main categories, namely, probability and non-probability sampling, which are also called random and non-random sampling. Different techniques from both probability sampling and non-probability sampling are briefly presented in the following sections.

3.7.5.1 Probability Sampling Techniques

Probability sampling allows each member in the sampling frame to have an equally known non-zero chance of selection in the sample (Bryman, 2001; Denscombe, 2003; Nachmias and Nachmias, 1981). It allows researchers to demonstrate the representativeness of their samples and clearly explain the possibly introduced variation (Aaker et al., 2004). Probability sampling techniques include, but are not limited to, simple-random sampling, systematic sampling, stratified sampling and cluster sampling.

The first type of probability sampling is *Simple random sampling*, which allows each element of the population to have the same chance of being included, such as choosing n different random numbers from 1 to N of the whole (N) population members (Elder, 2009). *Systematic sampling* is another probability sampling that is commonly used in survey studies (Elder, 2009). Such a technique involves systematic spread of the sample throughout the whole population members, such as every tenth member is selected until reaching the entire sample size. In some circumstances and based on one or more attributes, the target population may be divided into strata (groups), introducing *stratified sampling*, in which “*the resulting sample is made more efficient by ensuring that units from each population group are appropriately represented in a controlled way*” (Elder, 2009, p.9). Similar to stratified sampling, “*cluster sampling is useful when subgroups that are representative of the whole population can be identified*” (Aaker et al., 2004, p.384).

3.7.5.2 Non-probability Sampling Techniques

Non-probability sampling, on the other hand, relies on personal judgement of the sampling process where some elements have a greater probability of selection in the sample, given that each element has unknown probability inclusion (Bryman, 2001; Gilbert, 2004). Researchers tend to select non-random sampling as a result of the fact that probability sampling is time consuming and very expensive, whereas non-probability techniques are convenient and economic (Nachmias and Nachmias, 1981). Non-probability sampling techniques are recommended in some circumstances, such as when the population cannot

be easily defined, the sampling frames are unavailable, or the population is too dispersed to be clustered (Nachmias and Nachmias, 1981; Vaus, 2004). Non-probability sampling techniques include, but are not limited to, purposive sampling, convenience sampling, quota sampling, snowball and its variation respondent-driven sampling.

Quota sampling is a non-random sampling technique where researchers specify numbers non-randomly (quotas) for each specified subgroup that is often based on demographical data, whereas *purposive* or *judgmental sampling* involves the judgement of researchers for the selection of representative units without sampling at random (Elder, 2009). *Convenience sampling* is the most commonly used non-probability sampling, in which the selection of members is fast and depends on participant availability and ease. The last technique is *snowball sampling*, which starts with an initial set of participants and relies on referrals from those initial participants to generate additional members and so on (Johnston and Sabin, 2010). Such a technique is usually used to reach members of the target population that are not easy to reach otherwise (Johnston and Sabin, 2010).

Respondent-driven sampling, which was originally introduced by Douglas Heckathorn in 1997, is a variation of snowball sampling that allows unbiased estimates about the social network that connects the hidden population (Heckathorn, 1997). The respondent-driven sampling technique begins with initial participants (known as seeds), who in turn recruit eligible peers from their social network, rather than identifying them to an investigator, and continue until the pre-defined sample size is reached (Johnston and Sabin, 2010). This technique removes selection bias of the survey staff and minimises over-representation biases associated with large network participants (Heckathorn, 1997; Heckathorn, 2002). Respondent-driven sampling relies on the peer pressure of the recruiter to his or her peer as an incentive to encourage participation (Johnston and Sabin, 2010). This technique is seen to be appropriate as peer pressure of the social network is a very strong incentive in Saudi Arabia; this is because it is a collectivist society, in which members act for a group goal rather than an individual goal (DePauw, 2006). In other words, social influence in this study is not a coercive recruitment tool, as Saudi people have strong social customs that are likely to motivate them to support each other and respond to their peers.

The above discussion, as well as difficulties addressed in section 3.4.4, suggests that sampling inspired with personal contacts and social networks is likely to help in mitigating such difficulties. Therefore, the use of personal distribution of questionnaires is adopted

using purposive (judgement) sampling in association with response-driven sampling via social networks. It is also intended to administer the survey using two distribution forms: online-based and paper-based surveys in both English and Arabic languages, according to respondent preferences. While designing the online survey, challenges were encountered when designing the Arabic version of the online-survey, as most of the ready web-based survey solutions do not support the right-to-left alignment. Consequently, the online-survey was designed using LimeSurvey, which is an open source online survey tool that enables users to develop their own customised online survey and host it in their own servers (Limesurvey, 2010). This solution enabled the researcher to design an online survey that is very identical to the layout and format of the paper-based survey.

3.8 Data Analysis

By adopting a mixed-method data collection approach to explore the research objectives, the analysis process involves both quantitative and qualitative data analysis. Thematic analysis is the adopted qualitative analysis in this study, while the quantitative analysis involves various statistical analyses, which are briefly discussed in the following sections.

3.8.1 Qualitative Analysis

Qualitative data analysis is a complex, iterative process by which meaningful patterns or themes are provided. One of the main features of qualitative methods is their inductive analytical approach, as data is collected in relation to relevant issues that are usually not predetermined (Maykut and Morehouse, 1994). Qualitative analysis is needed to analyse qualitative data collected during the exploratory research. Miles and Huberman (1994) developed a framework which describes four major iterative phases of qualitative analysis, whereas Braun and Clarke (2006) introduced a process of six phases to guide the analysis.

Thematic analysis is a flexible qualitative analysis tool and “*a method for identifying, analysing, and reporting patterns (themes) within data*” (Braun and Clarke, 2006; p.6). Thematic analysis is an analysis technique that is “*essentially independent of theory and epistemology, and can be applied across a range of theoretical and epistemological approaches*”, as compared to “*those tied to, or stemming from, a particular theoretical or epistemological position*” (Braun and Clarke, 2006, p.4-5). To analyse qualitative data from the exploratory study, Braun and Clarke’s (2006) six-phased approach was adopted. Further discussion of the qualitative analysis is addressed in the next chapter (Chapter 4) when analysing qualitative data (section 4.5) from the exploratory investigation.

3.8.2 Quantitative Analysis

Unlike qualitative analysis, quantitative analysis focuses on numerical representations of quantitative data, using different computer software, such as SPSS 18, Stata 11, and MS Excel 7. Descriptive statistics of quantitative data are needed for the survey study in the explanatory phase in order to summarise results and to validate data prior to conducting multivariate analysis (Sekaran, 1992). In Particular, descriptive statistics are intended for a data screening process as well as an examination of the underlying assumptions and the potential bias that could exist. It is anticipated that a descriptive analysis would help in detecting entry errors and outliers and in describing the demographic characteristics of the collected data. Descriptive statistics are presented in Chapter 5, where data are validated.

To further analyse the quantitative data, the measurement model is evaluated and validity and reliability of research constructs are assessed quantitatively using the collected data, as addressed in Chapter 6. The validity and reliability process starts by assessing the initial reliability of the research constructs. An exploratory factor analysis process is conducted to statistically identify the underlying structure of relationships amongst the research variables. The process concludes by assessing the validity and reliability of the resultant factors and calculating their summated scales. At the final stage, structural analyses are conducted after examining the underlying assumptions and conducting multicollinearity diagnosis of the research constructs. Multivariate analysis is carried out to evaluate the research framework and to identify factors that determine e-commerce adoption and post-adoption amongst Saudi enterprises. In particular, various forms of logistic regression analysis are intended in order to empirically examine research models and propositions.

3.9 Research Credibility

The degree of credibility, which is typically based on the validity, the reliability and the generalisability of the research findings, is a common concern for any research. According to Krathwohl (1997), validity seeks to verify whether a study instrument measures exactly what it is intended to measure, whereas reliability seeks to verify whether the measure provides the same results when repeated, assuming no change in the measurement scales. Generalisability, on the other hand, seeks to verify whether the probability that research findings in a sample can be generalised for the whole target population (Krathwohl, 1997). As discussed earlier in section 3.2, this research is seen to lie within the post-positivist paradigm. The post-positivist paradigm supports research reliability and validity through the use of triangulation, which emphasises the use of multi-method approach (Hirschheim,

1992). According to Janesick (2000), there are five types of triangulation, namely, data, investigator, theory, methodological, and interdisciplinary triangulation, as illustrated in Table 3.3. To ensure the validity and reliability of the research findings, measures of the research constructs were drawn, when possible, from the literature, in which they are reported to be reliable in assessing the construct. Generalisation is achieved through the adoption of post-positivist approach, and hence what can be discovered in this research can, to a great extent, be generalised to a larger population as argued by Winfield (1990). Further discussions of these issues are addressed in subsequent chapters of this thesis.

Table 3.3: Types of triangulation and their applications in this research (Janesick, 2000)

Triangulation Type	Meaning	Application in the Current Research
Data Triangulation	The use of various data sources in a study	Data is collected through different sources, such as: -Literature review -Exploratory study -Explanatory study
Investigator Triangulation	The use of several researchers or evaluators	Data is collected through sampling that uses social networks, in which some participants help in the data collection process
Theory Triangulation	The use of multiple theoretical perspectives to study a single dataset	DOI theory, institutional theory, the PERM model and the TOE framework.
Methodological Triangulation	The use of multiple technique to collect and analyse data in a study	Various data gathering techniques are chosen such as: -Structured interviews -Documentation -Questionnaire survey Various data analysis techniques are chosen such as: -Thematic analysis -Binary logistic regression analysis -Ordered logistic regression analysis
Multidisciplinary Triangulation	The use of investigation of issues from different disciplines	This thesis is of a multidisciplinary nature and constitutes hybrid research in the field of adoption and diffusion of innovation, e-readiness and e-commerce. The research is built on investigation of methods and approaches from these disciplines.

3.10 Ethical Consideration

“Ethics define what is or is not legal to do, or what moral research procedure involves” (Newman, 2003). This research intends to follow the four standards of good practice: (1) to do positive good, (2) non-maleficence, (3) informed consent, and (4) confidentiality and anonymity assurance (Bošnjak, 2001). Ethical problems are not anticipated, as this research does not deal with invasive information. Prior to data collection, an application of the research instruments was submitted to Research Ethical Committee at the School of Computing Science in the University of East Anglia and approval was granted.

During the research phases, respondents were not intended to be asked to participate in any unpleasant way, but rather they were encouraged to respond (Salant and Dillmant; 1994; Zikmund, 2003). The privacy of participants is guaranteed from misrepresentation and exploitation (Zikmund, 2003). For ethical reasons, participating firms were kept confidential and participants were not asked for any personal information. An information sheet outlining the purpose of the study and the participant's rights is sent out in advance to each participant to ensure their confidentiality. Respondents were informed about their right to withdraw at any time and to contact the researcher when they have any concern.

3.11 Summary

This chapter presented a detailed description of the research methodology and design. After discussing the post-positivist philosophy, this chapter justified the mixed qualitative and quantitative approach chosen for this research. Giddens's (1984) framework was adopted for the research design, where this research starts with an exploratory phase that consists of investigation and framework designing processes, which is followed by an explanatory phase that consists of framework testing and analysis processes.

By adopting a mixed approach, this study employed both qualitative and quantitative data collection techniques, particularly face-to-face interview and questionnaire survey. Given the available resources and considering other IS research experiences in the region, this study adopted a non-random sampling from private organisations over Saudi major cities. Once data was collected, the analysis process began, including both quantitative and qualitative analysis. Research credibility and ethical considerations were also addressed.

CHAPTER 4: Exploratory Study and Proposition Raising

4.1 Overview

This chapter discusses a preliminary investigation held in the exploratory phase, aiming to provide direction to what factors are imperative to firms in the region. This chapter begins with a discussion of the needs for the current research to start with an exploratory phase. It then proceeds to highlight the study methodology and administration. Emphasis is then placed on presenting the findings, in which different issues and concerns are discussed. The findings of the investigation are then used to refine the research framework. This chapter then extends the literature by discussing relevant studies that bears upon factors represented in the framework. It discusses the identification of the research constructs and addresses arguments raised from relevant literature; hence propositions are spelled out.

4.2 The Need for an Exploratory Phase

The lack of e-commerce research in some parts of the world motivates researchers to conduct studies in different countries, revealing some evidence of contextual differences. This research investigates e-commerce adoption in the case of Saudi private organisations. This section argues that there are both literature and methodological needs to start with an exploratory phase to gain rich insights and, therefore, develop a comprehensive research framework that reflects the study context. As discussed earlier in section 3.5 of Chapter 3, many IS researchers suggest that an IS research should start with a qualitative exploratory stage, which is normally followed by a confirmatory quantitative stage (Giddens, 1984; Straub and Carlson, 1989). Such a view is especially appropriate for studying complex phenomena such as e-commerce in developing countries.

There is a shortage of literature that has investigated e-commerce adoption and subsequent utilisation at an organisational level in the GCC region, such as Saudi Arabia, which is the target in this research. Recent statistics of Internet penetration in Arab countries suggest that greater use of e-commerce activities is likely to appear in the region in the next few years. However, researchers interested in investigating e-commerce in these markets are “reliant on a fragmented and not easily accessible literature that presents a potentially distorted picture of e-commerce practice in these regions” (Shoib and Jones, 2003). It is not applicable to develop propositions based on fragmented literature; thus, an exploratory investigation is needed as a starting point that can contribute to the design of the research framework, following similar studies (e.g., Chong and Bauer, 2000; Scupola, 2009).

4.3 Study Methodology

This exploratory study intends to help gain an in-depth understanding of important issues that are worthy of further investigation. In the exploratory phase, a thorough literature review was conducted in the domain of innovation adoption and diffusion in general and in developing countries in particular. From the literature review, an initial framework was integrated, as illustrated in Figure 2.6, to be an underlying model to guide this study, as discussed in section 2.5 of Chapter 2.

Taking into account the exploratory nature of this investigation, the overall aim is to provide direction to which e-commerce adoption factors are imperative to firms in a high-income developing country. In particular, it is intended to conduct this exploratory study in order (1) to explore the e-commerce situation in Saudi Arabia from primary sources and (2) to deeply investigate influential factors and uncover potential issues related to the adoption and utilisation of e-commerce in the country. Consequently, it attempts to shed light on issues from different perspectives with regard to the adoption and use of e-commerce in this poorly investigated region that should contribute to focus the research scope and to refine the preliminary framework.

As discussed in section 3.5.1.2 of the methodology chapter, the qualitative approach is adopted in this exploratory study, as qualitative data “provide *'thick descriptions'* that are vivid, nested in real context and are also well suited for locating the meanings people place on events, processes and structures” (Miles and Huberman, 1994, p.10). According to Harvey and Myers (2002), qualitative research differs from traditional approaches in that it is designed to help in understanding social and cultural phenomena, especially with

the lack of sufficient related studies. Hence, the qualitative approach is adopted in this exploratory study to gain insights into issues that are worthy of further investigation.

In this exploratory study, the interview method is adopted as the main data collection technique, as discussed earlier in section 3.6.3 of Chapter 3. The main data were collected using the face-to-face interview technique with top-level management participants from private organisations in Saudi Arabia. According to Cavana et al. (2001), face-to-face interaction is likely to encourage an interviewee to share implicit knowledge and deep thoughts and opinions. It helps with managing the interview process by using specific questions to elicit information and moving when information is clear. The interviews were conducted based on a designed interview guide, as illustrated in Appendix A, in order to explore overall concepts and emerging issues.

Considering different issues related to e-commerce in developing countries, the interview guide is designed with reference to Iacovou et al.'s (1995) study guide. Despite the fact that the interviews were structured, by using an interview guide that includes open questions, participants were left free for any kind of response or elaboration. Although some researchers argue against recording interviews, the Association for Information Systems (ISWorld) in an online discussion concluded that “*using recorders is a not only good, but very important thing to do*” (ISWorld, 1999). Thus, after the permissions of participants, the researcher adopts such a view and recorded each interview digitally, taking recording recommendations of the ISWorld into account. In this study, the words ‘participant’ and ‘respondent’ are used interchangeably to refer to an interviewee.

4.4 Study Plan and Administration

Prior to data collection, the interview guide was piloted in order to detect weaknesses and to clarify ambiguity so that participants could give their responses without experiencing any difficulty. It also helped to check how long the interview would take to complete. The testing and piloting process of the interview guide took three runs, taking previous feedback into account. The piloting interviews helped in refining the interview questions and enhancing the structure of the interview guide.

For the data collection process, the selection of companies was made according to the following criteria: (1) the firm has to have a registered domain name, which does not mean that it has to have a website, but it is assumed that potential adopters usually make

some efforts for e-commerce preparation; (2) the organisation has to be from one of three main industry sectors: manufacturing, distribution and service sectors, which are known to be more advanced e-commerce adopters; (3) the selected organisation has to be located or have an office in the capital city, Riyadh. The rationale of selecting Riyadh is two-fold: firstly, the limited resources, both time and financial, available to conduct this exploratory study; secondly, Riyadh is the best location to find representative responses, as most headquarters and decision makers of local companies are usually located in Riyadh.

To achieve the research objectives, ten companies of different sizes and belonging to different business sectors that agreed to participate were interviewed during September and October of 2009. Prior to the interviews, an information sheet, outlining the purpose of the study as well as the interviewee's rights and the confidentiality of the interview, was sent out to each interviewee for ethical reasons. The researcher provided a supported letter from the academic supervisor to facilitate the data collection. Participants were informed about the interview recording and assured that they might withdraw their participation at any stage of the study without repercussion. The interviews were carried out in places that were convenient to the participants and where privacy could be afforded (Neuman, 1997).

While some interviews were held in participants' own offices, others were held in other locations that participants preferred. During each interview, the researcher began recording and taking notes. To put interviewees at the mood for the interview, interviewees were asked to start by discussing their current and planned e-business activities at their firms. The interviews then moved emphasis to investigate different e-commerce determinants. Throughout the interviews, interviewees were invited to discuss anything that could have an influence on e-commerce adoption and utilisation in their organisations. After each interview, follow-up phone calls were made, when needed, to clarify unclear points.

4.5 Qualitative Data Analysis

Although participants began answering a specific question, they were left to elaborate their answers, which offered a much greater depth for analysis. According to Braun and Clarke (2006), thematic analysis is a relatively straightforward method designed for analysing qualitative data to identify emerging patterns or themes and to provide a rich description of the dataset. As illustrated in Figure 4.1, Braun and Clarke (2006) introduced a 6-phase approach for thematic analysis. They further emphasise that qualitative analysis is a recursive process, in which a researcher can move back and forth throughout these

phases, when needed. Cross-case analysis and within-case analysis are two techniques for analysing data across cases or analysing data for each case individually, respectively (Miles and Huberman, 1994; Yin, 2009). In this research, data for each case were analysed individually and then compared with other cases based on their levels of e-commerce.

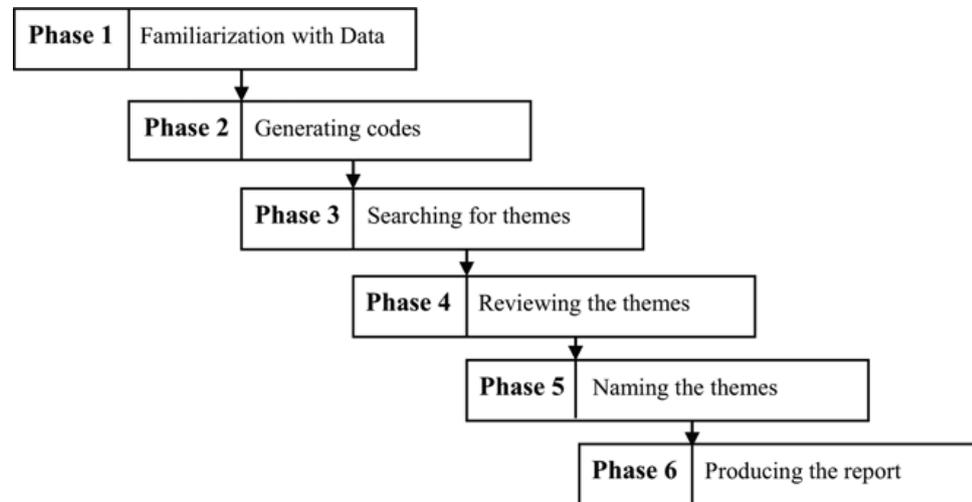


Figure 4.1: Phases of thematic analysis (Braun and Clarke, 2006)

During the first phase, Braun and Clarke (2006) suggest that the analysts immerse themselves in the data to the greatest possible extent to be familiar and gain insight into the content. Data typically need to be in a written format prior to conducting thematic analysis. Hence, the verbal data from interviews may need to be transcribed into a written format in order to start the analysis. While it may be time-consuming, the ‘time spent’ in transcribing data ‘is not wasted’, because it can be a starting point to develop a thorough understanding and be familiar with the data (Riessman, 1993; Braun and Clarke, 2006). In thematic analysis, it is important that transcripts retain the needed information in a way that matches its original nature, even though it does not require as much detail as other qualitative analysis, e.g. narrative and discourse analyses (Braun and Clarke, 2006).

At this preparatory stage, the researcher transcribed all the recorded interviews and checked the transcripts again by comparing them with the original interview recordings for ‘accuracy’, as suggested by Braun and Clarke (2006). The analysis of the transcribed data was conducted in their natural language (i.e., Arabic), and only the parts that could be quoted in the study findings were translated (Burgess, 2009). Further reading and re-reading were conducted for the transcribed interviews in order to be familiar with the data and to generate an initial set of issues related to the research objectives and what is interesting about them; thus moving to the second phase and producing initial codes from

the data, e.g. corporate image, website hacking, competition. Coding refers to “*the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon*” (Boyatzis, 1998, p.63). According to Miles and Huberman (1994), the process of coding is part of qualitative analysis, and it can be conducted either manually or through software packages (Braun and Clarke, 2006).

Although several software programmes are available for qualitative analysis, such as Nvivo, they were not used during the analysis process, as right-to-left languages, such as Arabic, do not perform well and encounter technical difficulties in such software, which are designed for left-to-right languages, such as English and other popular languages (Qdatraining, 2012). During this phase, it is important to note that some data extracts can be coded as many times as relevant, or even un-coded if not relevant. Because the coding process was conducted manually, data were initially coded by writing notes on the analysed texts to indicate potential patterns. These codes in turn matched up with their corresponding data extracts, as it is necessary to ensure coding data extracts and then collating them together within each code (Braun and Clarke, 2006).

Once data have been coded, the third phase begins by focusing the analysis on a broader level, which involves assigning various codes into potential themes, and combining relevant data extracts into their themes (Braun and Clarke, 2006). According to Braun and Clarke (2006), “*a theme captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set*” (Braun and Clarke, p.10). Therefore, different codes were assigned to their potential themes in a tabulated format to help organise and link the relationship between them. While most codes formed concepts categorised according to the study framework, a few others did not seem to fit anywhere, introducing other new emerging themes, such as process readiness. During this phase, data sharing similar meanings were grouped together and relationships between them were established.

The fourth phase involves two stages of reviewing and refining the candidate themes. Stage one involves reviewing the coded data extracts and suggests reading all collated data extracts for each theme to check whether they represent a coherent pattern (Braun and Clarke, 2006). In this stage, candidate themes may be segregated into separate themes, collapse into each other, or even discarded (Braun and Clarke, 2006). Stage two involves reviewing the coded data extracts in relation to the entire data set and suggests re-reading

the entire dataset to make sure that the themes fit in relation to the whole dataset and to code any additional missing data that were left in earlier stages (Braun and Clarke, 2006).

The fifth phase involves “*identifying the ‘essence’ of what each theme is about and determining what aspect of the data each theme captures*” (Braun and Clarke, 2006, p.22). As suggested by Braun and Clarke (2006), a theme needs to be as simple and coherent as possible. Therefore, the collated data extracts for each individual theme in this phase were mainly organised with reference to the research framework in a coherent and consistent way, in which themes and sub-themes were identified and clearly defined and related data extracts were highlighted. The last phase involves the final analysis and producing the report. In this phase, particularly representative examples or extracts that capture the essence of a particular point were translated and presented. In addition to the predefined themes, other issues and concepts have emerged from the qualitative analysis of this exploratory investigation, which are presented in detail in the following section.

4.6 Findings Presentation

This section addresses findings revealed from the exploratory study. After presenting the profiles of participating firms and other key ICT issues in the following section (4.6.1), findings related to innovation characteristics are presented in section 4.6.2, including perceived benefits, compatibility, complexity, security and perceived costs. Organisational factors are discussed in section 4.6.3, including internal resources, commitment, process readiness and governance. An analysis of environmental determinates is presented in section 4.6.4, where different aspects are discussed, including institutional trust, mimetic pressure, normative pressure, coercive pressure, external support, government readiness, supporting industry readiness and consumer readiness.

4.6.1 Organisational Profiles and Key Issues on ICT and E-Commerce

Firms in the sample range mainly from mid-sized to large organisations. The interviews were conducted with middle to top-level management staff (e.g., Chief Executive Officers (CEOs), Chief Information Officers (CIOs), and IS managers), which suggests a good data-source quality (Xu et al., 2004). All companies interviewed had a high-speed Internet connection and websites at different levels of maturity. About half of the firms failed to utilise their websites to conduct business effectively with their customers and suppliers, but planned for enhancement of their websites and for further e-commerce utilisation. The results of participating firms indicate that e-mails were in use for internal communication

amongst their employees as well as to communicate with most of their international partners, while the main communication methods in Saudi Arabia were fax with local partners, postal mails and in-person with the government, while SMS with customers is starting to gain popularity. The majority of the organisations interviewed had invested in IT projects and planned to improve their ability to conduct their business online. The use of network-connectivity is also common amongst the participating companies not only to connect internal departments, but also to connect branches at different locations. Inter-organisational technologies, such as EDI and EFT, were rarely used amongst firms in the sample, indicating a lack of B2B e-commerce activities amongst them. For ethical reasons, firms were referred to as case F1 to F10 respectively, as illustrated in Table 4.1.

Table 4.1: Profiles of the participating enterprises

Case	Business Type	Years in Business	No. of Emp.	Branches	Respondent Position	Years of Experience	E-Commerce Level
F1	Telecom	1.5	390	3 Branches & 17 Sale-Points	Manager of e-Channel Services & Development	1.5	6
F2	Stationery/Office Supplies	50	400	28 Branches	District Manager, Sale Administrator & Procurement with Government	1	5
F3	Computer HW Retailer	20	5	2 Stores	General Manager / Owner	20	2
F4	Private University	2	120	One Branch	Manager of Admission, Registration, & Student Services	1	3
F5	Electrical Material Supplier	20	115	3 Branches	General Manager / Owner	29	3
F6	Financial Services	50	7000	500 Branches	District Manager	20	6
F7	Air Conditioning & Heating	16	52	4 Branches	Executive President	16	3
F8	Internet Provider	11	50	3 Branches	Manager of Application Development & Support	7	4
F9	Car Retailer	29	700	13 Branches	CEO Manager	19	3
F10	Superstore Group	58	1000	9 Branches	IT Manager	11	4

One case (F3) had incomplete data that could not be followed-up; hence, it was partially excluded from the analysis when comparable data are unavailable. To capture e-commerce adoption in this study, a six-stage e-commerce indicator (adoption status) developed by Molla and Licker (2005a) is used to measure the level of e-commerce adoption. This indicator consists of six levels as follows: no e-commerce, connected e-commerce, static e-commerce, interactive e-commerce, transactive e-commerce and integrated e-commerce. Accordingly, e-commerce level in this study is ranging from 2 to 6. In this indicator, it has been assumed that the entry level adoption of e-commerce is level 4, i.e. interactive e-commerce. Firms at level 5 and 6 are referred to as advanced adopters, while firms at level

3 or lower are referred to as non-adopters. Note that while case F1 was at level 6, it was halting most of its online transaction activities due to several issues that are discussed later in this chapter. Organisational characteristics were not considered at this stage due to the small sample size; hence, the findings should be interpreted carefully.

4.6.2 Innovation Attributes

4.6.2.1 Perceived Benefits

Although there was a significant variation in recognising e-commerce benefits amongst participating organisations, the main perceived benefits and opportunities were: improving competitive advantage, expanding business reach, improvement of services provided to customers, enhancing the company's image, improving operational efficiency, increasing sales and reducing cost, as illustrated in Table 4.2.

Table 4.2: Recognised benefits of the participating enterprises

Recognised Benefits	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	Total
Reduce costs	x	x			x	x	x	x	x	x	8
Improve efficiency & effectiveness of operations	x	x		x		x		x	x	x	7
expand business reach	x	x		x		x	x	x			6
Improve competitive advantage	x	x				x		x		x	5
Increase sales and profits	x	x				x		x	x		5
Improve services provided to customers	x			x		x		x		x	5
Enhance company brand & corporate image	x	x				x			x		4
Increase return in investment (ROI)		x				x					2
Establish stronger links with clients and partners						x					1
Work opportunity for women	x										1
Direct collection for money	x										1
Provide physical security				x							1
Paperless environment										x	1
Perceived benefits (Total)	9	7	0	4	1	9	2	6	4	5	47

One key observation was that firms at a higher level of e-commerce adoption, such as case F1 and F6, recognised more e-commerce benefits than non-adopters and those at the entry-level. In particular, adopter firms recognised that there was a perception of high competitive advantages, whereas other firms primarily focused on direct or operational benefits, such as efficiency and cost saving. This suggests a significant lack of awareness about e-commerce benefits among those firms, and thus necessitates greater promotional efforts to increase e-commerce awareness amongst non-adopter and low-level adopter

firms. Although the government is expected to play a big role, its awareness was very limited and focused on the public sector:

“The government is now focusing only on the public sector. There is no information that is specific for e-commerce” (Case F1)

“I don't think there is any e-commerce awareness. I have been invited once to attend a forum on e-government” (Case F2)

However, the low level of e-commerce adoption was not perceived as a competitive disadvantage amongst firms in the sample, primarily since most of their competitors as well as business partners (usually other local firms) were at a similar, or even lower, level of e-commerce utilisation, as some respondents (case F9 and F10) emphasised:

“We as Saudis haven't reached the maturity level; if the service is offered, there will not be participation; customers and trading partners aren't ready. ... Now we are at the same level as other companies [in Saudi Arabia]” (Case F9)

“Companies are not ready for e-commerce locally. ... The one thing that is a disincentive is that no trader could do it [advanced e-commerce]” (Case F10)

Interestingly, the majority of the respondents believe that e-commerce doesn't establish stronger relationship with customers and business partners.

“E-commerce doesn't establish stronger relationship ... Because our mission was not clear, the relationship with some customers went bad, and this is among the things that we should be aware of in e-commerce” (Case F1)

“Customers lose the relationship with sellers for consultation” (Case F3)

Work opportunity for women, direct collection for money, physical security, and paperless environment are other benefits that some respondents were highlighted in this study.

“E-commerce provides direct collection for money, instead of using partners [to collect money] and delaying the process for 6 months or so” (Case 1)

“E-commerce provides physical security, instead of paying the money in cash, which is risky and there may be mistakes when counting [the money]” (Case 4)

4.6.2.2 Compatibility

The results also suggest that high level adopters did not show any concern regarding e-commerce compatibility and they were very positive towards e-commerce, while some non-advanced adopter firms had some compatibility concerns. One participant (case F10) clarified that it is difficult for grocery sectors to be online in a large country like Saudi Arabia, especially with the hot weather and the poor legislation infrastructure. Another respondent (case F9) mentioned that e-commerce is not completely consistent with their work practices. Other respondents (case F5 and F7) shared similar views:

“The company's products are specified products and can't be marketed to customers directly. ... e-commerce can't be applied to all companies” (Case F5)

“E-Commerce is not appropriate ... construction companies always require face to face [interaction]” (Case F7)

4.6.2.3 Complexity

The vast majority of the respondents did not show any concern regarding e-commerce complexity. Interestingly, the one firm (case 8) that encountered a difficulty in relation to e-commerce utilisation was the only one that deployed a full in-source model for its IT and e-commerce implementation.

“At this time it is difficult to be skilled and advanced in e-commerce ... The low number of IT staff causes problems not getting replacement for those who are leaving. If there were outsourcing from the beginning, we would not have such problems” (Case F8)

This finding highlighted the importance of outsourcing models in minimising e-commerce complexity as emphasised by some respondents. For example, one respondent (case F9) did not encounter difficulties in relation to e-commerce adoption and utilisation as they outsource their programmes, while another one (case F4) said that they could manage e-commerce via outsourcing. Such a view is shared by other participants (case F1 and F2):

“It is the responsibility of the vendor. Since we deploy an outsource model, we don't encounter any [difficulty]. The vendor might encounter some [difficulties]. The outsourcing model minimises the complexity from technical side, but not business side, which is not an issue right now” (case F1)

“Because we have a contract with a company [to implement e-commerce], they will face all the burden, and we will be in the next stage ... as a seller” (Case F2)

4.6.2.4 Security Concerns

All respondents in the sample, except one entry level adopter firm (case F10), expressed security concerns in relation to e-commerce adoption and implementation. Perceived risk and lack of trust in e-commerce had caused the majority of respondents in the sample to feel insecure when dealing with e-commerce, which is likely to affect their level of e-commerce utilisation. The most frequent security concern mentioned by the majority of the respondents (case F2, F4, F5, F7 and F8) is hacking. Advanced adopter enterprises emphasised the importance of security by establishing a separate security department as two respondents (case F1 and F6) declared. In particular, security was the main concern for some enterprises, as two respondents (case F4 and F8) reported:

“Security issues were the main concern we had, and there were some bugs that caused such a concern. ... 10% of the daily calls were for changes to the passwords of customer accounts because of hacking that was happening on a significant scale” (Case F8)

“The most important thing for us is security, and now we are preparing for a security set up. ... If there are no secure systems, there might be hacking to websites” (Case F4)

4.6.2.5 Perceived Costs

Although most participating firms have allocated a budget for IT investments and were willing to spend on e-commerce applications as well as Internet technologies, the results indicate a significant variation in allocated budget and priority. Advanced adopter firms (case F1, F2, and F6) allocated a high percentage of their budget to IT, gave it a high priority, and did not express any concern about the cost of e-commerce investment. As reported by one advanced adopter (case F6), the costs would increase if there were no e-channel. The other advanced adopters (case F1 and F2) shared similar view as follows:

“We invest in IT and give it priority ... The cost is not an issue in our firm because we have a good infrastructure and we implement it because we need it” (Case F1)

“In 2009, we allocated around 7% of the total revenue for IT ... investment in IT is very important because it is vital now and very important. ... we are willing to spend generously ... for us the cost is not that high” (Case F2)

For different reasons, firms at the entry-level adoption (case F8 and F10), on the other hand, allocated a lower budget, gave it a lower priority and some firms had a concern with regard to e-commerce investment.

“We allocate only 5% of the total budget. Although we believe it is important, it is very low because of the budget from the mother company. ... The available financial support was a problem when adopting e-commerce ... there was a need for hardware, but no budget for it ... there was a need for experts, but they weren't available ... At this time, it is difficult to be advanced in e-commerce ... due to the lack of sufficient budget” (Case F8)

“After the financial crisis and dropping down prices ... many companies start to think of how to survive and focus on their core business. The improvements can come when stability is reached” (Case F10)

All respondents from non-adopter firms, except case F4, did not recognise the cost of e-commerce adoption as justifiable nor were they willing to spend on its implementation. The reason was that they did not recognise e-commerce to be beneficial at this time as expressed by one respondent (case F9), although it invested a lot on IT in the last 3 years and it has a long term plan to improve it. The participant insisted that their organisation may adopt e-commerce in the future, only if there are no high costs or the likelihood of getting benefits is high. Another participant (case F7) shared a similar view as follows:

“No benefits or income from it [the website], it is just for information ... we allocate low budget for IT, less than 1% ... but if there is a benefit, we may [allocate more]” (Case F7)

Another respondent (case F5) expressed a cost concern by declaring that e-commerce utilisation may require a computer department that requires extra costs, which would not increase the company's turnover. The participant further added:

“There will be requesting orders through the website but not payment because it requires extra costs. ... If banks offer it [e-payment] in an easy and cheap way ..., this will motivate us to adopt it ... I think hiring one employee just for IT is a high cost because I don't have systems that require that” (Case F5)

4.6.3 Organisational Factors

4.6.3.1 Technology and Human Resources

The interviews revealed, as illustrated in Table 4.2, that high level adopters (case F1, F2, and F6) had in place IT infrastructure, IT staff, experts, as well as qualified management. In addition to the high level of technology resources in place and the outsourcing models employed, they also sought support from external consultants and considered training for their employees indicating a high level of IT sophistication. Advanced adopter companies encouraged IT sophistication throughout their organisations including the management IT knowledge, as one advanced adopter (case F6) explained:

“The high level managers are IT specialists more than management specialists ... 35 to 40% of employees at the head office are IT professionals” (Case F6)

On the other side, the majority of non-adopter and low-level adopter firms lack some important components of IT sophistication, such as no adequate IT infrastructure, no IT staff, no training, and/or no qualified management, although some of them have a high-level IT sophistication, e.g. case F4, as shown in Table 4.2. Some non-adopter firms (case F5 and F7) had low IT infrastructure and there were no IT staff nor qualified management in place to support e-commerce initiatives. Another non-adopter firm (case F9) suffered from a lack of human resources as they depend on an outsourcing company and they did not consider giving the required training for their unqualified staff and management at the moment. Regardless of IT staff availability, staff at entry stage firms (case F8 and F10) suffered from a lack of IT training:

“The low number of IT staff causes problems not getting replacement for those who are leaving ... developers learn by themselves and there isn't training” (Case F8)

“There are IT staff, but employees and management need more IT qualification, which is not available right now” (Case F10)

Table 4.3: IT sophistication of the participating enterprises

IT Resources	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Source of Development	Mostly Outsource	Multi-Mode	Ready Made	Outsource	Outsource	Multi-Mode	Outsource	Fully In-Source	Multi-Mode	Multi-Mode
Internet Connectivity	Fibre-Optic	DSL	Dial-up	DSL	DSL	Fibre-Optic	DSL	Fibre-Optic	Satellite	Satellite
Computerised Processes	99%	70%	15%	95%	50%	100%	30%	90%	40%	50%
Systems Integration	99%	50%	0%	70%	0%	100%	0%	90%	40%	50%
Multi-tier & Web-based Apps	100%	50%	0%	50%	10%	75%	10%	85%	50%	30%
IT Department	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes
IT Staff	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Qualified Management	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No
External Consultants	Yes	No	No	No	No	Yes	No	No	No	No
IT Training	Yes	Yes	No	No	No	Yes	No	No	No	No
Intranet	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Extranet	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes
EDI	No	No	No	No	No	Yes	No	No	Yes	No
EFT	No	No	No	No	No	Yes	No	No	No	No
Call Centre	Yes	Yes	No	No	No	Yes	No	Yes	No	No
IP phone	Yes	No	No	No	No	Yes	No	Yes	No	No
e-Mailing List	Yes	Yes	No	No	Yes	Yes	No	Yes	No	Yes
Advertise and Marketing	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exchange with Suppliers	No	Yes	No	No	Yes	No	No	No	Yes	Yes
Exchange with Customers	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes
Online Purchase	No	No	No	No	No	No	No	No	No	No
Online Sales	Yes	Yes	No	No	No	Yes	No	No	No	No
After-sales Support	Yes	Yes	No	No	No	No	No	Yes	No	No
Formal Integration	Yes	No	No	No	No	Yes	No	No	No	No

4.6.3.2 Commitment

The analysis revealed that there was a variation in e-commerce commitment and support amongst firms in the sample. The results indicate that advanced adopter firms (cases F1, F2 and F6) had a clear e-commerce vision. At these enterprises, e-commerce initiatives and implementation are supported and championed by management staff:

“Although it is not officially distributed, we have a clear vision for e-commerce. ... Management staff is supportive. Non-transaction initiatives, they push it to the maximum ... with immediate actions ... online transactions, they have some doubt and it involves the financial department and takes a longer time” (Case F1)

While companies at a lower level of e-commerce utilisation (case F8 and F10) had unclear e-commerce vision and low management support and commitment, the majority of non-adopter firms lacked e-commerce strategy and management support. Their management did not plan to support any e-commerce initiatives, especially if there were extra costs:

“There is no clear vision. There is limited support [for e-commerce] ... [we will adopt e-commerce] only if there is no high cost, and we get benefits from it” (Case F9)

“After studying the suggestions and initiatives, the decision will be made ... 'NO' if there is an extra cost or it introduces larger problems that require a computer department, which requires new costs” (Case F5)

4.6.3.3 Process Readiness

Throughout the interviews, many organisational issues related to e-commerce adoption and utilisation, were revealed. Although it may not influence the entry level adoption, business process readiness was found to influence the level of e-commerce utilisation. Business process readiness, which can be defined as the readiness of processes that are necessary to undertake e-commerce activities, could be either a concern before utilising an advanced level of e-commerce, or it could introduce problems that affect an organisation not performing in an appropriate manner. One adopter firm (case F2) expressed such a concern as they did not launch their transactive website due to the need of the maturity and readiness of related business processes. Other advanced adopters (case F1 and F6) stressed the concerns and difficulties they encountered due to process readiness as follows:

“Now they [top management] halted all online transactions. At the beginning, they have no concern. Their concern was ‘we have to provide it [online]’. Now to resume their online presence again, they had a concern. ... The concern now is the readiness of our internal processes. ... e-Commerce revealed that our internal processes are not ready; there was a delay to process orders and we couldn't respond to our customers” (Case F1)

“The most challenge was the internal readiness and capacity to work properly. ... Since our systems can't deal with huge number of users, we fixed the number of users ... there were faults that caused significant losses for many customers” (Case F6)

Although it might be a concern for entry level adoption, the findings revealed that process readiness affects advanced e-commerce utilisation, suggesting organisations should make sure that their internal processes are ready and clearly defined before utilising an advanced e-commerce presence. If not taken into account, process readiness could introduce many problems and difficulties, as one respondent (case F1) expressed:

“Because we didn't have defined process in our business, everything became difficult. Customer care couldn't solve customers' problems and complaints. Sales personnel couldn't process the existing orders. We didn't have mature processes or a mature business approach aligned with the existing IT systems” (Case F1)

4.6.3.4 Governance

The results revealed that advanced adopters (case F2 and F6), practised better governance in their e-commerce initiatives, suggesting its importance to progress to a higher level of e-commerce utilisation. Once a firm decided to move forward to an advanced e-commerce platform, management may have different views and priority, especially when decision maker authorities are poorly defined. This variation is expected when governance is weak and may introduce conflicts amongst management staff, which is likely to affect the level of e-commerce adoption. One advanced adopter firm that halted its transactive activities (case F1) emphasised the difficulties they encountered due to the lack of governance:

“As a start-up company, roles and responsibilities change a lot ... not easy to define. ... Conflict is everywhere especially where there are many employees. ... It is not coming from the IT management. Problems come from other department conflicts. ... There are no decision maker authorities for [e-commerce] initiatives” (Case F1)

4.6.4 Environmental Factors

4.6.4.1 Mimetic Pressure

Consistent with the literature, all respondents in the sample agreed that competition would influence them to adopt and extensively utilise e-commerce. The results also revealed that the majority of adopters perceive competitive pressure as most of their competitors were

adopters, while it was not the case for non-adopters where most of their competitors were not e-capable. One adopter firm (case F10) stressed that competition had a big role in e-commerce adoption. Other adopters (case F1, F6 and F8) shared similar views as follows:

“We have 4 to 5 competitors, all have e-presence. The more competitors there are, the more the influence. Competition has a large pressure and no other pressure; competition is the only reason.” (Case F1)

“Competition has a big role and we try to be in a better position among ... Our company have 4 strong competitors, and we try to be better than them” (Case F6)

“There are 21 competitors; our company try to offer the best services due to competition. 70% of competitors have e-channel, which influence us to adopt e-commerce” (Case F8)

Although competitive pressure may not be the main motivator for e-commerce adoption and utilisation, the majority of respondents stressed that the more competitors online, the more influence to adopt e-commerce. Respondents emphasised that as follows:

“We have 4 to 5 competitors. Only 1 or 2 have e-presence. Competition has no pressure, but it is in our strategy. The more competitors there are, the more the influence” (Case F2)

“There are around 10 competitors in the country, and few more in the GCC countries. 50% have e-channel, which doesn't have a huge influence because people prefer physical channels. However, the more e-capable competitors, the more the influence” (Case F4)

The lack of perceived success amongst competitors is likely to be a major concern for e-commerce adoption and utilisation as respondents (case F9 and F10) emphasised:

“Now we are at the same [e-commerce] level as other companies. ... We don't want the beginning to be from us. We want to see others' success. ... We don't want to be who tries it first” (Case F9)

“The one thing that is a disincentive is that no trader can do it [advanced e-commerce]. ... The [X] company few years ago adopted e-commerce, but failed to continue. ... e-commerce is not common, so we didn't move forward” (Case F10)

4.6.4.2 Coercive Pressure

Despite having positive attitude towards e-commerce, the results indicate that the majority of respondents did not receive or initiate any request to interact with external parties electronically, indicating a passive role towards e-commerce.

“There is no pressure from business partners. We'd accept if we had been asked to use e-commerce” (Case F4)

“We got no request from others, and we have no problem at all. The problem is that there are only few companies who have knowledge about [e-commerce] integration” (Case F8)

Despite that, the results emphasise the role of pressure, especially from international parties. Some respondents expressed their response to coercive pressure as follows:

“We got pressure from international markets... They always ask about your website ... if you don't give your website, they most of the time don't reply to your request” (Case F7)

“Regarding maintenance and spare parts [from international partners] sometimes it has to be electronically, and there is no other option ... we were in a journey to hire employees from outside the country and the first request we got is about the website of our company ... the website gives a clear vision of the company ... this request was from individuals; how about companies? ... This motivated us to enhance our website” (Case F9)

“The weekly online offers developed because of customer pressure because they wanted them on the website instead of flyer distribution in the market ... some were satisfied and others sent some feedback ... people want excellence and new ideas” (Case F10)

The majority of the respondents were willing to be amongst the adopter enterprises if the government recommends dealing with them electronically. For example, one respondent (case F6) mentioned that amongst the reasons to provide e-channel is government pressure and trend. Other respondents (case F2, F5 and F10) emphasised such a trend as follows:

“If a pressure comes from a governmental body, then we have to accept it ... If there is an e-system for custom, it would influence the adoption of e-commerce. It is very positive and it is modern and would accelerate the work undertaken” (Case F5)

“When the government recommends dealing electronically, we will certainly do so due to its influential power. I strongly agree that e-government would influence us ... Whenever e-government is provided and applied, all will follow it like a herd, because the economy in this country is based on government support ... and it is the leader” (Case F2)

“There is an orientation, ... if the money had no other source except electronically, you would have to work electronically, but in reality everything is paper, paper, paper ... many companies that didn't have any connections to banks, now they opened online to pay to the government ... because the government doesn't accept cash” (Case F10)

In reality, the immature e-services provided by the government as well as the high costs associated with it were likely to prevent many Saudi organisations from dealing with them electronically as mentioned by some respondents (case F1, F7, and F8):

“When passport services offered online, programs were made for this service because it implemented on a printed form but not on the web directly, which pressured many firms to have computers ... it is expected that pressure from government to accept online orders would be stronger. It might introduce some difficulties, but there will be community solutions as happened in similar situations... e-government is not enough” (Case F1)

“If it [e-government services] is for all ... and for free ... I will accept it. But the infrastructure is very weak and e-government websites aren't reliable to work with heavy load. ... We got a request to join a government agency [for an e-service], and we were asked for subscription fee of 10,000 SR [2667\$], but we didn't accept it” (Case F7)

“Government procurements ... aren't e-ready ... and there are so many papers required for process ... there are many problems with e-government systems” (Case F9)

Some firms were discouraged by governmental and large companies, which had a negative effect on their e-commerce utilisation. One respondent (case F2) declared that their firm requested a large company and other public organisations to communicate via e-mail, but they did not accept. Another firm (case F8) was discouraged by its mother company.

“The mother company controlled and enforced us to be at this level [of e-commerce] and not to include any payment online.... We even have no refund system ... and instead, we

have to transfer the credits to another service that the customer chooses, ... which caused many problems with customers” (Case F8)

4.6.4.3 Normative Pressure

The results revealed that the low adoption rate of e-commerce amongst market forces is likely to hinder e-commerce adoption and subsequent utilisation. The vast majority of the interviewees expressed that there were only a small percentage of their business partners who were capable for e-commerce. The results indicate that non-adopter firms had a lower percentage of e-capable partners than adopters, as expressed by some non-adopters:

“We do some e-commerce activities with external companies. With internal partners, unfortunately there is no one work like this. ... which works as a barrier” (Case F5)

“The problem is that all companies here don't have any [online activities] or even e-mail. If there were companies that use it, I would improve myself to be like them” (Case F7)

“We as Saudis haven't reached the maturity level [of e-commerce], if the service were offered, there would not be participation; customers and trading partners aren't e-ready. Local e-communication is limited most of the time because of their e-readiness. ... Now we are at the same level as other companies. ... The problem is from the participation of other sectors ... we don't want the beginning to be from us” (Case F9)

The results also indicate that such a low percentage of e-capable partners would hinder e-commerce utilisation amongst adopter firms so that only minimum online activities were adopted. Entry level adopters (case F8 and F10) mentioned that they were discouraged by the lack of e-capable partners; thus not moving forward. Another adopter (case F2) had an optimistic view and believed that their e-channel will be used in the future; however, the low percentage of e-capable partners affected their e-commerce investments.

4.6.4.4 Institutional Trust

The majority of the respondents expressed a trust concern in relation to e-commerce use. Due to the lack of trust relationship amongst partners in Saudi Arabia, many companies did not accept electronic purchase orders (PO) and e-payment methods as one respondent (case F8) mentioned. The majority of participating organisations used bank LC (i.e. Letter of Credit: a document issued to provide a payment undertaken) for their payments.

“Even with European companies ... any commercial work that has a PO should be through fax, as it has to be officially signed and stamped. ... There has to be commercial contracts ... and everything under control and there is an authorisation” (Case F7)

“Although some suppliers may be e-capable and using e-commerce for long time, we buy from them in large amounts of money, which should not be online” (Case F1)

“Most of our external trading [outside the country] are done electronically except payments, which is through LC banks, although it is available online. ... Financial issues have to be through banks” (Case F9)

Other respondents (case F2 and F5) went further and classified their business partners in different levels of trust and dealt with them accordingly, as they expressed:

“We use bank LC when buying, and it is the right way. I guarantee my right and they guarantee theirs. ... We are afraid of fraud since we buy in huge quantities. ... We classify our partners and deal with them in different levels of trust. Some require only signatures, while others require an official stamp from the Chamber of Commerce” (Case F2)

“Trust doesn't come from the first moment, but develop through time. ... The best way for guarantee is the LC from a bank ... and most of our trading is done this way. ... There are 3 types of companies ... [1] known companies that pay in credits, [2] other known companies that don't pay in credits, and [3] unknown companies. The two latter groups pay 50% in advance and the remaining when handling, and we do not use credit cards to prevent problems because we buy in large amounts and we only use bank LC ... Depending on the type of customers, some of them present a risk” (Case F5)

The results indicate that participating enterprises prefer to conduct electronic business only with trustworthy organisations such as the government and large companies, because they are safe and there is no risk, as some respondents (case F1, F5 and F6) mentioned:

“We trust 50% of our suppliers because they have big names. ... There is no confidence on the knowledge of some trading partners. ... For payments, it is too early to decide. There might be problems with disputes and how to resolve them” (Case F1)

“We only deal electronically with mature companies that use encrypted messages. Electronic trading can't be done unless there are formal agreements, as e-trading is an extension of traditional business agreements” (Case F6)

“We use credit cards if we find it in a trustworthy company ... If a pressure [to conduct e-business] comes from a governmental body, then we have to accept it, and if it comes from a large company with a long term contact, it will be implemented ... as large companies are very safe and have zero risk” (Case F5)

4.6.4.5 External Support

Even though the majority of respondents perceived external support to be an important motivation for e-commerce adoption, none of the participating organisations, except one enterprise (case F1), received such an external support. This respondent expressed the importance of this external support as follows:

“Support acts as a driver. ... We can't forget the support of [Y] bank for our integration with them when using Visa cards in our sales ... such support is very important, ... another support was from 'SADAD', and we would like if we get support from Saudi post. ... 'AL-ELM' company has some services related to identity check. 'SEMAH' service is in progress right now for car rental companies to know whether or not a customer pay his/her bills in a good manner. This is a very good service to reduce frauds. Now, all our services are prepaid, and we will offer post-paid services in the future, which requires a service like 'SEMAH’” (Case F1)

On the other hand, other respondents (case F2 and F5) were disappointed with the lack of external support from the government and other supporting agencies in the country. They further stressed the importance of such a support as a driver for e-commerce adoption:

“There are no governmental or non-governmental agencies that could help or direct me, as it is not there. ... I think such a support is very important, but it is far away” (Case F2)

“If banks offer it [e-payment] in an easy and cheap way and there is a support from related agencies such as 'SAMA' [Saudi Arabian Monetary Agency], this will motivate us to adopt it” (Case F5)

4.6.4.6 Government Readiness

4.6.4.6.1 Regulatory Environment

The majority of respondents expressed a concern in relation to the available laws and regulation that support e-commerce within the country. The main regulatory concern was dispute issues, as one respondent (case F2) mentioned and emphasised that there should be solid, strong laws to be followed for e-commerce. Other respondents (case F1 and F5) shared similar views as follows:

“It is not clear whom to deal with in case of [e-commerce]disputes... printed documents are the only official ones ... it is not clear where to go. ... When there is a conflict in something, there is no specific judicial authority we can refer to. ... In reality, there are no clear laws ... There is no regulatory environment that supports e-commerce” (Case F1)

“For solving e-commerce disputes, there is a no law. You have to be careful; you should not send product before getting money as it may take many years to be solved” (Case F5)

Some respondents in the sample had an optimistic view related to e-commerce regulation after introducing the cyber crime law within the country as one respondent (case F6) stressed, Another respondent (case F10) mentioned that e-commerce laws in the country started to grow and spread although there is a long way to go. Another respondent (case F4) agreed with this view as follows:

“Even though we haven't reached the maturity and stability yet, after adopting cyber crime laws, at least there is an official system” (Case F4)

The absence of strong laws that support e-commerce forced firms not to become involved in any procurement activities, and only a small percentage would made an online purchase only if there was no other option available as expressed by some respondents:

“For online payments, it is too early to decide. There might be problems with dispute and how to resolve it” (Case F1)

“We use credit cards if we find it in a trustworthy company and a good offer and no other alternatives” (Case F5)

Another respondent (case F8) mentioned that since there was no way to protect yourself when someone defaulted during an e-commerce transaction, many firms would not accept online purchase orders. This respondent restated the dispute concern as follows:

“There is no good environment for e-commerce activities. ... There might be some laws ..., but what is the process to officially document any problem related to e-commerce. ... It is difficult to follow-up dispute [for online problem in Saudi Arabia]” (Case F8)

4.6.4.6.2 Government Incentives and Support

Despite the fact that there were some government initiatives and awareness related to e-commerce, the majority of respondents thought that such initiatives and awareness were not enough and they focused on general information for the public, and not for companies. Although the government is expected to play a big role as expressed by one respondent (case F9), its initiatives and support were very limited and focused for the public sector, and citizens to some extents, as other respondents (case F1 and F2) declared:

“The government is now focusing only on the public sector. There is no information that is specific for e-commerce. There is no support for e-commerce ... YASSER project is just for the public sector. ... There is no EFT [Electronic Fund Transfer] between companies, and the government don't encourage it as it would reduce the role of Saudi banks” (Case F1)

“I have been invited once to attend a forum on e-government. There might be some e-commerce invitations for businesses but it is very limited and focused on general information for public” (Case F2)

“For e-commerce, we need more than motivation, we need enforcement. Awareness, support, and e-government's initiatives would influence it [e-commerce adoption] ... e-initiatives from the government would support e-commerce” (Case F1)

The role of the government in supporting e-government related projects would benefit e-commerce, as expressed by one respondent (case F4). However, government incentives need to be realistic and focus on organisational needs in order to motivate them to adopt e-commerce, as criticised by another respondent (case F1):

“We haven't received any support from the government, but it is working on important security systems such as PKI [Public Key Infrastructure] and other systems that would support e-commerce” (Case F4)

“There is only a small support on Domain name registration, which is free; but we are expecting more than that. For example, hosting in Saudi Arabia is very expensive while external hosting is much cheaper from Saudi hosting of 100 times. ... So, instead of paying 3,000 SR [800\$], you can pay 50-60\$ in hosting abroad. We save only 15\$ for the domain name, which is nothing” Case F1)

Particularly in developing countries, government support and subsidies could encourage e-commerce adoption and diffusion throughout the country. Two respondents (case F9 and F10) emphasised such a role from the government as follows:

“The government in Saudi Arabia has a big role [to support e-commerce]; we are like feeding from its breast” (Case F9)

“Government support, as well as the support of large companies when adopting e-commerce ... will make it easier for other companies to overcome difficulties” (Case F10)

4.6.4.6.3 Government Requirements

The results revealed that government requirements could hinder e-commerce adoption as stressed by some participants in the sample. One respondent (case F2) stressed that their communication with the government had to officially be paper work through postal mail or fax. Other respondents (case F1, F5 and F6) mentioned the difficulties they encountered in their e-channels due to government requirements as follows:

“Our movement towards e-commerce depends on services that the government has to provide such as the acceptance of online verification. Now, we minimised new online subscriptions since we have to verify every new customer through a copy of his/her ID card [as required by the government] ... The delivery company has to be trained to take the ID from the subscriber when shipping and handling and isn't just normal shipment. ... The delivery companies don't know how to collect money or anything else from people. It was the first time for them to do such a procedure and it was not an easy step” (Case F1)

“Government requirements are an obstacle for e-commerce, as everything requires official paper documents. ... We buy and pay online just from external websites and for small amounts of 1,000 to 2,000\$ that doesn't require official documents for Customs; Because if the amount is high, it would require official documents to Customs; So because of these government requirements, it isn't dealt electronically” (Case F5)

“Due to not offering some e-governmental services, some problems were introduced, such as the government requirement to freeze accounts when ID cards are expired, and we can't know whether the ID is renewed, so he/she has to come with a copy of the ID” (Case F6)

4.6.4.7 Supporting Industry Readiness

4.6.4.7.1 ICT Infrastructure

One of the main elements required for e-commerce is ICT and telecom infrastructure, which is the gateway to the Internet. The analysis revealed that there was a concern amongst participants in relation to ICT availability, affordability, and reliability, although it is getting better nowadays. For instance, one respondent (case F7) mentioned that ICT infrastructure is weak even in the major cities, in which many places have no Internet connection. The Internet cost is very expensive for middle class people as expressed by another respondent (case F1). Such a high cost may prevent Internet penetration, and consequently reduces the movement towards e-commerce adoption as emphasised by another participant (case F10). Other participants (case F1 and F8) expressed their concerns with regard to Internet availability and affordability as follows:

“The Internet is too expensive for people and companies. ... There are some locations, even in the large cities, where people have no access to the Internet. ... For example, a coffee shop company ... had to search for a location in which they could provide Internet services to their customers in store” (Case F1)

“It is getting better, but not enough. There are areas even in the large cities that have no Internet connection, and the cost is very high for the middle class” (Case F8)

Internet reliability is another concern that is likely to influence Internet adoption and consequently e-commerce adoption, as one respondent (case F2) stressed. Such a concern is emphasised by other respondents (case F6, F9 and F10) as follows:

“Because of the weaknesses of telecom infrastructure in the past ... there were faults, which caused customers many significant losses” (Case F6)

“Telecom network doesn't help ... the infrastructure of the network is very weak ... doesn't have the ability; there are delay and many failures in the network; it is very bad. We had to overcome these weaknesses through satellites with extra costs to avoid the network failures. ... Those failures would affect trading” (Case F9)

“ICT infrastructure is very weak. ... DSL is disconnecting. Services don't reach specific locations. The widespread use of mobile services is due to the absence of other options. ... It is not adequate and reliable for e-commerce. ... It is very expensive” (Case F10)

4.6.4.7.2 Financial Institutions

Electronic payment channels are an essential element for e-commerce, which facilitates transferring money between parties involved in e-commerce transactions. As part of its IT plan, Saudi Arabia developed a local, specified e-payment system (SADAD) that can be used to transfer money to registered companies through bank accounts. Although it may be a secure and reliable system, difficulties and requirements associated with it threatened its benefits as one respondent (case F1) described:

“SADAD can be considered expensive for SMEs. It requires 200,000SR [53,333\$] insurance as a set up cost; and the difficulties associated with it, make it difficult for a firm to start such a project that should be at a lower cost to serve the trend” (Case F1)

The other available e-payment option is the use of credit cards as a payment method thorough the company website, which is not common at the time of the interviews. One respondent (case F1) mentioned some difficulties related to credit card certificates in Saudi Arabia. Other issues mentioned by two respondents (case F4 and F10) are:

“E-Payment systems are problematic in Saudi Arabia. There are two methods of e-payment systems SADAD ... and Visa & Master Cards; everyone has its problem. ... All of them are very expensive. ... Credit card payments are offered only by two banks, which require opening accounts with them ... electronic payments and identification are the most important elements for e-government and e-commerce, and up till now the country has not reached the stage of maturity [to use them]” (Case F4)

“It [online payment] requires verification for credit cards, and companies that offer it are outside the country, and no local company can do it. Now, it is difficult to use cards as an e-payment method in Saudi Arabia” (Case F10)

Another participant (case F7) declared that banks were even struggling to offer a sufficient service for in store ATM machines, and many problems had happened in the last few years because of in store ATM machine operations, which took a very long time to be resolved.

4.6.4.7.3 IT Industry

Despite its weaknesses in developing countries, local IT industry is an important player that could support companies to adopt e-commerce. This is especially true for small and medium enterprises (SME) since large companies look at international availability but not just locally, as one respondent (case F6) mentioned. The lack of IT human resources in developing countries forces many companies to outsource almost all of its IT projects. However, the difficulties in finding affordable IT companies to install and implement their IT infrastructure and IS projects would discourage IT and e-commerce adoption amongst enterprises, especially SMEs. Many respondents (case F2, F7, F8 and F9) stressed that IT companies were expensive. Respondents described this issue as follows:

“As a large company, there are enough IT companies, but it is so expensive for SME; so, the number of opportunities to find any [IT company] decreases when the cost is expensive. ... For example, I received a call yesterday from someone who needs to develop a website for his company 'Gold shop'. He said that the website would cost him between 200,000 and 300,000 SR [53,333 – 80,000 \$]. After his explanation of the project, we found out that it shouldn't be more than 10,000 to 20,000 SR [2,667 – 5,333 \$]” (Case F1)

“The aim of IT companies is getting money and they are very expensive, and this is why SMEs cannot go forward; and there are not enough of them. There are some companies but the ones that can really do it are very small in number” (Case F2)

“IT companies are absolutely there, but to collect money” (Case F7)

The last issue with regard to IT industry is related to after-sales support, which is supposed to be available. One respondent (case F10) emphasised that the problem with IT in Saudi Arabia was the lack of after-sales support.

4.6.4.7.4 Postal and Delivery Services

All respondents in the sample agreed that postal and delivery services in Saudi Arabia are very weak. The lack of building addresses makes it difficult even for large, international delivery companies (e.g., DHL, FedEx and UPS) to reach any particular address in Saudi Arabia. One respondent (case F1) described the situation as follows:

“Even though there are large companies in the market [in Saudi Arabia] ... the largest challenge we face for new subscriptions was the delivery. The cost is very expensive and can't be processed via normal postal services because you have no guarantee to reach customers. So, we use other providers like DHL, which is expensive ... without any extra cost to customers ... The Saudi post should deliver it without any problem, but it is not in the picture up till this moment. ... The Saudi post is very, very weak in their addressing system and postal services. ... There are neither efficient, affordable postal services nor delivery systems. There is no addressing system and there is a huge corruption in the Saudi post. I do not trust cheap delivery services, but I only trust expensive [international] providers within the country” (Case F1)

With the absence of sufficient local postal and delivery services, delivery costs appeared to be a concern amongst interviewed firms. For example, one respondent (case F8) said that there were huge problems in the local postal mail and delivery services, whereas other alternatives were very expensive. Other respondents (case F9 & F10) shared such a view:

“Delivery is very expensive, and the problem is that there are no postal addresses that can be easily reached [in Saudi Arabia]. We depend only on P.O. Boxes, and they are expensive especially for companies” (Case F9)

“The cost of delivery is like or more expensive than the cost of the item itself. ... There is no addressing system, and they always changing building numbers. It is difficult to describe [to reach a specific location in Saudi Arabia]” (Case F10)

To overcome such a problem, many delivery companies started to use mobile phones to reach customer addresses as mentioned by one respondent (case F7). Other firms moved further and tried to find a radical solution not depending on postal and delivery services as one respondent (case F6) expressed:

“Postal and delivery services are very poor. We looked for radical solutions to overcome such a problem, e.g. the implementation of instant ATM cards issued in branches [instead of issuing cards in central locations and then delivering them to customers]” (Case F6)

Another respondent (case F1) addressed their radical solution in order to overcome ‘the no addressing problem’ and the challenge encountered in implementing their e-services. In order to provide its customers with the availability of the service coverage in a specific location, the company had to use specified maps and implemented a specified project for such an e-service, costing them hundreds of thousands of Dollars.

4.6.4.7.5 IT Centres

There are many challenges associated with IT training in Saudi Arabia, as the results revealed. Firstly, for those who believed in IT training, there is a lack of specialised IT trainers, especially for relatively new, specialised technologies such as e-commerce and e-business, as mentioned by some participants. The lack of qualified IT training centres as well as the hesitation of staff to get trained caused many problems, as one respondent (case F6) declared that many problems they had were due to poor training. Even when there is a need for such training, many managers as well as employees were hesitating to go forward to such an action. One respondent (case F1) explained concerns related to IT centres as follows:

“No training in our company even though there is a need. [Why?] Firstly, Saudi people don’t believe in HR investments. Secondly, accountability, i.e. when you want to leave the company, the company requires that it has to be a year after the last training you got, or you have to pay its cost, and this is a reason for hesitating to take training” (Case F1)

“Not easy to find courses specialising in e-commerce. ... There is only a minimum number of IT training centres [in Saudi Arabia]” (Case F1)

4.6.4.8 Consumer Readiness

4.6.4.8.1 Consumer Awareness

The majority of respondents expressed that people in Saudi Arabia are not ready for e-commerce. In particular, the vast majority of the Internet users in Saudi Arabia are youth as two respondents (case F6 and F7) emphasised:

“Consumer e-readiness [in Saudi Arabia] is very low; most users are teenagers, not decision makers. ... Decision makers don't even have e-mails” (Case F7)

“The main e-commerce barrier is consumers’ e-readiness, as the largest segment of our customers is elderly” (Case F6)

Another respondent (case F9) thought that the use of the Internet in Saudi Arabia is for fun, not for business. Although there were a high percentage of online activities, other participants (case F1 and F8) were concerned about consumer use of online transactions.

“Consumer e-readiness differs in transactional and non-transactional activities. It is around 10% in transactional activities, and 60 to 70% in non-transactional activities. ... Saudi consumers aren't ready for online purchase. ... They don't understand the flow of orders (shopping cart)” (Case F1)

“Consumer e-readiness is around 50%. We are afraid that some services would not be understood by consumers or be used improperly due to ignorance” (Case F8)

The majority of respondents in the sample believed that only a small percentage of people are aware of e-commerce in Saudi Arabia. One respondent (case F2) further added that there is a low percentage of the e-commerce acceptance amongst people in Saudi Arabia, but it is increasing with the awareness of its benefits. Another respondent (case F6) mentioned that they encountered challenges with consumers who were not aware of e-channels and many people did not adopt e-commerce unless they were visited and were trained to use it. Other respondents (case F1, F4 and F8) mentioned that there might be awareness of e-commerce benefits, but people may perceive it as risky:

“30% [of Saudi consumers] are aware of e-commerce activities. They perceive e-commerce to be dangerous ... People [in Saudi Arabia] perceive e-commerce as risky, but the Internet is not risky. They are worried and 50% of them consider e-commerce to be beneficial and could make things easier such as paying bills electronically” (Case F1)

“For e-commerce, the half knowledgeable consumers work with caution and ignorant people stop” (Case F8)

4.6.4.8.2 Consumer Culture

This research highlighted some cultural issues of the business and legal environment in Saudi Arabia. The majority of interviewees believed that consumer culture was another challenge for e-commerce adoption and diffusion within the country. For example, one respondent (case F2) mentioned that they had encountered a large challenge relating to consumer culture and trust in e-commerce. In Saudi Arabia, e-payment and its acceptance and diffusion is very low as mentioned by one respondent (case F3).

The low credit card penetration rate amongst Saudi people, the negative attitude towards it, and the absence of other affordable alternative e-payment methods have a negative impact on e-commerce adoption as other respondents (case F1, F8 and F9) declared. Consumers in Saudi Arabia have a negative attitude towards credit cards, and they are cautious of using them as another respondent (case F9) reported. Another issue was that consumers in Saudi Arabia do not like to go through manuals to make their decisions, but instead they prefer face-to-face interactions as well as consultations, especially with whom they trust, as emphasised by other respondents (case F1 and F3):

“For us, e-commerce is very good, but pushing everything to be online is not good. The Saudi society has a face to face culture. Many people don't want to get online Internet subscription. There is too much information, and he/she does not want to read” (Case F1)

“There is no acceptance of such services because people here have a different culture and don't want to buy directly, but want to see other options. ... Most people like to buy after consultation and not directly. People here don't read and don't come specifying what they want to buy. ... I have been for around 20 years in this business, I have never been asked about manuals of a specific product to be read before buying ... but instead, a consumer says I want to do such and such ... and s/he wants a suggestion” (Case F3)

The conservative nature of Saudi society raised another issue as one respondent (case F1) expressed. The respondent explained that the Internet offers opportunities that make life easier, especially for women who want to work and shop from home, given that women in Saudi Arabia are not allowed to drive cars and there is no public transportation even in large cities. Consumer privacy is another concern that could cause problems:

“Even though we can offer some services online through signals, consumers may think that we are spying on them ... as happened in similar situations” (Case F7)

“Some consumers don't want anyone to come to their home, so we supplied current cards through branches” (Case F6)

Although English is the second popular language in the country, most people are not fluent in English. The lack of English capability discouraged many companies to get hosting from outside, as one respondent (case F1) mentioned. The participant further expressed that international hosting was provided by small firms that try to get benefit of that, but they were not trustworthy and companies were afraid of fraud or manipulation. Customer trust is another concern that is stressed by other respondents:

“The employees who got the orders noticed that those consumers who had ordered online suddenly got worried and started flooding us with calls, saying “What’s happened to my order?” because s/he paid and don't know what happened. ... People don't trust that the service will be delivered without complaints.... In Saudi Arabia, consumers always complain since things can't proceed unless you walk through it and complain” (Case F1)

Enjoyment in purchase as well as the difficulty in deploying detail information online were other issues that one respondent (case F2) mentioned explaining the reason for their plan to open new branches in addition to the e-channel and the available branches:

“Although we are offering an e-channel, we plan to open other branches because marketing has enjoyment and not everything can be answered via e-channel especially those of hobbies that ask for detail about a specific product, as it is difficult to show all details of all items in the website and its low importance in most cases” (Case F2)

4.6.5 Summary of Findings

The exploratory study assisted to gain insight into e-commerce phenomenon in Saudi Arabia. While it has confirmed several findings, it also has raised other issues. Table 4.4 illustrates a cross-case representation of the study findings. Such an illustration can help understand the influence of such issues on e-commerce utilisation. Note that F1, F2 and F6 are advanced adopter firms, while F9 and F10 are entry-level adopters. F3, F4, F5 and F7, on the other hand, are non-adopter enterprises.

Table 4.4: Summary of e-commerce issues and concerns in this study

E-Commerce Issue/Concern	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Number of Benefits Recognised	9	7	0	4	1	9	2	6	4	5
Compatibility Concerns					x		x		x	x
Complexity Concerns								x		
Security Concerns	x	x		x	x	x	x	x	x	
Cost Concerns					x		x	x		x
Lack of IT Resources			x		x		x			
Lack of Human Resources			x		x		x		x	x
Commitment & Management Support	x	x		x		x		x		
Business Process Readiness	x	x				x				
Governance Issues	x	x		x		x		x	x	
Competitive Pressure	x					x		x		x
Lack of Success among Competitors									x	x
Coercive Pressure							x		x	x
Dominant Partner Control								x	x	
Lack of Partner Readiness	x	x		x	x		x	x	x	x
Trust Concerns	x	x		x	x	x	x	x	x	
Law & Regulatory Concerns	x	x			x			x		x
Lack of Government Awareness	x	x		x		x	x	x		
Lack of Government Intervention	x	x		x	x	x		x	x	x
Lack of Government Support	x	x			x		x	x	x	x
Government Requirement Concerns	x	x			x	x				
Lack of External Support		x		x	x		x	x	x	
ICT infrastructure Readiness	x	x		x		x	x	x	x	x
Financial Institution Readiness	x			x			x			x
IT Industry Readiness	x	x					x	x	x	x
Postal & Delivery Service Readiness	x	x		x		x		x	x	x
IT Centres Readiness	x	x		x		x		x		
Lack of Consumer Awareness	x		x	x		x	x	x	x	x
Consumer Culture Concerns	x	x	x			x	x	x	x	

4.7 Major Findings and Framework Refinement

The exploratory study provided an understanding of many issues at different levels of analysis, as shown in Table 4.5. It helped confirm several findings and raised other issues. At the innovation level, this exploratory study highlighted the importance of perceived benefits for e-commerce adoption. The results also revealed some compatibility concerns amongst some non-adopters and low-level adopters, whereas complexity did not appear to be a concern for the majority of participating firms.

Table 4.5: Summary of major e-commerce findings at different levels of analysis

Type of Analysis	Major Findings
Innovation Attributes	<ul style="list-style-type: none"> ▪ Firms at a higher level of e-commerce adoption recognised more benefits, while other firms primarily focused on direct benefits, e.g. efficiency and cost saving. ▪ Low e-commerce utilisation was not perceived as a competitive disadvantage, as most local firms were at similar, or even lower, e-commerce levels. ▪ There were compatibility concerns only amongst some non-advanced adopter firms. ▪ E-Commerce complexity was not a concern, as practising IT outsourcing models are likely to minimise its effect. ▪ Perceived risk and lack of trust in e-commerce had caused the majority to feel insecure when dealing with e-commerce. ▪ The security concern, mentioned most often by the majority, is hacking. ▪ Unlike other firms, advanced adopters did not express any concern regarding the cost and investment related to e-commerce utilisation. ▪ The majority of non-adopter firms did not recognise the cost of e-commerce adoption as justifiable nor were they willing to spend on its implementation.
Organisational Context	<ul style="list-style-type: none"> ▪ In addition to the high level of technology resources in place and the outsourcing models employed, advanced adopter companies also sought support from external consultants and considered training for their employees. ▪ Some non-adopter firms had very low IT infrastructure and there were no IT staff nor qualified management in place to support e-commerce initiatives. ▪ There was a lack of IT training for staff amongst firms at entry level e-commerce. ▪ Unlike other firms in the sample, advanced adopters had a clear e-commerce vision and e-commerce initiatives and implementation are supported and championed by management. ▪ E-Business process readiness is necessary to utilise e-commerce extensively, as its absence could be either a concern prior utilising e-commerce, or it could introduce problems if not taken into consideration. ▪ Advanced adopters practised better governance in their e-commerce initiatives, suggesting its importance to progress beyond the entry level.
Environmental Context	<ul style="list-style-type: none"> ▪ The majority of adopter firms perceive competitive pressure as most of their competitors were adopters, while it was not the case for non-adopters. ▪ The lack of perceived success amongst competitors is likely to be a barrier for e-commerce adoption and post-adoption. ▪ The majority of companies in the sample did not receive or initiate any request to interact electronically with external parties. ▪ The role of coercive pressure, especially from international parties, was apparent. ▪ The majority of firms were willing to be amongst adopters if the government recommends dealing with them electronically. ▪ The immature e-government services as well as the high costs associated with them were likely to prevent firms from adopting them. ▪ There were negative coercive pressures by some influential organisations that discourage e-commerce utilisation. ▪ Non-adopter firms had a lower percentage of e-capable partners than adopters. ▪ Trust was a major concern and many companies preferred to conduct e-business only with the government and large trustworthy companies. ▪ There was a lack of external support related to e-commerce, even from the government and other supporting agencies within the country. ▪ There was a concern in relation to current e-commerce laws and regulation, especially for dispute issues. ▪ There was a lack of e-commerce incentives and subsidies within the country. ▪ Some government requirements were likely to hinder e-commerce utilisation. ▪ There was a concern in relation to ICT availability, affordability, and reliability. ▪ The available e-payment methods could not support the move to e-commerce. ▪ Firms encountered difficulties in finding efficient and affordable IT companies for IT and e-commerce development and support. ▪ Postal addressing and delivery services within the country were major concerns. ▪ There was a lack of specialised IT trainers, especially for e-commerce. ▪ There was a concern in relation to consumer readiness for online transactions.

The findings suggest that the deployment of IT outsourcing models amongst participating enterprises is likely to minimise e-commerce complexity. Security concerns, especially hacking, were found to be one of the concerns that the majority of participants had with regard to e-commerce adoption and subsequent utilisation. From these four innovation attributes, one factor (complexity) will be excluded from the study framework, while the remaining factors will be held for further investigation.

At the organisational level, the results indicate that the relationship between internal resources and e-commerce adoption is not very strong, specifically as few non-adopter firms with high organisational resources were not likely to adopt immediately. This could suggest that internal resources may be needed for adoption and subsequent utilisation; however, high resources do not necessarily lead to high e-commerce utilisation. The findings have highlighted the importance of commitment, especially from high-level executives, on e-commerce adoption and subsequent utilisation. The findings also suggest that, governance and another emerging factor, process readiness, are likely to affect the extent of e-commerce adoption, although they may not be necessary at the entry level.

To enhance the research framework, technology and human resources will be investigated separately, while perceived costs will be investigated under innovation attributes instead of financial resources, as respondents during the exploratory study did not give accurate figures for their financial resources. As an emerging factor during the exploratory study, business process readiness will also be included in the refined framework. Therefore, the study framework is refined to include the following organisational factors: commitment, governance, process readiness, technology and human resources, while perceived costs will be investigated under the innovation attributes.

At the environmental level, not only competitive pressure, but also perceived success amongst competitors is likely to play a significant role for e-commerce adoption and utilisation in the context of Saudi Arabia. This type of pressure is referred to in the literature as mimetic pressure (Teo et al., 2003). It also observed that the low level of e-commerce utilisation amongst enterprises in the sample seems to be primarily influenced by the adoption and utilisation of e-commerce amongst market forces, i.e. local firms. This type of influence is referred to in the literature as normative pressure (Teo, et al., 2003).

The results of the exploratory study also revealed another type of pressure, coercive pressure, which typically comes from e-capable influential parties, such as the government and large corporate (Teo, et al., 2003). In addition to consumer readiness, the findings also demonstrate trust concerns amongst respondents, particularly for online payments. Hence, instead of external pressure and market forces readiness, the research framework will be refined to include mimetic, normative, and coercive pressures, in addition to institutional trust and consumer readiness.

The results revealed that many issues related to government readiness, emphasising its importance for e-commerce adoption. In particular, the dispute issue was one of the most serious concerns that the majority of participants had with regard to e-commerce adoption and utilisation. The readiness of supporting industries is likely to have an effect on e-commerce adoption in Saudi Arabia. In addition to ICT infrastructure, postal and carrier facilities, IT industry, financial and payment services within the country seem to be major concerns amongst participating firms.

While ICT infrastructure readiness can be investigated within supporting industry readiness, it will be investigated separately so that various ICT issues, highlighted in the exploratory study, can be addressed. Despite the importance of external support, the exploratory findings indicate a lack of external support amongst participating firms and emphasise the significant role of the government and major supporting industries; hence the focus will be shift to investigate external support within supporting industry readiness and government readiness. Thus, the refined framework will include eight environmental factors, namely, government readiness, supporting industry readiness, ICT infrastructure readiness, consumer readiness, mimetic pressure, normative pressure, coercive pressure and institutional trust.

4.8 Construct Identification and Proposition Raising

The findings of the exploratory study, in association with relevant literature, helped to provide insights and confirm choices of the contextual factors; thus, refining the research framework. To gain more insights into the phenomenon at hand, the refined framework considers various stages of e-commerce adoption, namely, adoption, utilisation and scope of use, as illustrated in Figure 4.2.

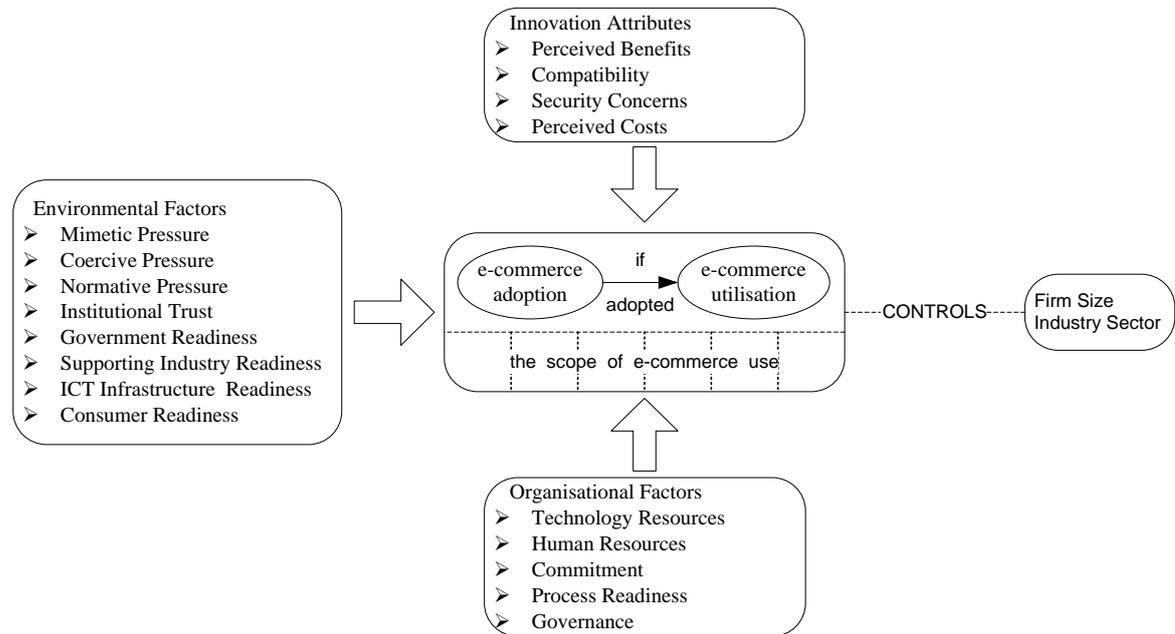


Figure 4.2: Conceptual framework for e-commerce adoption in developing countries

4.8.1 Innovation Attributes

4.8.1.1 Perceived benefits

Perceived benefits, also referred to as ‘relative advantage’ and ‘perceived usefulness’ in classical innovation literature, is defined as “*the degree to which an innovation is perceived as being better than the idea it supersedes that has a direct impact on the likelihood of adoption*” (Rogers, 2003, p. 229). According to Benbasat et al. (1993), the higher managerial understanding of the technology benefits, the higher the likelihood of the allocation of resources (e.g., technological and financial resources) that are necessary to implement such a technology. Perceived benefits is one of the most frequently cited innovation characteristics in adoption research and has been consistently identified as the most critical factors for IT adoption and growth (Cragg and King, 1993).

Although the construct has been operationalised differently across studies, the literature indicates that perceived benefits is a major determinant not only in IS/IT innovation adoption (Tornatzky and Klein, 1982; Jeyaraj et al., 2006), but also in e-commerce adoption (Teo et al., 2004). Unlike prior types of IS innovations that were mainly used to improve operational efficiencies, e-commerce has the potential to provide both strategic benefits (e.g., increased sales) and operational benefits (e.g., reduced costs) (Zhu et al., 2006b). This is also supported by Gibbs and Kraemer (2004) who found a relationship between e-commerce usage and strategic benefits. Thus, *it is anticipated that perceived benefits is positively related to e-commerce adoption, utilisation and scope of use.*

4.8.1.2 Compatibility

Compatibility is another technology characteristic of the DOI theory that has been shown as one of the main determinants of innovations adoption (Tornatzky and Klein, 1982). According to Rogers (2003, p. 240), compatibility refers to “*the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters*”. In their analysis across a number of IS studies, Jeyaraj et al. (2006) found compatibility to be among the most well-utilised factors that have been examined by researchers when investigating IT innovation adoption.

In the e-commerce domain, Teo et al.'s (2004) meta-analysis revealed that compatibility is one of the main e-commerce adoption determinants in the technological context. Scholars have found that the incompatibility of a new e-commerce platform with working practices, existing values and benefits, and infrastructure negatively influences users' attitudes and increases the resistance to change; hence inhibiting the adoption of e-commerce (Grover and Goslar, 1993; Teo and Tan, 1998). Conversely, if conducting business over the Internet is consistent with existing business practises, organisations would require lower efforts to be e-capable in adopting and using e-commerce (Chatterjee et al., 2002). Therefore, *it is anticipated in this research that compatibility will positively affect e-commerce adoption, utilisation and scope of use.*

4.8.1.3 Security

Security is regarded as a unique feature for Internet technologies, e.g. e-business and e-commerce. Security concerns refer to “*the degree to which the Internet platform is deemed insecure for exchanging data and conducting on-line transactions*” (Zhu et al., 2006b, p. 603). In the e-commerce domain, security is concerned with the ability of an organisation to ensure availability, integrity and confidentiality of core corporate data, and therefore lack of security is a major constraint to the wider adoption and diffusion of e-commerce (Doyle and Melanson, 2001). Systems running over the Internet are at risk from any unauthorised body that may breach system controls and access valuable information, resulting in the loss of intellectual property (Alwabel and Zairi, 2005). Ratnasingham (1998) argues that the security of transactions and information is crucial for the success of e-commerce. Security is likely to hinder e-commerce diffusion when there is a severe concern about privacy and fraud, which may cause parties involved in online transactions to be reluctant to participate in such activities (Malhotra et al., 2004; Zhu et al., 2006b).

Not being an attribute of any prior adoption and diffusion models such as the DOI theory, only few studies have examined the security factor in innovation adoption research (Zhu et al., 2006b). They highlighted three issues that underline security concerns in Internet-based innovations. The first issue is the open standards that Internet technologies are based on, where organisations have less control over data standards and access; the transaction based along the value chain is another issue, which involves exchanging important information and transferring funds over the Internet; the third issue is being a relatively new technology (Zhu et al., 2006b). The last issue is especially critical for developing countries, where users encounter a less mature institutional framework (Zhu et al., 2004).

If the Internet is not perceived as a secure platform, potential adopters would expect a high risk of exposing sensitive data and thus hindering e-commerce adoption and utilisation amongst companies (Stewart and Segars, 2002; Jones et al., 2000). The recent literature indicates that the use of Internet technologies in the Arab countries was hindered by issues related to personal privacy and financial security (Al-Hosni et al., 2010; Khasawneh, 2009). In studies of e-commerce in Saudi Arabia, researchers found that the majority of Saudi firms have real concerns about the security of e-commerce, especially site hacking (Al-Otaibi and Al-Zahrani, 2003; Aldwsry and Mayhew, 2011). Therefore, *it is anticipated in this research that high confidence in e-commerce would positively affect e-commerce adoption, utilisation and scope of use.*

4.8.1.4 Perceived Costs

Perceived costs, also referred to as financial resources in the literature, refers to the availability of financial resources to acquire and run the technology, including the costs of e-commerce technologies and their operations (Al-Qirim and Corbitt, 2001). It reflects the availability of a firm's capital to implement necessary Internet technologies for setting up a website and subsequent investments, such as technology implementation and employee training (Chircu and Kauffman, 2000). The literature has suggested that the cost of an innovation influences its adoption and implementation (Tornatzky and Klein, 1982). In particular, the low financial resources available for IT implementation are most likely to inhibit its adoption (Poon and Swatman, 1995; Thong, 1999).

The use of IT financial resources is largely drawn from the cost-benefit effectiveness analysis of e-commerce adoption (Jia, 2008). Unlike prior IT innovations, e-commerce

adoption and subsequent utilisation requires extra efforts for organisational restructuring and process re-engineering, which further add to the costs of using e-commerce (Zhu, et al., 2006b). Even though firms can in-source their e-commerce applications, there are still other costs for system operations and maintenance that are necessary for the systems to keep working. In a recent study of post-adoption digital transformation of European enterprises, Zhu et al. (2006b) found a negative relationship between e-business usage and the costs of implementing necessary technologies for online transactions and related efforts. In another cross-country research, Gibbs and Kraemer (2004) found IT financial resources to be among the most significant determinants of the scope of e-commerce use. Thus, *it is expected that perceived costs to be negatively associated with e-commerce adoption, utilisation and scope of sue.*

4.8.2 Organisational Factors

4.8.2.1 Technology and Human Resources

Technology and human resources are known in the literature as technology readiness, technology competence and IT sophistication. It expresses whether or not an establishment is technologically ready to adopt an IS/IT innovation (Chwelos et al., 2001). Iacovou et al. (1995) defined it as “*the level of sophistication of IT usage and IT management in an organisation*” (p.469). According to Zhu and Kraemer (2005), technology resources comprise not only IT infrastructure, but also human resources. One element of these definitions is related to the extent of technology resources within an organisation, such as the level of computerisation and experience with network-based applications (Powell and Dent-Micallef, 1997; Hartman et al., 2000). It has been argued that more highly integrated, computerised processes are likely to increase internal readiness into higher e-commerce utilisation (Iacovou et al., 1995). Mata et al. (1995), on the other hand, argue that human resources are a complementary element to physical assets.

Based on a thorough literature review and supported by several empirical studies, Kwon and Zmud (1987) emphasise the importance of internal technological resources (e.g., IT infrastructure and technical skills) for the success of IS innovation adoption. As it forms a basis for e-commerce development, the available IT infrastructure, IT expertise and e-commerce know-how have been identified to be major determinants of the adoption of e-commerce (Kuan and Chau, 2001; Zhu et al., 2003). In the context of developing countries, Karanasios and Burgess (2008) state that inadequate IT professionals in the local market impact Internet deployment in developing countries. In another study, Molla and Licker

(2005b) found that technological and human resources significantly influence initial e-commerce adoption. Thus, *it is expected that technology resources are positively related to e-commerce adoption, utilisation and scope of use*. Further, *it is also expected that human resources are positively related to e-commerce adoption, utilisation and scope of use*.

4.8.2.2 Commitment

Commitment, also known as management support in the literature, is defined as “*support by key members of the organisation, especially its CEO, to champion e-commerce*” (Molla and Licker, 2005b, p. 88). It has been argued that top management could encourage the change by strengthening values and by establishing a supportive environment for any new innovation (Tolbert and Zukar, 1983; Thong, 1999; Premkumar and Roberts, 1999). Researchers have found that top management support is an important determinant for the success implementation of a technology (Schneider and Perry, 2000; Eid et al., 2002; Al-Mashari et al, 2003). In the DOI theory, Rogers (2003) argues that managerial champions in the information network of organisations could affect the adoption of an innovation.

In the e-commerce domain, Aghaunor and Fotoh (2006) argue that senior managers have the power and authority to make strategic decisions, which are crucial in developing a concise e-commerce vision and strategy, and hence disseminating the importance of e-commerce throughout the organisation. In particular, a CEO's interest and involvement in e-commerce would devote additional resources into e-commerce implementation (Al-Qirim, 2003). That is, managerial staff would make sure that the required resources are allocated to e-commerce initiatives to be successfully implemented in their organisations. The literature indicates that through a lack of management support and commitment, a great number of e-commerce projects are likely to fail or not move to advanced adoption levels (Daniel and Grimshaw, 2002; Hartman et al., 2000).

In the developing country context, the lack of managerial and organisational commitment was found to be a major constraint that influence IS project success (Montealegre, 1998; Wang and Cheung, 2004). Molla and Licker (2005b) found a significant relationship between the extent of e-commerce adoption and commitment in developing countries. Interestingly, top management support has been found to be the best predictor and stands as the main factor that links individual and organisational IT innovation adoption (Jeyaraj et al., 2006). Therefore, *it is expected that commitment, especially from top management, will positively affect e-commerce adoption, utilisation and scope of use*.

4.8.2.3 Process Readiness

As an emerging issue from the exploratory study (section 4.6.3.3), process readiness can be defined as the readiness of business processes and procedures that are essential to extensively utilise e-commerce. It encompasses not only the handling of the internal processes in a company, but also processes related to the interaction with customers and suppliers. Similarly, the exploratory study of Doherty and King's (2001) investigation alerted them to the importance of the re-engineering of business processes as an emerged organisational issue that was thus considered in the revised questionnaire of the successful treatment of organisational issues in systems development projects. The introduction of the Internet and the e-transformation associated to e-commerce mandates organisations to arrange many changes to their current technologies, business processes and the structure of the value chain in order to assimilate the Internet technologies successfully into their e-initiatives (Chatterjee et al., 2002; Zhu et al., 2006a). Therefore, it can be argued that organisations engaging in e-commerce should make considerable efforts and investments not only for IT resources, but also for the readiness of their e-business processes in order to achieve success and maximise benefits.

According to Barua et al. (1996), the failure of re-engineering projects in the early 1990s suggests that large IT investments alone do not necessarily lead to success. Zhu et al., (2006a) declare that “*when firms confront obstacles in making organizational changes, redesigning processes, and acquiring new expertise, it is difficult to achieve a smooth digital transformation and deep assimilation of e-business*” (p.1563). Therefore, it is necessary to make a considerable set of investments in e-business facilitators, such as business processes across the value chain, in order to achieve operational excellence (Barua et al., 2001). The findings of the exploratory study (section 4.6.3.3) revealed that business process readiness is particularly crucial for developing countries, in which most organisations have at best weakly defined business processes. This finding revealed that process readiness could be either a concern before utilising an advanced level of e-commerce or it could introduce problems that could affect an organisation not to perform in an appropriate manner. Therefore, *process readiness is expected to positively affect e-commerce utilisation, although it may not have an impact on the initial adoption.*

4.8.2.4 Governance

Governance comprises specifying rights and responsibilities, allocating resources and spelling out decision making rules and procedures (OECD, 1999; Willcocks and Griffiths,

1997). According to OECD (1999), “*corporate governance is the system by which business corporations are directed and controlled*”. It also reflects priority given to e-commerce adoption and subsequent utilisation (Hartman et al., 2000).

It has been argued that the digital transformation associated with e-commerce requires changes on ‘coordination mechanisms’ in order to assimilate the Internet technologies successfully (Chatterjee et al., 2002; Zhu et al., 2006a). In particular, governance models affect how well an organisation manages any further progress in e-commerce beyond entry level; however, they are lacking in most organisations in developing countries (Molla and Licker, 2005b; Palacios, 2003). Empirically, governance was found to be an important determinant for the extent of e-commerce adoption and implementation in developing countries (Molla and Licker, 2005b, Alwabel and Zairi, 2005). Thus, *although it may not have a strong effect on the entry level adoption, governance is expected to positively affect the extent of e-commerce adoption.*

4.8.3 Environmental Factors

4.8.3.1 Institutional Pressures

As a driver of e-commerce adoption, the e-readiness of market forces responds to the principles of network externalities, emphasising that the adoption is more likely to be driven by the social system of the firm rather than the attributes of the innovation *per se* (Au and Kaufman, 2001). External pressures, also known as institutional pressures in innovation adoption literature, refer to influences that a business has from its market forces, i.e. competitors, customers, and suppliers (Iacovou et al., 1995). In the knowledge-based economy, Gibbs and Kraemer (2004) declared that the adoption of Internet-based interactive technologies (i.e., e-commerce and e-business) is more likely to have a higher influence by the enterprise’s institutional environment. Pressure from a company’s market forces has been found amongst the key determinants not only for e-commerce adoption (Dos-Santos and Peffers, 1998), but also for the scope of e-commerce use (Gibbs and Kraemer, 2004). Based on a thorough review, the latter authors assert that “*organisational decisions are not driven purely by rational goals of efficiency but also by social and cultural factors and concerns for legitimacy*” (p.126). That is, firms are more likely to be influenced by partners or competitors to adopt a technology (Kuan and Chau, 2001).

Institutional theory asserts that legitimacy and isomorphic pressures enforce organisations to become more similar (DiMaggio and Powell, 1983). Consequently, organisations in the

same industry are likely to “*look like each other over time*” motivated or induced by externally driven pressures from competitors, suppliers, customers or the government to imitate industry leaders “*rather than making a purely internally driven decision to adopt e-commerce*” (Gibbs and Kraemer, 2004, p. 126). In a study of Financial Electronic Data Interchange (FEDI) adoption, Teo et al. (2003) examined institutional pressures (i.e., mimetic, coercive and normative pressure) of DiMaggio and Powell (1983) and found a significant relationship between these institutional variables and the intention to adopt FEDI. The following sections discuss, in some detail, these institutional pressures, i.e. mimetic, coercive and normative pressures.

4.8.3.1.1 Mimetic Pressure

Pressure from competitive intensity in an industry has long been recognised amongst the best driving forces in IS innovation adoption literature (Gatignon and Robertson, 1989; Jeyaraj et al., 2006). Such a pressure tends to become a strategic edge over competitors or just a necessary strategy in order to remain competitive in an industry (Premkumar and Ramamurthy, 1995; Al-Qirim, 2003). Mimetic pressure not only refers to the extent of adoption amongst competitors, but also perceived success of competitor adopters (Teo et al., 2003). Competition is more likely to force organisations to initiate, adopt and utilise a technology in order to maintain their competitive position. Porter (2001) pointed out that Internet-based technologies (e.g., e-business and e-commerce) provide better opportunities than previous IT generations to establish distinctive strategic positioning. Porter further argues that companies are likely to be forced to adopt these Internet-based technologies to remain competitive. Such a view is supported by Poon (1998) who found out that there is a direct relationship between firms' motivation to adopt e-commerce and the percentage of competitors in an industry that have already adopted it.

The competition *per se* is likely to be induced by the industry characteristics (Alzougool and Kurnia, 2008). They further argue that “*if the industry characterised by a duopoly or oligopoly then any technology initiative by one player will be closely matched and emulated by the other. On the flip side, if the industry is monopolistic and lacks perfect competition, urgency to thrive for business excellence and constricting competition's profits through technological innovations might not be at the top of the agenda*” (p.49). Hence, firms that are facing a higher degree of competition tend to face higher pressure to adopt and extensively utilise e-commerce in order to achieve more competitive advantages (Sadowski et al., 2002). In a study of e-business diffusion in European countries, Zhu et al.

(2006b) argue that “*companies can leverage Internet-based innovations to improve their responsiveness to market changes and enhance customer services*” (p. 605). Regardless of expected benefits, the extent of adoption amongst competitors as well as their perceived success is likely to motivate firms to simply respond to 'mimetic pressure' to survive with those competitors (Teo et al. 2003). In their study of FEDI adoption, Teo et al. (2003) found a strong empirical support for mimetic pressure to be a significant predictor of the intention to adopt FEDI. Hence, *it is expected that mimetic pressure is positively related to e-commerce adoption, utilisation and scope of use.*

4.8.3.1.2 Coercive Pressure

Another common form of institutional pressure to adopt and use e-commerce is business partner pressure or 'coercive pressure' that comes from partnership demands (Teo et al., 2003). According to Wu et al. (2003), “*organisations may also adopt innovations on account of powerful constituencies in its environment*” (p. 5). Coercive pressure from external parties (e.g., suppliers, customers, investors, parent companies, large corporate, and the government) makes an organisation feels the pressure to adopt e-commerce when such an external party requests, recommends or enforces such a movement, e.g. large corporate requiring their business partners to adopt e-commerce, e-government initiatives requiring a movement from purely paper-based documents to electronic declarations. A number of empirical studies have found that coercive pressure from business partners, customers, parent companies and the government to be a strong factor for IT innovation adoption (Iacovou et al., 1995; Chwelos et al., 2001; Teo et al., 2003).

Dominant players in an industry who have a lot of power could influence the behaviour of other enterprises by threatening or forcing weaker firms “*to follow their suit*” (Alzougool and Kurnia, 2008). According to Gibbs et al. (2003), multinational corporations exert 'coercive pressures' by requiring their suppliers and subsidiaries to adopt e-commerce technologies to link the networks of global production. Kuan and Chau (2001) noted that another driving force for enterprises to adopt and use a technology is simply to respond to government policies. The adoption of e-commerce might be sometimes inescapable as e-government initiatives might demand enterprises to be e-capable, allowing no choice in the matter except migrating to electronic declarations (Chau and Hui, 2001). In order to encourage the rapid take-up of e-commerce by businesses, many governments (e.g., Australian and Malaysian governments) as well as large corporations have mandated their suppliers to interact with them online (NOIE, 2000). An empirical evidence is the high

level adoption of EDI amongst parties of Customs Department that have been forced to make their duty payment electronically when making import and export declaration within Malaysian shipping industry (Ang et al., 2003).

Coercive pressure is also likely when suppliers or customers pressure a business to use electronic channels in conducting business with them, and failing to do so would be a competitive disadvantage. Locke (2004) suggests that demands from customers motivate firms to adopt e-commerce in order to maintain the relationship with existing customers or to attract more other businesses. On the other hand, firms would have very little incentive to adopt e-commerce if their customers and suppliers had no demand for e-commerce (Al-Qirim, 2003). The level of pressure depends on the dependency of firms on their partners, as declared by Iacovou et al. (1995) who found firms that have greater dependency on their trading partners are more likely to respond to trading partner pressure to adopt EDI. In Teo et al.'s (2003) research, a strong empirical support was found for coercive pressure to be a significant predictor for the intention of FEDI adoption. Thus, *it is expected that coercive pressure positively affect e-commerce adoption, utilisation and scope of use.*

4.8.3.1.3 Normative Pressure

Normative pressure refers to the extent of adoption amongst enterprises' customers and suppliers as well as their participation in trade, industry or business association to support such a trend (Teo et al., 2003). This type of pressure is also known as partner readiness or critical mass in the literature. It has been argued that firms may adopt an innovation due to normative pressures, i.e. the fear of being left behind (Wu et al., 2003). As in Molla and Licker (2005b), the e-readiness of business partners, up and down the value chain, is likely to influence firms to adopt e-commerce and implement more sophisticated e-commerce platforms in order to gain a competitive advantage, perceive benefits or simply to keep up with 'the trend' (Au and Kaufman, 2001; Chwelos et al., 2001; Wang and Cheung, 2004). The benefits of e-commerce initiatives of a company depend not only on its own internal readiness, but also on the readiness of its customers and suppliers to interact electronically.

Consistent with the theory of critical mass (Markus, 1987; Rogers, 1991), Castleman and Chin (2002) found that e-commerce adopter firms, who had participated in their research, had adopted e-commerce to catch up with shifts in industry practices when relatively high level of adoption had occurred within the industry. The theory asserts that once a certain level of adoption is reached, the adoption amongst industry members would be self-

sustaining (Markus, 1987; Rogers, 1991). Empirical evidence suggests that e-business success depends on the readiness of business partners using the Internet collectively along value chain activities (Barua et al., 2004). However, the low rate Internet use for online transactions amongst customers in many developing countries challenges firms in those nations to use Internet technologies (Karanasios and Burgess, 2008). Hence, 'normative pressure' tends to be less likely for organisations in developing countries (Humphrey et al., 2003). Teo et al. (2003) found a strong empirical support for normative pressure to be a significant predictor of the intention to adopt FEDI. Thus, *it is anticipated that normative pressure is positively related to e-commerce adoption, utilisation and scope of use.*

4.8.3.2 Institutional Trust

Several IS researchers have embraced institutional trust research indicating its importance (McKnight et al., 1998; Pavlou, 2002; Pavlou and Gefen, 2004). Empirical evidence suggests that the level of trust amongst partners in an economy to have a strong impact on commerce efficiencies (Burns and Brady, 1996; Palmer, 2000). Unlike developing nations, to make transactions in the developed world, *“there is often access to better redress, such as an efficient judiciary, efficient arbitration and reliable enforcement of redress decisions in the case of failed transactions”* (Bajaj and Leonard, 2004, p. 243). Thus, transactions in developed countries are likely to perform smoothly as expected by participated parties.

In the knowledge-based economy, researchers have emphasised the importance of trust in Internet-based innovations (Ba et al., 1999; Hoffman et al., 1999; Stewart, 1999 cited in McKnight and Chervany, 2002). Byrant and Colledge (2002) have asserted that trust is a significant attribute in the development of e-commerce relationships. In other words, an environment without trust would be perceived as risky, which can lead to uncertainty in the participation of future trading (Ratnasingham, 2003; Tan and Thoen, 2001). Singh and Gilchrist (2002) developed a three-dimension framework of e-commerce challenges: the availability of infrastructure, availability of logistics and supporting services, and trust. In their conceptual typology of trust constructs, McKnight and Chervany (2002) identify three types of trust constructs, namely, dispositional, institutional and interpersonal trust. They further pointed out that disposition trust suggests that *“actions are molded by certain childhood-derived attributes that become more or less stable over time”*; institution trust suggests that *“action is not determined by factors within the person but by the environment or situation”*; and interpersonal trust says that *“interactions between people and cognitive-emotional reactions to such interactions determine behaviour”* (p. 41-42).

According to Alzougool and Kurnia (2008), a 'trustworthy relationship', which promotes confidence amongst firms that their partners will perform as expected, is an important facilitator in all e-commerce activities to achieve strategic objectives. Conversely, the lack of trust and confidence in business creates the perceptions of vulnerability for even low-value transactions because of the unfamiliarity with business partners (Salleh et al., 2006). In a study of e-commerce cultural issues, Efendioglu and Yip (2004) found trust to be a major constraint for e-commerce diffusion in China. Thus, *it is expected that institutional trust is positively related to e-commerce adoption, utilisation and scope of use.*

4.8.3.3 External Support

External support, also referred to as external change agents and subsidies in the literature, can be defined as the availability of help and support from an external party to implement as well as utilise an innovation (Premkumar and Roberts, 1999). In innovation diffusion research, Rogers (2003) emphasises the importance of technology vendors, consultants and change agents in convincing potential adopters to accept a new innovation. Prior IS adoption research revealed that external IS support is amongst the significant factors not only in IS adoption (e.g., Premkumar and Roberts, 1999; Thong, 2001), but also in IS success (e.g. Delone, 1988). As a relatively new innovation comes into place, the lack of internal innovation champions and people 'know-how' forces enterprises to seek external support, especially with the popularity and growth of outsourcing third-party services. An organisation is more likely to take the risk and try a new technology if it feels that an adequate support from a third-party is available (Premkumar and Roberts, 1999). Change agent support (e.g., external technology vendors trying to sell an e-commerce technology, government and industry bodies trying to initiate growth of e-commerce) has been found to be a motivator for e-commerce adoption, especially after trust had been established (de Berranger et al., 2001). In line with de Berranger et al.'s (2001) results, Pollard (2003) supports such a view in that change agent efforts familiarise the company with the new technology, which results in gaining confidence to adopt e-commerce.

Due to the lack of internal IT expertise, many firms rely on external support to adopt e-commerce (Chau and Hui, 2001). Similarly, Jones et al. (2003) in their study stress the significant role of ISPs and advisers in e-commerce knowledge learning. On the other side, Lawson et al. (2003) found a lack of e-commerce knowledge across the industry, calling for more work to be done by industry associations to disseminate the knowledge.

To integrate the efforts of external change agents, Jutla and Weatherbee (2002) proposed an integrated approach called CLEAR (Coordinated Learning for e-Business Adoption, Research and Resource), with which external change agents (e.g., industry associations, local boards of trade, government agencies and universities) coordinate to establish an innovation network. The findings of the exploratory study (section 4.6.4.5) indicate a lack of such support within the country except a few efforts from the government. Given the lack of external support in developing countries and the significant role of the government and some major supporting industries, this research will only focus on external support provided by the government as well as supporting industries, which will be discussed in section 4.8.3.4 and section 4.8.3.5, respectively.

4.8.3.4 Government Readiness

Within the environmental context, governments are among the most powerful institutional forces that play a significant role in innovation adoption and diffusion (King et al., 1994; Montealegre, 1999; Zhu et al., 2004). Such a role is more important, especially in type III innovations, such as e-business and e-commerce, in which interventions are more likely to happen (Bandyopadhyay, 2002; Pucihar and Podlogar, 2006). In the present research, government readiness refers to “*organisations’ assessment of the preparation of the nation state and its various institutions to promote, support, facilitate and regulate e-commerce and its various requirements*” (Molla and Licker, 2005a, p. 882). In the knowledge-based economy, supportive infrastructure, legal and regulatory frameworks and support given to e-commerce are important considerations that the government can provide in order to create confidence amongst private sector enterprises and encourage them to adopt and extensively utilise e-commerce (Kuan and Chau, 2001; Oxley and Yeung, 2001).

In developed economies, higher education institutions, along with governmental subsidies, play a significant role in knowledge building and standard setting making a rapid spread of information technology and e-commerce in the development stages of the Internet (Teo et al., 1997). Researchers declared that government policies and initiatives may increase the capacity of an organisation to compete in marketplaces, which have a significant effect on the strategies of technology development (Rashid and Qirim, 2001; Tan and Teo, 2000; Lefebvre and Lefebvre, 1996). According to Gibbs and Kraemer (2004), government incentives and subsidies have been determined as significant facilitators for e-commerce adoption and diffusion, particularly in newly industrialising countries (e.g., Singapore, Taiwan) and developing countries (e.g., India, Mexico, Brazil). It seems that a clear e-

commerce commitment that appears in government policy measures can encourage e-commerce utilisation within the country (Dutta et al., 2003).

Government initiatives and promotions were also found to be dominating factors for Internet growth and e-commerce use (Looi, 2003; Gibbs and Kraemer, 2004). Gibbs and Kraemer (2004) affirm that government policy, particularly legislation, is an important factor for e-commerce use. According to Oxley and Yeung (2001), e-commerce diffusion depends heavily on ‘rule of law’ of an institutional environment, which facilitates the integrity of online transactions. In the context of developing countries, governments often have the power to control technological development and influence competition, which is more likely to be shaped by business relationship with the government rather than other market forces (Montealegre, 1998; Montealegre, 1999). In a recent study, Hamade (2009) found that one of the main constraints that negatively affect ICT adoption in most Arab nations is related to government’s policies and regulations.

Due to the lack of protection laws in developing countries, privacy and security concerns about Internet fraud or misuse tend to be among the largest constraints of e-commerce adoption and diffusion (Gibbs et al., 2003). The effect of regulatory environment is more important in developing nations “*given the relatively immature markets and more frequent government interventions*” (Xu et al., 2004, p .17). In Saudi Arabia, Albur (2008) argues that there is a lack of regulation and legislation, including intellectual property, consumer protection, cyber law and dispute resolution. In particular, there is no publicised dispute to establish a precedent for dispute resolution since Internet access was officially made available (EIU, 2007). Hence, *it is expected that perceptions of government readiness will positively affect e-commerce adoption, utilisation and scope of use.*

4.8.3.5 ICT Infrastructure and Supporting Industry Readiness

The literature indicates that developing countries suffer from immature infrastructure in general, and Saudi Arabia is no exception. Supporting industry readiness refers to “*the assessment of presence, development, service level and cost structure of support-giving institutions ... whose activities might affect the e-commerce initiative*” (Molla and Licker, 2005a, p. 882). Unlike previous generation innovations, e-commerce depends extensively on numerous supporting industries to make available, efficient, reliable, affordable or even preferential access to e-commerce supporting services, such as telecom infrastructure, carrier facilities and online financial payment services (Porter, 1990; Dutta et al., 2004).

Arguably, many e-commerce supporting services that have been taken for granted in the developed world are lacking or at best are very weak in developing countries. As illustrated in Figure 4.3, the gaps of the availability of ICT development and Internet access between developed and developing countries are growing wider (Campbell, 2001).

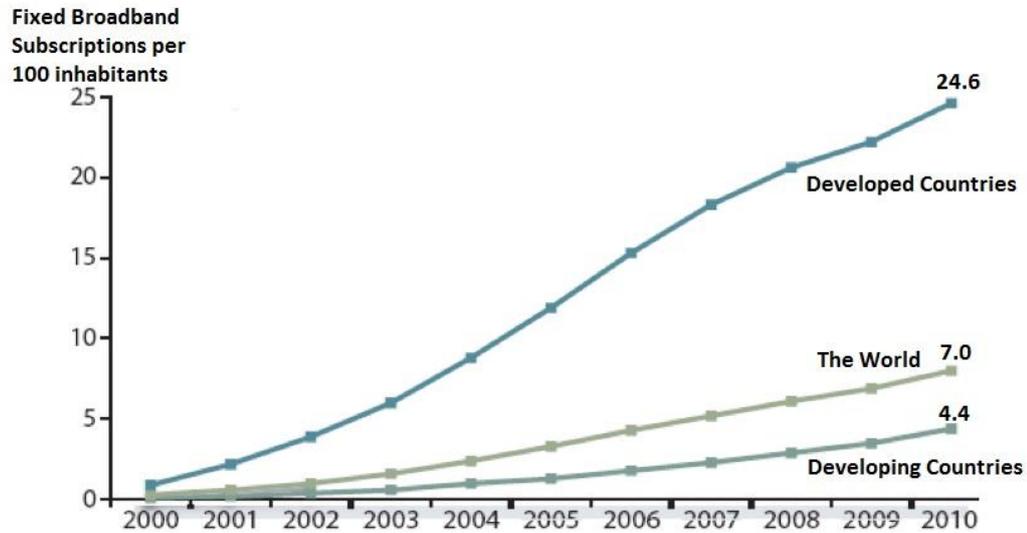


Figure 4.3: Broadband subscriptions in developed and developing countries (ITU, 2010)

It seems that the lack of an appropriate ICT infrastructure is amongst the reasons for the low rate of its usage in many developing countries. In particular, the poor and slow Internet connectivity is found to hinder the completion of online transactions in many developing countries (Kshetri, 2007). The slow and low adoption and diffusion of Internet technologies in developing countries is in part due to the high cost of Internet access (Molla et al., 2006). In another study, Raven et al. (2007) conclude that the increase cost of Internet access is found to impede the adoption of the Internet and e-commerce in developing countries. In particular, connection service fees, communication fees and hosting are found to be a major barrier of e-commerce diffusion in developing countries (Andam, 2003). Although ICT infrastructure in Saudi Arabia is one of the highest when compared with other developing countries, it is still under expectation and far below the reliance rate in developed countries, as revealed by the exploratory investigation (section 4.6.4.7.1) and other recent studies (Al-Ghaith et al., 2010).

In addition to ICT infrastructure, which is the gateway to the Internet, the most critical e-commerce supporting industries in developing countries are IT industry, financial sector and carrier and transportation facilities (Humphery et al., 2003; Travica, 2002). In some

developing countries, local banks do not process any form of e-payment systems, including credit cards (Fraser and Wresch, 2005; Wresch and Fraser, 2006). Wresch and Fraser (2006) found the lack of delivery systems as well as technological and logistical infrastructures to impede the growth of e-commerce in the Caribbean countries, whereas insufficient transport networks were found to hinder e-commerce diffusion in China (Cheung, 2001). Al-Otaibi and Al-Zahrani (2003) found that the immature supporting services (e.g., absence of financial companies involvement, lack of postal and delivery services) negatively affect e-commerce use in Saudi Arabia.

In short, it appears that the readiness of ICT infrastructure that can provide an affordable and reliable access to Internet services; the sufficiently developed IT industry that can play supply push roles; the mature financial sector that can handle electronic transactions; and the well developed carrier and transportation facilities as well as postal addressing systems that can support rapid shipping and handling are lacking in most developing countries (Aldwsry and Mayhew, 2011; Josanov, et al, 2008; Hadidi, 2003; Humphery et al., 2003; Tigre, 2003; Dutta et al., 2004). Thus, *it is expected that perceptions of the readiness of ICT infrastructure is positively related to e-commerce adoption, utilisation and scope of use. Further, it is also expected that the readiness of supporting industries is positively related to e-commerce adoption, utilisation and scope of use.*

4.8.3.6 Consumer Readiness

An appropriate consumer readiness and culture is an important condition to reach an acceptable e-commerce readiness stage; therefore motivate e-commerce adoption and diffusion. Consumer readiness can be defined as the assessment of public readiness to conduct online activities within the country, including e-commerce awareness, technology readiness and culture. In a cross-country study of e-business adoption, Zhu et al. (2003) investigated consumer readiness and found it to be a significant adoption driver. The low use of credit cards for online payments in developing countries is a major constraint in the business environment (Mercer, 2006; Kenny, 2003; Miller, 2001; Biederman, 2000). In Asia, the anonymity of online relationships challenges the establishment of inter-personal connectivity (Gibbs et al., 2003). In a study of e-commerce cultural issues in China, social e-commerce effects and attitude towards debt were found as major barriers of e-commerce adoption (Efendioglu and Yip, 2004). Stylianou et al. (2003) pointed out that the cash-based culture in China worked as a constraint to conduct online purchases, which mainly relies on online transactions using credit cards or other e-payment methods. Such a finding

has been supported by the UN report (2003), emphasising the influence of cultural resistance on e-commerce. In the Arab region, a study conducted in e-commerce in Egypt reported culture as a main barrier to e-commerce implementation (El Nawawy, 2000).

In studying cultural effects across countries, Hofstede (1991) investigated five ‘value’ dimensions that are deeply engrained and adhered to in most cultures, including Saudi Arabia and other Arab countries. Hofstede (1991) declared that Arab culture in the Middle Eastern countries demonstrates an extreme score of high power distance, high collectivism orientations, high masculinity index, and a high position of uncertainty avoidance. According to DePauw (2006), Saudi Arabia is a collectivist society, in which members act for a group goal rather than any individual goal. Saudi society has a large power distance, which could be due to the monarchical system in power in the country, as Saudis do not have a strong political voice (DePauw, 2006). Saudi society also has a high level of uncertainty avoidance, as Saudi Arabia is a very conservative society and has many rules that restrict freedoms and resists change from the outside (DePauw, 2006). Saudi Arabia has far-reaching gender-based segregation policies at all levels of everyday life, and ranks high in long-term orientation, partly because of the strong social influence (DePauw, 2006; Sait et al., 2004). Therefore, *it is expected that perceptions of consumer readiness is positively related to e-commerce adoption, utilisation and scope of use.*

4.8.4 E-Commerce Adoption and Post-Adoption

Prior studies of innovation theories, as discussed in section 2.3.1 of Chapter 2, typically deal with intention to adopt, intention to use, adoption and acceptance, whereas recent studies have used different measures to examine different stages from the initial adoption to the full use of an innovation, such as the extent of use and impact. Zhu et al. (2006a) employed these theories to examine different stages of adoption (assimilation), which include the initial adoption, adoption, and impact. Since the adoption of e-commerce can be operationalised using various forms and complexities, Molla and Licker (2005a) proposed a conceptualised indicator to differentiate between the entry-level adoption and subsequent utilisation. They further argue that researchers are likely to accept that firms follow certain migration paths in innovation assimilation, in which it assimilates from initial awareness and adoption to full development and institutionalisation.

Costello and Tuchen (1998) suggest that firms start with publishing information on the Web (static web), then interact with their customers and suppliers (interactive web), and

finally business processes can be transacted via the Internet (transactive web). A further advanced stage (integrated web) focuses on the full integration of business processes across the supply chain (Currie, 2000). Molla and Licker (2005a) drew from the literature a six-stage indicator that is relevant to the realities of e-commerce in developing countries. This indicator consists of six stages as follows: no e-commerce, connected e-commerce, static e-commerce, interactive e-commerce, transactive e-commerce, and integrated e-commerce. Accordingly, the initial adoption is achieved if a business has attained an interactive e-commerce status, arguing that it is common amongst researchers to accept interactive e-commerce as the initial e-commerce adoption. In this indicator, the extent of e-commerce adoption is examined by looking into whether an enterprise has attained an interactive, transactive or integrated e-commerce status.

Other studies went further by investigating the extent of e-commerce use (Gibbs and Kraemer, 2004; Zhu et al., 2006b). Such research intends to capture the extent of e-commerce use of online activities along the value chain. The scope of e-commerce use has been assessed using an aggregated index of whether or not the firm had adopted the Internet for each activity across the value chain (Gibbs and Kraemer, 2004; Zhu et al., 2006b). Accordingly, the scope of use of n e-commerce activities is the total number of used Internet activities, creating $(n+1)$ ordered levels of e-commerce use, which has been suggested to enhance its comprehensiveness (Grover and Goslar, 1993, Fichman, 2001). Such an approach has been adapted to gauge the adoption of open systems (Chau and Tam, 1997), software practice technologies (Fichman, 2001), and e-business (Zhu et al., 2006a), in addition to e-commerce use (Gibbs and Kraemer, 2004).

To capture e-commerce adoption, Molla and Licker's (2005a) maturity indicator has been adopted; thus consistent with prior research and capturing two adoption stages: the adoption and the extent of adoption. The rationale for choosing this indicator is two-fold. Firstly, it has been suggested that maturity stage models help to conceptually identify the stages that a firm migrates through when utilising e-commerce (McKay et al., 2000; Deise et al., 2000). Secondly, the indicator has been successfully employed to capture not only e-commerce adoption, but also the sophistication of e-commerce utilisation in the context of developing countries (Molla and Licker, 2005a; Tan et al., 2007). To provide increased understanding and greater exploration, this research also intends to investigate the extent of e-commerce use along the value chain activities (Gibbs and Kraemer, 2004).

4.9 Summary

This exploratory study helped to provide direction to what factors are imperative to firms in developing courtiers. In particular, it shed light on issues at different level of analysis with regard to e-commerce adoption and use in Saudi Arabia. In this chapter, emphasis is placed on presenting the study findings, which contributed to focus the research scope. The results of the exploratory investigation, in line with relevant literature, were used to extend and confirm choices of the contextual factors; thus, the research framework was refined and propositions were formulated.

The framework encompasses organisational and environmental factors, in addition to innovation attributes, in order to explain variations of e-commerce uptakes at different settings, i.e. e-commerce adoption, utilisation and scope of use. For innovation attributes, perceived benefits, compatibility, perceived costs and security were addressed. In the organisational context, technology and human resources, commitment, governance and process readiness were discussed. The environmental context encompasses institutional pressures and trust, in addition to the readiness of the government, consumers, supporting industries and ICT infrastructure. The findings of this exploratory study are intended to be re-visited later to support and justify the survey findings in the discussion chapter.

CHAPTER 5: Empirical Settings and Data Validation

5.1 Overview

As the first step for the explanatory phase, the present chapter discusses the empirical settings and data validation of the research survey. It starts by discussing the origins of the research constructs, conceptualisations, operationalisations and measurement items as well as any modifications made to the original item scales. The discussion then proceeds to present the methodology of the explanatory phase, including sampling, survey design, and the piloting stage. It then discusses survey administration, and follows with data validation of survey data through data screening and missing data analysis. Descriptive analysis is undertaken for the research variables to detect entry errors and to describe survey data. An examination of underlying assumptions and the potential bias is also undertaken.

5.2 Research Constructs

According to Malhotra and Birks (2003), constructs form the foundation of the research concepts, which cannot be observed, but can only be conceptually defined. Research constructs, also known as latent variables, are representative concepts or ideas that can be conceptualised to produce theoretical meanings (Mueller, 2003). Measurement theory typically recommends the use of multi-item measures, which are also called indicators or scale items, rather than single-item measures, because the latter normally have significant measurement errors (Churchill, 1979; Nunnally, 1978). Accordingly, a research construct is usually assessed using a group of measurement items, where these items examine the research construct to cover the entire measurement scale.

Due to the lack of literature that associates e-commerce adoption and use to contextual factors for the target population, research constructs and proposition formulation were based on relevant literature as well as the findings of the exploratory study. The constructs in the study framework are believed to be reflective in nature and consist of dependent and independent variables. The dependent variable is e-commerce adoption, which includes the adoption, the extent of adoption and the scope of use, while the independent variables include constructs at different levels of analysis, as illustrated in Figure 4.2.

5.3 Conceptualisation and Operationalisation of Research Constructs

In this section, each construct is described in detail in terms of its conceptualisation and operationalisation. Conceptualisation is the process by which a research construct is given an abstract meaning and defined conceptually in theoretical terms (Mueller, 2003). On the other hand, operationalisation is the process of moving the focus from the conceptual meaning of a construct to an empirical level, in which variables or measurable items are specified and attached to each construct (Mueller, 2003).

Based on a comprehensive literature review, this research followed scholarly suggestions and employed, to the greatest possible extent, operationalisations that had been tested in previous studies in order to strengthen construct validity and “*to facilitate cumulative research*” (Zhu et al., 2006b, p.1566). In this study, no modification has been made to construct items, except those that have been introduced as a result of emerging issues from the exploratory study or revision during the piloting phase. Measurement items for those emerging issues were initially designed based on a literature review and expert opinions and followed to a great extent Churchill’s (1979) approach to ensure validity and reduce measurement errors of research constructs. Scale items were designed to investigate how organisational factors, innovation attributes and environmental determinants influence e-commerce adoption, utilisation and scope of use, which would increase the validity of these construct items. Unless otherwise reported, most of the research constructs are a 5-point Likert scale, where respondents indicate their extent of agreement with a statement from a scale of one (1=strongly disagree) to five (5=strongly agree).

When the complete items were ready, and prior to the piloting phase, a judgement process took place in order to assess these items in their representativeness, clarity and to suggest any further improvement to them. Survey items, along with construct conceptualisations, were sent for judgement to both professional and academic representatives to get their

feedback. The judgement panel includes three academic experts from the UK (the academic supervisor, a survey expert, and an IS academic expert), three IS PhD students in the UK, two academic experts from Saudi Arabia and two Saudi professional experts. This process was intended to help improve the survey and its structure.

5.3.1 The Dependent Variables

5.3.1.1 E-Commerce Adoption and Utilisation

The literature suggests that maturity stage models help to conceptually identify stages that a firm migrates through when adopting and utilising e-commerce (McKay et al., 2000; Deise et al., 2000). Taking the maturity model view into account, the dependent variable in the current research is conceptualised to capture not only the adoption of e-commerce, but also the extent of e-commerce adoption as another dependent variable (Molla and Licker, 2005a). The first variable is referred to as e-commerce adoption and the second variable as e-commerce utilisation; hence, consistent with previous research and covering both e-commerce initial adoption and post-adoption.

Molla and Licker (2005a) drew from the literature a six-stage e-commerce indicator that is relevant to the realities of e-commerce in developing countries; thus it is adopted. Molla and Licker's indicator consists of six stages as follows: no e-commerce, connected e-commerce, static e-commerce, interactive e-commerce, transactive e-commerce, and integrated e-commerce. In this indicator, e-commerce adoption is operationalised as a binary variable that refers to whether or not an organisation adopted e-commerce by achieving at least an interactive Web status, whereas the extent of e-commerce adoption (e-commerce utilisation) is operationalised as a categorical variable of whether an organisation has attained an interactive, transactive or integrated Web status (Molla and Licker, 2005a). The six measurement items of e-commerce are as follows:

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- | | |
|------|---|
| ECS1 | <i>Not connected</i> (i.e. no connection to the Internet and no e-mail). |
| ECS2 | <i>Connected</i> (i.e. connected to the Internet with e-mail, but no web site). |
| ECS3 | <i>Static Web</i> , (i.e. publishing basic company information on the Web). |
| ECS4 | <i>Interactive Web</i> , (i.e. accepting queries, e-mail, and form entry from users). |
| ECS5 | <i>Transactive Web</i> , (i.e. online selling and purchasing of products and services such as customer service). |
| ECS6 | <i>Integrated Web</i> , (i.e. a web site integrated with suppliers, customers, and other back office systems allowing most business transactions to be conducted electronically). |
-

5.3.1.2 Scope of e-Commerce Use

In addition to e-commerce adoption and utilisation, the present study went further by investigating the scope of e-commerce use along the value chain (Gibbs and Kraemer, 2004; Zhu et al, 2006b). As conceptualised by Gibbs and Kraemer (2004), the scope of e-commerce intends to capture the extent of e-commerce use of online activities along the value chain, namely, advertising and marketing, data exchange with customers, data exchange with suppliers, online sales, online purchase and after-sale service and support.

SCP1	Advertising and marketing.
SCP2	Making sales online.
SCP3	Making purchases online.
SCP4	Exchange operational data with upstream suppliers.
SCP5	Exchange operational data with downstream business partners and customers.
SCP6	After-sales customer service and support.

The scope of e-commerce use is measured by an aggregated index of whether the firm had used the Internet for each of the above value chain activities, ranging from 0 to 6 and creating seven ordered levels. Originally, seven items were aggregated to measure the scope of e-commerce use. The seventh item “*formal integration of the same business processes with suppliers or other business partners*” was excluded due to: (1) its inclusion of many e-business processes and/or e-commerce activities, and (2) not to be confused with the highest stage of e-commerce utilisation in the previous section (“*integrated e-commerce status that allows most business transactions to be conducted electronically*”).

5.3.2 Innovation Attributes

5.3.2.1 Perceived Benefits (PB)

The perceived benefits construct can be conceptualised in the current research to reflect benefits related to a firm's strategy, which has been associated with e-commerce adoption and post-adoption (Gibbs and Kraemer, 2004). The construct is designed to cover several aspects of strategic benefits, such as expanding markets and improving coordination with both suppliers and customers.

The measurement scale for perceived benefits is designed by Gibbs and Kraemer (2004) to assess e-commerce strategic benefits of a firm. This measurement scale was tested in a cross-country study on the degree to which perceived benefits motivate firms to conduct business over the Internet, and was reported as a valid and reliable scale, with a Cronbach

alpha equal to 0.74–0.76 and an Average Variance Extracted (AVE) equal to 0.62 (Gibbs and Kraemer, 2004; Zhu et al., 2006b). This construct is measured by four survey items on the degree to which these strategic benefits motivate firms to adopt e-commerce: to expand market for existing products or services; to enter new businesses; to reduce costs; and to improve coordination with customers and suppliers. Originally, these items are evaluated on a 5-point Likert scale, ranging from 1 = ‘not a factor at all’ to 5 = ‘a very significant factor’. The first modification made to this construct was changing the rating scale to be from 1 = ‘strongly disagree’ to 5 = ‘strongly agree’. As the research sample is intended for both adopter and non-adopter firms, the other modification was changing the word ‘conduct’ to ‘adopt’ for all items in the scale.

PB1 Our firm is motivated to adopt e-commerce to reduce costs.

PB2 Our firm is motivated to adopt e-commerce to expand market for existing products or services.

PB3 Our firm is motivated to adopt e-commerce to enter new businesses or markets.

PB4 Our firm is motivated to adopt e-commerce to improve coordination with customers or suppliers.

5.3.2.2 Compatibility (CT)

For various innovations, many researchers designed this construct to cover Rogers’ (2003) aspects of compatibility, namely, the consistency with existing values, needs and past experience. It also has been conceptualised to reflect the degree of consistency of an innovation with existing business practices (Zhu et al., 2006b). Hence, it is conceptualised to reflect not only the consistency of e-commerce with existing culture and value systems, but also the consistency with current business practices (Zhu et al., 2006b).

The measurement scale for compatibility is made up of four items designed by Zhu et al. (2006b) in a Likert-style format. This measurement scale was tested in a cross-country study for assessing the degree of consistency of an innovation with current business practices and value, and was reported as a valid and reliable scale, with a Cronbach alpha equalling 0.84 and AVE equalling 0.57 (Zhu et al., 2006b). The first item assesses e-commerce compatibility with organisational culture and value systems, while the second item assesses the consistency of online transaction with existing distribution channels. The last two items assess the compatibility of selling and buying over the Internet with the company's current process. Items are evaluated on the same 5-point Likert scale. The only modification that was made to this construct was changing the word “your” to “our” for consistency with other scale items.

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- CT1 E-Commerce is compatible and consistent with our company's culture and value systems.
 - CT2 E-Commerce is compatible and consistent with existing distribution channels
 - CT3 E-Commerce is compatible and consistent with our firm's current selling process.
 - CT4 E-Commerce is compatible and consistent with our firm's current procurement process
-

5.3.2.3 Security (SC)

In the current thesis, the security construct is conceptualised to reflect security concerns of e-commerce over the Internet. The construct is designed to measure the degree to which the Internet is deemed secure for exchanging data and performing online activities with both suppliers and customers (Zhu et al., 2006b).

The measurement scale of this construct is originally assessed using two survey items designed by Zhu et al. (2006b). This measurement scale was tested in a cross-country study for assessing security concerns that an organisation perceived in relation to e-commerce transaction and confidential data, and was reported as a valid and reliable scale, with a Cronbach alpha of 0.75 and AVE of 0.61 (Zhu et al., 2006b). One item assesses the extent to which the firm is concerned about the security of data and transactions over the Internet, and the other item assesses a firm's assessment of customer concerns about the security of data and transactions over the Internet. An additional item was added by the researcher to assess an emerging issue, the hacking concern over the Internet, which was found to be a major concern in the exploratory study. The security items are evaluated on the same 5-point Likert scale.

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- SC1 Our firm has complete confidence in the ability to prevent hacking risks over the Internet
 - SC2 Our firm has complete confidence in the ability to maintain security of data and transactions over the Internet
 - SC3 Our customers have confidence in the security of data and privacy over the Internet.
-

5.3.2.4 Perceived Costs (PC)

Perceived costs can be conceptualised to reflect the availability of financial resources to acquire the technology. In particular, this construct is designed in the current thesis to cover the costs of adopting e-commerce as well as the costs associated with its operation, implementation and needed support (Al-Qirim, 2005).

The measurement scale of perceived costs, which is adopted from Al-Qirim (2005), was tested in a study for assessing perceived costs that an organisation had in relation to e-commerce adoption and utilisation, and was reported as a valid and reliable scale, with a

Cronbach alpha equal to 0.83 (Al-Qirim, 2005; Al-Qirim, 2007). This scale is measured by three survey items related to the costs of e-commerce adoption and post-adoption. The first item assesses the cost of initial adoption. The second item assesses the amount of time and money required for training, while the last item assesses the cost of maintenance and support related to e-commerce technologies. Items were designed in a 5-point Likert-scale, ranging from 1 = strongly disagree to 5 = strongly agree.

PC1	The cost of adopting e-commerce technologies is very high for our business.
PC2	The amount of money and time invested in training employees to use e-commerce technologies are very high.
PC3	By adopting e-commerce technologies, the cost of maintenance and support of these technologies is very high for our business.

5.3.3 Organisational Factors

5.3.3.1 Technology Resources (TR)

In the current study, the technology resources construct is conceptualised to reflect available technological resources. The construct is designed to cover both the available hardware and software resources within an organisation that are important and relevant to e-commerce initiation and utilisation (Molla and Licker, 2005a).

The measurement scale for this construct is assessed using five survey items that were designed to assess technology resources that are available in place for an organisation (Iacovou et al., 1995; Molla and Licker, 2005a). Most measurement items were tested in relation to e-commerce adoption and utilisation, and were reported as valid and reliable, with a Cronbach alpha equalling 0.82–0.85 (Molla and Licker, 2005a; Tan et al., 2007). The first item assesses the connection to the Internet. The second and fourth items assess the extent of computerised systems and their integration, whereas the third item, which is designed by the researcher, assesses the use of Web-based and multi-tier applications. The last item assesses the use of LAN and WAN connectivity amongst the organisation's departments and branches. To be consistent with other items in the questionnaire, items of this construct were re-worded to be in the same 5-point agreement format.

TR1	Our firm has a very high speed connection to the Internet.
TR2	Our business processes are well managed or supported by computerised systems.
TR3	Our systems have been developed using web-based or multi-tier applications.
TR4	Our computerised systems and web applications are integrated.
TR5	Our firm is well computerised with LAN and WAN connectivity among our departments and branches.

5.3.3.2 Human Resources (HR)

Human resources is conceptualised in this research to reflect the availability of staff with IT skills that an organisation has in place. In particular, the construct is designed to cover the availability of staff with adequate experience with ICT and other related skills needed for e-commerce initiatives and implementation (Molla and Licker, 2005a).

Although several measurement scales are available for assessing IT human resources, the majority focuses on computer access and literacy (e.g. Molla and Licker, 2005a), which are believed to be inadequate for complex technologies, e.g. e-commerce. Therefore, scale items are adopted from Iacovou et al. (1995) to assess various aspects of the IT human resources, although no reliability or validity was reported for it. The first item assesses the availability of necessary expertise and know-how to acquire the technology, whereas the second item assesses employees' knowledge through the training they get. The third survey item assesses the availability of external consultants to assist with the development of e-commerce and IT systems. The fourth item assesses the qualification of management to manage an e-commerce environment. To be consistent with other items in the survey, survey items of this construct were re-worded to be in a 5-point Likert-scale.

HR1	Our firm has the necessary IT expertise and know-how to acquire the technology.
HR2	Employees at our firm get IT training when needed.
HR3	Our firm hires outside consultants to assist with IT systems development.
HR4	There is an adequate and qualified management and staff in our firm who have the knowledge and expertise to manage e-commerce environment.

5.3.3.3 Commitment (CM)

Commitment can be conceptualised in the current thesis to cover several aspects related to e-commerce vision, strategies, initiatives and their champions. In particular, the construct is conceptualised to reflect the level of support for e-commerce, especially in terms of having a clear-cut e-commerce vision and strategy championed by top management as well as organisation-wide support for e-commerce initiatives (Molla and Licker, 2005a).

The measurement scale for the commitment construct is designed by Molla and Licker (2005a), for assessing support for e-commerce from all corners of an organisation and especially from top management, and was reported as a valid and reliable scale, with a Cronbach alpha of 0.88–0.91 (Molla and Licker, 2005a; Tan et al., 2007). Commitment is measured by the assessment of five items related to e-commerce strategy, initiatives and

implementation. The first and the last items reflect clarity of e-commerce vision and its wide communication and understanding throughout the organisation. The second item assesses whether e-commerce implementation are strategy-led, while the third and fourth items assess whether e-commerce initiatives and implementations have been championed, especially by senior managers. Items are evaluated on a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

CM1	Our business has a clear vision on e-commerce.
CM2	Our e-commerce implementations are strategy-led.
CM3	All our e-commerce initiatives have champions.
CM4	Senior management champions our e-commerce initiatives and implementations.
CM5	Our vision of e-commerce activities is widely communicated and understood throughout the company.

5.3.3.4 Process Readiness (PR)

As an emerging issue from the exploratory study, process readiness refers not only to the handling of internal processes, but also external processes related to the interaction with external parties. Process readiness in this research assesses the readiness of e-business processes that determine operational excellence and channel management effectiveness, which include not only customer and supplier related processes, but also internal processes that are necessary for any further progress in e-commerce beyond the entry level (Barua et al., 2001; Aldwsry and Mayhew, 2011).

In this thesis, the measurement scale of process readiness is made up of ten items designed to measure e-business process readiness. As an emerging factor from the exploratory investigation that lack literature support in the adoption domain, most of the measurement scales for this construct are designed by the researcher to measure several aspects related to internal process readiness. Items related to external process readiness are adopted from Barua et al. (2001), with no reliability or validity was reported for them. The first two items reflect the availability of e-business processes and their working instructions. The third and fourth items related to Service Level Agreement (SLA) processes and their executions. The fifth item is to assess project management process practices. The sixth, seventh and eighth items are to assess product and customer related processes, including ordering scenarios, product catalogue and customer support, whereas the last two items assess supplier related processes, including product demand forecasting and procurement scenarios. The survey items are evaluated on the same 5-point agreement format.

PR1	e-Business processes are clearly defined and followed in our organisation
PR2	For each e-business process, we have a detailed working instruction
PR3	We define internal/external Service Level Agreement (SLA) for every e-business process
PR4	In our firm, penalty is executed for every unsuccessful SLA.
PR5	e-Commerce initiatives and implementation in our company are managed by a defined project management process
PR6	There is a business process to control our online product catalogue
PR7	There is a well defined business process to support/manage our online customers
PR8	Our firm has standard operating procedures that cover all online ordering scenarios
PR9	Our firm has standard operating procedures that cover all online procurement scenarios.
PR10	Our firm has a well-defined process of sharing product roadmap and/or demand forecast with our online suppliers.

5.3.3.5 Governance (GV)

Governance can be conceptualised in the current thesis to reflect strategic, tactical and operational model available for an organisation in order to govern e-commerce initiatives and e-business activities (Molla and Licker, 2005a). The construct is designed to cover several aspects related to how well an organisation manages e-commerce transition, e-commerce integration to business and any further progress in e-commerce beyond the entry level adoption (Molla and Licker, 2005b).

Originally, the measurement scale for the current construct is made up of eight items designed by Molla and Licker (2005a) for assessing the strategic, tactical and operational model put in place to govern business activities and e-commerce initiatives, and was reported as a valid and reliable scale, with a Cronbach alpha equal to 0.91–0.92 (Molla and Licker, 2005a; Tan et al., 2007). In this study, one item “*e-Commerce accountability is extracted via on-going responsibility*” was dropped from the scale during the piloting phase, as it has not been understood by participants. While the first item examines roles, responsibilities and accountability related to e-commerce initiatives, the second item assesses the assignment of decision-making authority for e-commerce initiatives. The third and fourth items deal with analysing and managing change issues related to e-commerce implementation. The fifth item deals with business cases associated with e-commerce utilisation, whereas the sixth item is related to the metrics used for assessing e-commerce impact. The last item assesses support given to e-commerce initiative by the company's employees. This construct items are assessed by a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

GV1	Roles, responsibilities and accountability are clearly defined within each e-commerce initiative.
GV2	Decision-making authority has been clearly assigned for all e-commerce initiatives.
GV3	We thoroughly analyse the possible changes to be caused in our organisation, suppliers, partners, and customers as a result of each e-commerce implementation.
GV4	We follow a systematic process for managing change issues as a result of e-commerce implementation.
GV5	We define a business case for each e-commerce implementation or initiative.
GV6	We have clearly defined metrics for assessing the impact of our e-commerce initiatives.
GV7	Our employees at all levels support our e-commerce initiatives.

5.3.3.6 Demographic Variables and Organisational Characteristics

In the present research, several organisational characteristics are assessed, including firm size, business sector, firm scope, head-quarter's location and years in business. Additional respondent-related demographic variables are assessed to measure variables that might have an effect on the research results, namely, respondent position, age and experience.

Amongst these characteristics, two organisational attributes (i.e., firm size and business sector) are included in the research framework to control their effects (Hong and Zhu, 2006). Using standard classifications, business sector is measured using a dummy variable that refers to the industry sector of an organisation, whereas firm size is assessed using a dummy variable that refers to the size of an organisation in term of number of employees (Hong and Zhu, 2006).

5.3.4 Environmental Factors

5.3.4.1 Mimetic Pressure (MP)

Mimetic pressure can be conceptualised to reflect the competitive environment. The construct is designed in the current thesis to cover two aspects related to competitors, namely, e-commerce adoption by competitors as well as their success (Teo et al., 2003).

The original measurement scale for this construct is made up of four items designed by Teo et al. (2003) for assessing e-commerce competitive environment. The first item is measured by the extent of e-commerce adoption by competitors, whereas the remaining survey items assess whether or not the main competitors that have adopted e-commerce: have benefitted greatly; are perceived favourably by others in the same industry; and are perceived favourably by suppliers and/or customers, and was reported as a valid and reliable scale, with a Cronbach alpha of 0.94 and AVE of 0.82 (Teo et al., 2003). Due to their similarity from participants' points of views in the piloting phase, the last two items

were combined into a single item. Originally, the items are evaluated on 7-point Likert scales. The first item is re-worded to be assessed using the 5-point agreement scale instead of using a scale rating from '1- None has been adopted' to '7-All have been adopted'. To be consistency with other items, the 5-point scale is used in all items of the construct.

-
- MP1 The percentage of e-commerce adoption by our firm's competitors is high.
 MP2 Our main adopter competitors have not benefited greatly from e-commerce.
 MP3 Our main adopter competitors are perceived favourably by others (e.g., suppliers or customers).
-

5.3.4.2 Normative Pressure (NP)

Normative pressure can be conceptualised to reflect aspects related to market forces e-readiness and critical mass of e-commerce amongst them. This construct is designed to cover two aspects, namely, the adoption of an organisation's business partners, and the participation with organisational bodies to promote and disseminate information on e-commerce adoption (Teo et al., 2003).

The measurement scale for this construct is made up of three items designed by Teo et al. (2003) for assessing the influence of adopter partners and critical mass on e-commerce. The first two items measure the extent of e-commerce adoption by the firm's current customers and suppliers, whereas the third survey item measures the degree to which the company has participated with other parties for e-commerce promotion and information. Teo et al. (2003) treated this construct as formative; hence no validity or reliability was reported for it. Instead of using a scale rating from '1-None has adopted' to '7-All have adopted', the first and second items in this construct is re-worded to be assessed using the 5-point agreement scale. Instead of the Yes/No scale, the third item was also re-worded to be consistency with other items using the same 5-point Likert-scale.

-
- NP1 The percentage of e-commerce adoption by our firm's customers is high.
 NP2 The percentage of e-commerce adoption by our firm's suppliers is high.
 NP3 Our firm participates extensively with other parties in e-commerce promotion and information.
-

5.3.4.3 Coercive Pressure (CP)

Coercive pressure can be conceptualised to reflect aspects related to perceived dominance of and conformity with market forces (Teo et al., 2003). In particular, it is designed in this research to focus on coercive pressures from influencing parties, as the exploratory study revealed that most firms in Saudi Arabia did not perceive pressure from market forces.

The original survey items of this construct are designed by Teo et al. (2003) to assess coercive pressures, and was reported as a valid and reliable scale, with a Cronbach alpha equalling 0.80–0.93 and AVE equalling 0.69–0.75 (Teo et al., 2003). Due to the lack of such pressure in the country, this study focuses on assessing coercive pressures that an organisation received from its influencing parties using four survey items. The first two items assess the degree to which dominant customers and suppliers pressure the company to deal with them electronically. The Third item, which is an emerging issue from the exploratory study, assesses the degree to which the government pressure the company to conduct business online, given that governments in developing countries are likely to force firms to respond to their e-government projects. The fourth survey item measures the degree to which the parent corporation or other dominant corporation influences the firm to adopt e-commerce, given that firms are likely to face greater conformity pressures from their parent or large dominant corporate. The last survey item was modified to include the pressure of large corporations in addition to parent companies since most Saudi firms do not have parent companies. To be consistency with other items, the last item is measured using a 5-point Likert-scale, instead of the original Yes/No scale.

CP1 Our firm is pressured by its dominant suppliers to deal with them electronically.

CP2 Our firm is pressured by its dominant customers to deal with them electronically.

CP3 Our firm is required to deal with the government electronically.

CP4 Our firm is required to adopt e-commerce by the parent company or other dominant corporations.

5.3.4.4 Institutional Trust (TT)

The current construct is related to trust in dealing with business partners electronically. Institutional trust can be conceptualised to reflect the ability to fully monitor business partners by assessing if they will perform e-commerce activities according to the firm's expectations (Salleh et al., 2006).

The measurement scale for this construct is made up of six items designed by Salleh et al. (2006). It is operationalised to assess whether an organisation has the confidence with their business partners in several trust issues, and was reported as a valid and reliable scale, with a Cronbach alpha equal to 0.80 (Salleh et al., 2006). The first two items assess confidence in partners' technological knowledge, skills and competency to perform e-commerce correctly and completely. The third and fourth items assess the reliability and reputation of partners to appropriately undertake e-commerce activities. The fifth item

assesses the security of payments when undertaking e-commerce activities. The last item deals with partners' attitudes of partiality in managing e-commerce activities. The last item was modified to be more understandable and focus on its measurement issue as suggested by a survey expert. These items are evaluated on a 5-point agreement Likert scale.

TT1	Our firm has complete confidence in the technological skills and e-commerce knowledge of our trading partners.
TT2	Our firm has complete confidence in the competency of our trading partners to appropriately undertake e-commerce.
TT3	Our firm has complete confidence in the reliability of our trading partners to appropriately undertake e-commerce.
TT4	Our firm has complete confidence in the reputation of our trading partners to appropriately undertake e-commerce.
TT5	Our firm has complete confidence in the security of payments from our trading partners when undertaking e-commerce activities.
TT6	We have complete confidence that our partners don't have an attitude of partiality in e-commerce activities.

5.3.4.5 Government Readiness (GR)

Government readiness is conceptualised to reflect the organisation's assessment of government preparation to facilitate and support the e-commerce environment and its various requirements (Molla and Licker, 2005a). The government readiness construct is designed to cover several aspects related to current laws and support given to e-commerce by the government in Saudi Arabia.

This measurement scale is designed for assessing government preparation to promote, support, facilitate and regulate e-commerce and its requirements, and was reported as a valid and reliable scale, with a Cronbach alpha of 0.77–0.78 (Molla and Licker, 2005a; Tan et al., 2007). Originally, Molla and Licker (2005a) measure government readiness using four items. To cover other issues that emerged from the exploratory study, the researcher introduces an additional three items; thus it is assessed using seven items. The first item assesses whether the legal environment is conducive to conducting business on the Internet, whereas the last item assesses whether the government demonstrates strong commitment to promote e-commerce. The next three items reflect the perceptions of effective laws with regard to consumer privacy and cyber crime, in addition to dispute resolution, which was not covered by Molla and Licker's (2005a) measure, but rather was found as a major concern that emerged from the exploratory study. Two additional items (fifth and sixth items) were added to cover other emerging issues from the exploratory study that appears to have an impact on e-commerce adoption and utilisation in Saudi

Arabia. The fifth item is related to the negative effect of government requirements, while the sixth item assesses the efficiency and affordability of e-government services as an incentive to e-commerce adoption and use. The construct items are evaluated by a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

GR1	In Saudi Arabia, the legal environment is conducive to conduct business on the Internet.
GR2	There are effective laws to combat cyber crime in Saudi Arabia.
GR3	There are effective laws to resolve e-commerce disputes in Saudi Arabia.
GR4	There are effective laws to protect consumer privacy in Saudi Arabia.
GR5	There are government requirements that would discourage the adoption and use of the Internet for business.
GR6	There are efficient and affordable e-government services that can motivate the use of the Internet for business.
GR7	The Saudi government demonstrates strong commitment to promote e-commerce.

5.3.4.6 Supporting Industry Readiness (SR)

Supporting industry readiness can be conceptualised to reflect the organisation's assessment of the availability, affordability and/or reliability of support-giving industries whose activities may influence e-commerce initiatives in developing nations (Molla and Licker, 2005a). The construct is designed to cover three main industries that have been suggested to be important components for e-commerce adoption and diffusion, namely, financial institutions, IT industry and postal and delivery services.

The measurement scale of supporting industry readiness is designed to assess supporting industry readiness. The measurement items are adopted mainly from Molla and Licker (2005a) to assess supporting industry readiness, and was reported as a valid and reliable scale, with a Cronbach alpha equalling 0.75–0.83 (Molla and Licker, 2005a; Tan et al., 2007). To cover other emerging issues from the exploratory study, an additional items have been adopted from other sources: Shannak and Al-Debei (2005) and the researcher; thus supporting industry readiness is measured in this research by seven survey items. The first two items assess financial institution infrastructure and support given by local banks. The third and fourth items assess the availability, efficiency and affordability of support from the local IT industry and IT vendors to provide needed technologies. The fifth item assesses the availability of IT training centres to help in knowledge dissemination to run e-commerce business, whereas the sixth and seventh items examine the affordability and efficiency of support from postal mail and delivery companies to enable the movement to the Internet. Items are evaluated on the same 5-point Likert scale.

SR1	In Saudi Arabia, the technology infrastructure of commercial and financial institutions is capable for supporting e-commerce transactions.
SR2	Local banks and financial institutions can help us in our e-commerce (e.g., e-payment).
SR3	There is an adequate number of IT vendors that can provide us with needed hardware and software.
SR4	There is an efficient and affordable support from the local IT industry to support our move on the Internet.
SR5	There is an adequate number of IT training centres in Saudi Arabia that can help us knowing how to run our e-commerce business.
SR6	There is an efficient Saudi postal and addressing system to support our move on the Internet.
SR7	In Saudi Arabia, there is an adequate number of delivery companies that can provide affordable solutions to e-commerce business.

5.3.4.7 ICT Infrastructure Readiness (TC)

In this research, ICT infrastructure readiness is conceptualised to reflect the organisation's assessment of the local ICT infrastructure. In particular, the construct is designed to cover the availability, affordability and reliability of ICT infrastructure in Saudi Arabia.

The measurement scale for this construct consists of six items mainly designed by Molla and Licker (2005a) and Shannak and Al-Debei (2005) for assessing local ICT and telecom infrastructure. The survey items from Molla and Licker (2005a) are part of the supporting industry construct and were reported as being a valid and reliable scale, with a Cronbach alpha of 0.75–0.83 (Molla and Licker, 2005a; Tan et al., 2007). The survey items cover several ICT aspects, namely, the efficiency and affordability of telecom infrastructure to support e-commerce, the extent of Internet connection failures, the extent of website inaccessibility, the availability of secure services over the Internet, the availability and affordability of trust enabler environment, and finally the support from the CITC (i.e., Communication and Information Technology Commission) to help with offering website registrations locally. Items are evaluated on the same 5-point Likert scale.

TC1	There is an efficient and affordable telecom infrastructure to support e-commerce locally.
TC2	The number of Internet connection failures is small when using services offered by telecom companies.
TC3	The possibility of not being able to access the firm's web site in Saudi Arabia is high and has a negative effect on the use of the Internet for business.
TC4	Secure e-transaction and/or secure e-commerce environment services are easily available and affordable.
TC5	Local telecom companies and Internet service providers trying to offer secured services over the internet.
TC6	Saudi CITC offers local websites registration and hosting with low costs to support our move on the Internet.

5.3.4.8 Consumer Readiness (CR)

Consumer readiness can be conceptualised in this thesis to reflect the organisation's assessment of consumer awareness and culture towards e-commerce activities. The construct is designed to cover several aspects related to consumer readiness to conduct business over the Internet (Zhu et al., 2003; Shannak and Al-Debei, 2005).

Using five survey items adopted from Zhu et al. (2003) and Shannak and Al-Debei (2005), the measurement scale for this construct is designed to assess several aspects related to consumer readiness and willingness to conduct online activities. The survey items from Zhu et al. (2003) were reported as being a valid and reliable scale, with a Cronbach alpha equal to 0.92 (Zhu et al., 2003). The first item assesses the availability of technologies required to conduct e-commerce activities, whereas the second item assesses consumer knowledge and awareness needed to start online shopping. The third item assesses the acceptance and use of online banking amongst consumers in Saudi Arabia. The fourth item assesses the perceptions of credit card penetration and attitudes toward them amongst the Saudi community. The last item deals with the acceptance of online payments amongst the Saudi consumers. These items were re-designed to capture different aspects of consumer readiness from the original items. For consistency reasons, these items were re-worded and the rating scales were changed to be in the same 5-point Likert scale.

-
- | | |
|-----|--|
| CR1 | Saudi consumers have technologies needed to start using online activities. |
| CR2 | Saudi consumers are aware enough and have the knowledge to start online shopping. |
| CR3 | Saudi consumers accept online banking and use it in their daily lives. |
| CR4 | Saudi consumers use credit cards in their daily lives and have positive attitudes toward them. |
| CR5 | Saudi consumers are willing to use e-payment for online activities. |
-

5.3.5 Summary of Research Constructs

The researcher followed scholarly suggestions and employed, to the greatest possible extent, items that have been drawn from the literature that shares a similar context, in which they were reported to be reliable and valid measures. In this study, no modification has been made to construct items, except those introduced as a result of emerging issues in the exploratory study or in the piloting phase. All measurement items were designed to investigate how innovation attributes, organisational factors and environmental factors influence e-commerce adoption and post-adoption, which should increase the validity of construct items. A summary of the research constructs as well as their interpretations and measurement items are illustrated in Appendix B.

5.4 Study Methodology

In the current explanatory phase, the problem has been formulated in terms of testable hypotheses, aiming to evaluate relationships between research constructs and outcomes. The quantitative approach is adopted using the survey strategy to examine the research propositions. Since the current research is to examine e-commerce adoption and post-adoption amongst Saudi firms, the best source of primary data is management staff of Saudi private enterprises, as discussed in section 3.6.3 of Chapter 3. Respondents were asked to participate by filling out a questionnaire survey. The sample process involves selecting Saudi firms that vary in terms of sizes, the maturity of e-commerce utilisation and business sectors located in Saudi major cities (i.e. Riyadh, Makkah, Maddinah, Jeddah, Dammam, Khobar and Joubil), as these cities represent 90 percent of the study universe (CITC, 2008). As discussed earlier in Chapter 3 (section 3.7.5.2), this research adopted personal distribution of questionnaires using purposive (judgement) sampling in association with response-driven sampling via social network.

5.4.1 Survey Design

The survey has been adopted as a research strategy at this explanatory phase, in which a close-ended questionnaire survey is designed as a data collection technique. Most of the survey items are rating questions with a few closed questions for demographics and organisational characteristics. As discussed previously in section 5.2, the survey items were adopted (where available) from reliable literature to ensure reliability and validity following prior innovation adoption research. The questionnaire consists of two parts. The demographic part is designed to collect the characteristics of participating organisations as well as respondents as follows: three items that collect data about the respondent's current position, age and experience. There are also five items that assess the company's sector, years in business, number of employees, head-quarters' location and geographical scope.

In addition to e-commerce adoption and use indicators, the main part of the survey is designed to gather data of the adoption factors at different levels (as in Appendix B). At the innovation level, fourteen items are used to collect data about the strategic benefits, compatibility, perceived costs and security concerns. At the organisational level, nine items are used to assess technology and human resources, in addition to ten items that assess process readiness, five items that assess commitment and seven items that assess governance. At the environmental level, ten items are used to assess mimetic, normative and coercive pressures along with six items for assessing the trust construct. Twenty five

items are used to assess national readiness, including government readiness, supporting industries readiness, ICT infrastructure readiness and consumer readiness.

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 to the local language, i.e. Arabic. In such a case, it has been emphasised that “*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*” (Herk et al., 2005; p.353). ‘Direct translation’ is a common translation method in which a research questionnaire is professionally translated from the source language to the target language of the respondents (Malhotra and Birks, 2000). Prior to distribution, the questionnaire of this research was translated from English to Arabic, as it is the first language in the region. The translation process took place in Saudi Arabia during August 2010 and took several rounds. To enhance readability, the Arabic version was assessed and enhanced by an academic expert specialised in Arabic language and then back-translated. The two versions of the questionnaire were assessed by two industry experts to ensure accuracy. Copies of the survey in English and Arabic are illustrated in Appendix C (I) and C (II), respectively.

As discussed previously in section 5.3, the questionnaire was extensively pre-tested and the content (face) validity of the questionnaire was evaluated through academic and practical experts to whom copies of the questionnaire were sent for judgement. As discussed in the next section (section 5.6), the questionnaire 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 survey items.

5.4.2 Survey Piloting

Prior to the final large distribution for any well-constructed surveys, it is important that the questionnaire is pre-tested on a small population (Wiersma, 2000). Luck and Rubin (1987) stress the importance of the piloting phase with a sample between ten and thirty in order to estimate the required time, investigate any potential problems and evaluate the reliability of survey items. In particular, a pilot study warns initially about areas where instruments are not appropriate or where the explanatory study could fail to yield results (Teijlingen and Hudley, 2001). To preliminarily ensure the consistency of the measurement items, the reliability can be calculated (Hair et al., 2010).

After a thorough review and judgement procedure of the questionnaire by professionals and academics, a piloting phase was conducted to highlight difficulties that participants may encounter with the questionnaire setting or in understanding the survey items. The survey was piloted with a small sample of participants that were not considered in the final stage. The questionnaire was piloted during September 2010 in the capital city (Riyadh) and personally distributed using the response-driven sampling technique through social networks. The questionnaire was directed to management staff of Saudi companies in their preferable form and language, i.e. paper or online based; Arabic or English language. Forty questionnaires were distributed during August and September of 2010 through networking in two forms: paper and online versions via personal visits and e-mail.

Questionnaires were sent to participants with a covering letter that explains the research purpose. Participants in the piloting phase were asked to fill out the questionnaire and to provide their feedback on the questionnaire items and the survey setting. Within 30 days, a total of 13 enterprises (10 paper and 3 online) responded and completed the questionnaire with some comments, which was deemed adequate for the purpose of the pilot study (Wand and Tang, 2001). To ensure the reliability of the research constructs prior to conducting the explanatory phase, Cronbach alpha was assessed for each construct. The values of Cronbach 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 accepted (Hair et al., 2010; Nunnally, 1978; Van de Ven and Ferry, 1980; Chin, 1998; Keil et al, 2000). As presented in Table 5.1, the Cronbach alpha ranges from 0.68 to 0.97. The research constructs can be classified as reliable, as the minimum coefficient (TR = 0.68) is close to the threshold (0.70).

Table 5.1: Constructs reliability for the pilot study

	Research construct	Mean	Cronbach alpha
PR	Process Readiness	2.889	0.936
GV	Governance	2.600	0.977
CM	Commitment	2.750	0.911
TR	Technology Resources	3.646	0.679
HR	Human Resources	3.673	0.885
PC	Perceived Costs	3.154	0.956
PB	Perceived Benefits	3.500	0.903
CT	Compatibility	3.063	0.702
SC	Security Concerns	3.694	0.952
NP	Normative Pressure	3.111	0.764
MP	Mimetic Pressure	3.167	0.838
CP	Coercive Pressure	2.933	0.971
GR	Government Readiness	2.505	0.682
SR	Supporting Industry Readiness	2.923	0.837
TC	ICT Readiness	3.000	0.741
CR	Consumer Readiness	3.062	0.887
TT	Institutional Trust	3.139	0.692

Such results were considered acceptable for these existing constructs in the piloting stage due to the small sample size as well as the few modifications made on the original items. The measurement items have passed through a translation process, suggesting that the established reliability of the previous instruments is not necessarily identical in this study. Once more, the small sample size at this stage is not appropriate for further purification through exploratory factor analysis (EFA), as suggested by Churchill (1991). Follow up discussions were made with respondents to clarify comments, which helped the researcher to incorporate appropriate alterations in the survey questions.

One item was dropped from the governance construct (*e-commerce accountability is extracted via on-going responsibility*), because it was not likely to be understood by some participants. Some participants complained about the consistency of the questionnaire format and layout. Luck and Rubin (1987) stress the importance of the appearance of the survey questionnaire and its physical characteristics to motivate respondents to complete it and to increase the chances of gaining quality answers. Accordingly, some adjustments were made to the survey's layout and items were designed in a tabular format by grouping related items in borders to enhance its readability. There were also comments about the wording of some items. These items were re-worded with the support of the experts who had already participated in the translation process.

5.4.3 Survey Administration

As discussed earlier in the methodology chapter (section 3.5), a quantitative, cross-sectional survey was adopted to collect data in this explanatory phase. The questionnaire was designed based on a comprehensive literature review and a qualitative exploratory study that involved interviews with business managers. It has also been discussed (section 3.5.4) that the postal mail is not a suitable channel in Saudi Arabia, as it is weak and unreliable (Al-Otaibi and Al-Zahrani, 2003; Aldwsry and Mayhew, 2011). Difficulties associated with mail distribution suggest the use of alternative options, such as personal distribution and online survey.

The piloting phase, however, revealed that the online-based survey can be used as an alternative option to facilitate the data gathering process, but not as a standalone data collection technique due to its low response rate and its inherited exclusion of part of the population (non-adopter firms). This supports the use of online survey as an option only for those who prefer it. As suggested by prior studies in the country, Saudi organisations

tend to refuse to participate in survey studies as a matter of policy (Al-Maliki, 2005), and that personal distribution is more likely to overcome such a difficulty (Al-Sudairy, 2000). During the exploratory phase, the use of sampling through social networks helped in finding participating organisations for the exploratory investigation.

Since there is no physical postal addressing for residents or businesses in Saudi Arabia that can easily be reached (Aldwsry and Mayhew, 2011), it was decided not to depend on postal addressing to collect data, which presents a challenge to locating enterprises when randomly selected. To facilitate the sampling process, the population was divided into three major administrative regions, i.e. eastern region, western region and the capital city region, which are the most developed areas in the country within which the majority of companies are located. In particular, seven cities have been identified from these regions, as they represent 90% of the population (CITC, 2008). In addition to the capital city (Riyadh), Makkah, Jeddah and Maddinah are from the western region, and Damman, Khobar and Joubil are from the eastern region. To the great of possible extent, different locations, in which firms can be found, were identified to facilitate the data collection process. Related exhibitions and forums held during the data collection were also targeted.

The main data collection process commenced on October 2010, where questionnaires were mainly distributed personally to firms in the predefined locations and picked up later to ensure that they reached intended respondents (Tuncalp, 1988). The process of the data collection continued for around three months. Due to financial and time constraints, the researcher sought support from other friends and colleagues, who participated in the data collection process through their social networks, which could help to include participants that are hard to reach (Johnston and Sabin, 2010). Questionnaires were distributed to Saudi firms that varied in sizes and sectors, regardless of their e-commerce status.

Questionnaires were distributed to firms in their preferred forms (paper vs. online) and languages (English vs. Arabic), with a covering letter that stated the research purpose and assures anonymity of the responses to encourage participation. In addition to direct visits to firms in their physical locations, questionnaires were electronically circulated through social networks so that the survey can reach both adopter and no-adopter organisations that were not limited to a specific industry or size. While online-based questionnaires were sent via e-mail and responses were submitted online, paper-based questionnaires were mainly personally distributed to firms in an A4 envelope. The majority of paper-based

responses were collected in person while a few were returned through e-mail or fax, as the postal mail is not a favourable medium in Saudi Arabia.

During the data collection, several difficulties were encountered. The use of personal distribution of the paper-based questionnaires and collection instead of the unreliable postal mail delivery mandates long distance trips to participating firms, which were hard to locate due to the lack of a reliable addressing system within the country. In some cases, several visits had to be made to distribute or collect questionnaires from those who had not completed the survey, or even disregarded it. Another challenge is the lack of trust in the benefits of research amongst managers of Saudi organisations and their low participation in education and research, although those participants, especially top managers, showed full support and enthusiasm for the researcher during the data collection process.

During the data collection process, around 400 questionnaires for each form (i.e., paper and online based) were distributed. After excluding invalid responses (e.g., mostly empty survey, mostly one number in the Likert scale), there were a total of 434 survey responses out of the distributed 800 questionnaires by the end of the pre-set deadline (December 31, 2010), including incomplete cases as illustrated in Figure 5.1.

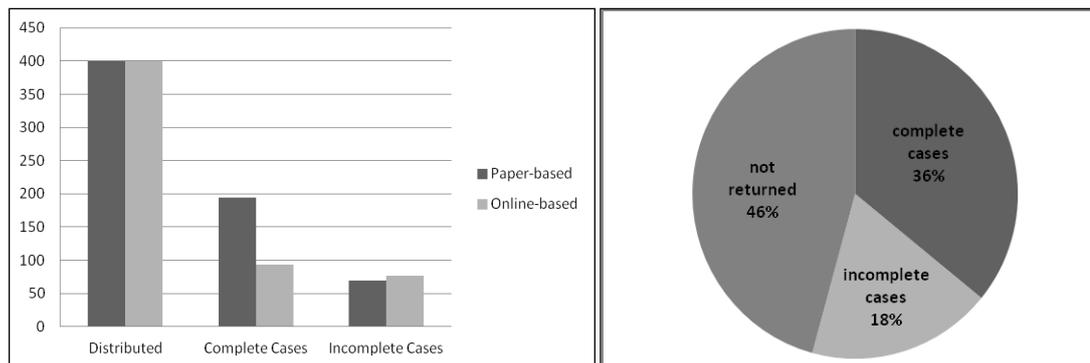


Figure 5.1: Summary of the distributed and returned questionnaires

At 54 percent (434 out of 800), the initial response rate for this study was found to be relatively high, which can be attributed to the personal delivery of the questionnaires and the peer pressure of social networks. Consistent with most survey studies, the response rate for the online-based survey was considerably lower than the paper-based survey (Nulty, 2008). This variation could be attributed to the higher social network pressure of personal distribution. It could also be partly attributed to the study sample that includes non-adopters who may have lacked Internet access at the time of the survey's distribution.

5.5 Data Validation

Although time-consuming, data screening is an essential prior to conducting any analysis. In this part, the impact of missing data is evaluated. Before data entry, the questionnaires were screened and each questionnaire item was coded, where each questionnaire was given a unique number along with the source of the questionnaire. Data were entered into the SPSS program (V. 18) for analysis. The researcher reviewed all the data in order to ensure that the entries are correct and no error exists. The ranges of each variable were assessed and mistakes were corrected by revisiting the corresponding questionnaire.

Cases were then exported to Excel 2007 format for further data screening, in which the percentage of missing values were calculated and evaluated for elimination. The choice of using Excel 2007 at this stage was made as it has some useful and unique features that help in identifying errors, such as conditional formatting. In total, the number of received questionnaires was 434 cases from both paper-based (60.8%) and online-based (39.2%). As illustrated in Table 5.2, 66.1% from the 434 cases were complete, while 33.9% had some non-ignorable missing values, which account for 8.4% of the whole dataset.

Table 5.2: Summary of distribution of 800 questionnaires and 434 responses

Sample Type	Questionnaire Distribution			Case Completeness	
	Distributed	Returned	Response Rate	Complete Cases	Incomplete Cases
Paper-based	400	264	66.0%	194 (73.5%)	70 (26.5%)
Online-based	400	170	42.5%	93 (54.7%)	77 (45.3%)
Full Sample	800	434	54.3%	287 (66.1%)	147 (33.9%)

Some types of missing data were expected, as in long questionnaires some participants may not complete the questionnaire or they may accidentally miss out some questions (Field, 2005). To deal with missing data, cases were classified into five groups based on the percentage of missing values using Excel 2007 software. The summary statistics, as illustrated in Table 5.3, show that more than 40% of these 147 cases had less than 10% of missing values, while around 26% had more than 50% of missing values.

Table 5.3: The number of cases with respect to their missing data percentages ($N = 147$)

	< 3%	3-10%	10-30%	30-50%	> 50%	Total
Paper-based	27 (38.5%)	12 (17.1%)	16 (22.9%)	6 (8.6%)	9 (12.9%)	70 (47.6%)
Online-based	12 (15.5%)	11 (14.3%)	19 (24.7%)	6 (7.8%)	29 (37.7%)	77 (52.4%)
Total	39 (26.5%)	23 (15.6%)	35 (23.8%)	12 (8.2%)	38 (25.9%)	147 (100%)

5.5.1 Missing Data Analysis

Newman (2009) suggests that missing data can be of three levels of non-response, although these levels can be nested: (1) item-level non-response (i.e. some items were left blank); (2) scale-level non-response (i.e. an entire construct was not answered); and (3) person or survey-level non-response (i.e. failure to return the entire questionnaire). In their discussion of cleaning and transforming data, Hair et al. (2010) stress that missing data is a fact that can rarely be avoided. They suggest a four-step process to deal with missing data: determining the types of missing data, determining the extent of missing data, diagnosing the randomness of missing data and applying remedies for the missing data.

Hair et al. (2010) suggest deleting offending cases with excessive levels of missing values in a dataset as a simple remedy to reduce the extent of the missing data. Therefore, the researcher considered excluding cases with more than 50 percent of missing values (38 cases) in order to reduce the overall of missing data. By deleting these offending 38 cases (less than 10% of the sample), the overall of missing data decreased markedly from 8.4% to 3.2% for the reduced sample (396 cases). The missing data analysis of the reduced sample (396 cases) revealed that only 12 cases (with 30% to 50% of missing data) accounted for around one-third of the overall missing values, making them possible candidates for deletion. In an attempt to reduce the overall of missing data, these 12 cases were omitted, reducing the sample to 384 usable questionnaires, at a response rate of 48.0% and with an overall of non-ignorable missing data of 2.2%, as shown in Figure 5.2.

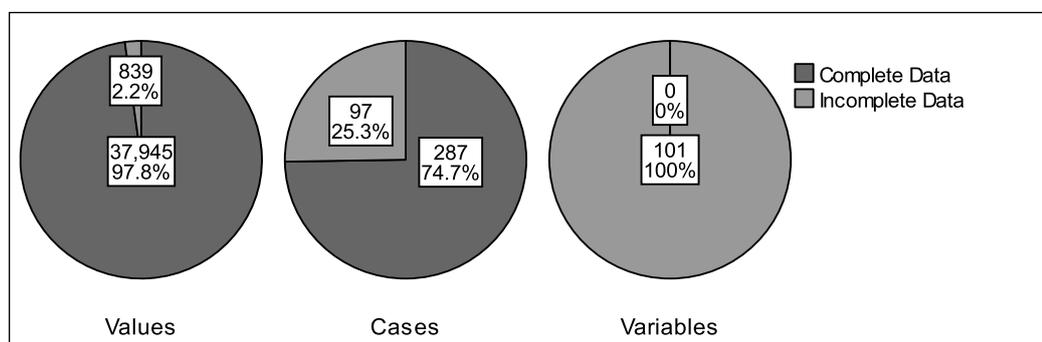


Figure 5.2: Overall summary of non-ignorable missing data ($N = 384$)

For further data screening, SPSS 18 was used to detect missing data amongst variables, as the number of missing data may vary extensively amongst cases and variables (Hair et al, 2010). The results of the reduced sample (384 cases) suggest that the missing values for the research's variables range from 0.5% to 6.9%, as illustrated in Table 5.4.

Table 5.4: Summary statistics of the extent of variables' missing data ($N = 384$)

	Case Statistics			Missing		Range		Normality Test			
	N	Mean	Std. dev.	Freq.	%	Low	High	Skewness	Std. Err.	Kurtosis	Std. Err.
EST e-Commerce Status	381	NA	NA	3	0.8	1	6	NA	NA	NA	NA
SCP Summated Scope	382	NA	NA	2	0.5	0	6	NA	NA	NA	NA
PR1 - defined e-processes	185	3.86	1.010	4	2.1	1	5	-0.942	0.179	0.596	0.355
PR2 - working instruction	185	3.50	1.119	4	2.1	1	5	-0.346	0.179	-0.760	0.355
PR3 - defined SLA	179	3.32	1.140	10	5.3	1	5	-0.341	0.182	-0.649	0.361
PR4 - SLA penalty	179	3.04	1.192	10	5.3	1	5	-0.056	0.182	-0.903	0.361
PR5 - project management	176	3.46	1.126	13	6.9	1	5	-0.520	0.183	-0.483	0.364
PR6 - online catalogue	183	3.97	0.931	6	3.2	1	5	-0.884	0.180	0.637	0.357
PR7 - online customers	184	3.80	1.053	5	2.6	1	5	-0.736	0.179	-0.215	0.356
PR8 - e-ordering scenarios	182	3.51	1.169	7	3.7	1	5	-0.401	0.180	-0.806	0.358
PR9 - e-procurement scenarios	180	3.32	1.204	9	4.8	1	5	-0.372	0.181	-0.809	0.360
PR10 - online suppliers	180	3.22	1.184	9	4.8	1	5	-0.154	0.181	-0.910	0.360
GV1 - roles, respon. & account	180	3.53	1.095	9	4.8	1	5	-0.382	0.181	-0.585	0.360
GV2 - decision-making authority	180	3.42	1.133	9	4.8	1	5	-0.492	0.181	-0.542	0.360
GV3 - analyse changes	179	3.49	1.119	10	5.3	1	5	-0.342	0.182	-0.664	0.361
GV4 - systematic change	178	3.56	1.099	11	5.8	1	5	-0.493	0.182	-0.452	0.362
GV5 - business case	177	3.49	1.045	12	6.3	1	5	-0.430	0.183	-0.361	0.363
GV6 - defined metrics	180	3.42	1.051	9	4.8	1	5	-0.302	0.181	-0.397	0.360
GV7 - all levels support	180	3.56	1.074	9	4.8	1	5	-0.296	0.181	-0.676	0.360
CM1 - business vision	376	3.53	1.129	8	2.1	1	5	-0.498	0.126	-0.612	0.251
CM2 - strategy-led	373	3.52	1.113	11	2.9	1	5	-0.479	0.126	-0.593	0.252
CM3 - champions	375	3.27	1.152	9	2.3	1	5	-0.278	0.126	-0.819	0.251
CM4 - senior management	373	3.47	1.167	11	2.9	1	5	-0.491	0.126	-0.676	0.252
CM5 - widely communicated	373	3.26	1.167	11	2.9	1	5	-0.197	0.126	-0.814	0.252
HR1 - IT expertise	379	3.89	1.024	5	1.3	1	5	-0.842	0.125	0.149	0.250
HR2 - IT training	380	3.69	1.003	4	1.0	1	5	-0.624	0.125	-0.209	0.250
HR3 - outside consultants	375	3.43	1.135	9	2.3	1	5	-0.308	0.126	-0.827	0.251
HR4 - qualified staff	375	3.41	1.108	9	2.3	1	5	-0.397	0.126	-0.662	0.251
TR1 - Internet connection	380	3.94	0.989	4	1.0	1	5	-0.960	0.125	0.642	0.250
TR2 - computerised systems	377	3.93	0.936	7	1.8	1	5	-0.709	0.126	-0.021	0.251
TR3 - web-based applications	378	3.57	1.061	6	1.6	1	5	-0.409	0.125	-0.620	0.250
TR4 - systems integration	378	3.51	1.108	6	1.6	1	5	-0.451	0.125	-0.586	0.250
TR5 - LAN & WAN	378	3.70	1.104	6	1.6	1	5	-0.546	0.125	-0.537	0.250
PC1 - adoption cost	374	3.29	1.135	10	2.6	1	5	-0.225	0.126	-0.691	0.252
PC2 - training cost	370	3.26	1.067	14	3.6	1	5	-0.127	0.127	-0.773	0.253
PC3 - maintenance cost	373	3.24	1.050	11	2.9	1	5	-0.139	0.126	-0.650	0.252
PB1 - reduce costs	380	3.98	1.046	4	1.0	1	5	-1.078	0.125	0.677	0.250
PB2 - expand market	379	4.16	0.889	5	1.3	1	5	-1.134	0.125	1.305	0.250
PB3 - new businesses	379	4.07	1.003	5	1.3	1	5	-0.961	0.125	0.204	0.250
PB4 - improve coordination	379	4.30	0.831	5	1.3	1	5	-1.244	0.125	1.595	0.250
CT1 - culture & value	376	3.94	0.956	8	2.1	1	5	-0.785	0.126	0.328	0.251
CT2 - distribution channels	369	3.71	0.997	15	3.9	1	5	-0.724	0.127	0.220	0.253
CT3 - selling process	372	3.64	1.068	12	3.1	1	5	-0.609	0.126	-0.273	0.252
CT4 - procurement process	372	3.60	1.068	12	3.1	1	5	-0.523	0.126	-0.358	0.252
SC1 - hacking risks	367	3.11	0.996	17	4.4	1	5	-0.098	0.127	-0.421	0.254
SC2 - data security	368	3.30	1.001	16	4.2	1	5	-0.338	0.127	-0.477	0.254
SC3 - customers trust	368	3.38	1.050	16	4.2	1	5	-0.292	0.127	-0.504	0.254
NP1 - online customers	379	3.20	1.094	5	1.3	1	5	-0.344	0.125	-0.682	0.250
NP2 - online suppliers	379	3.45	1.155	5	1.3	1	5	-0.352	0.125	-0.782	0.250
NP3 - online participation	371	3.03	1.146	14	3.6	1	5	-0.009	0.127	-0.780	0.253
MP1 - online competitors	374	3.22	1.110	13	3.4	1	5	-0.105	0.126	-0.767	0.252
MP2 - e-competitors benefits	372	2.97	1.010	10	2.6	1	5	-0.004	0.126	-0.519	0.252
MP3 - e-competitors favourable	370	3.32	1.046	12	3.1	1	5	-0.219	0.127	-0.517	0.253
CP1 - suppliers pressure	372	2.98	1.100	12	3.1	1	5	0.109	0.126	-0.672	0.252
CP2 - customers pressure	373	2.92	1.092	11	2.9	1	5	0.150	0.126	-0.682	0.252
CP3 - government pressure	372	2.79	1.115	12	3.1	1	5	0.087	0.126	-0.707	0.252
CP4 - parent/dominant pressure	373	3.03	1.169	11	2.9	1	5	0.034	0.126	-0.833	0.252
GR1 - legal environment	381	3.23	1.232	3	.8	1	5	-0.256	0.125	-0.988	0.249
GR2 - cyber crime	382	2.90	1.200	2	.5	1	5	0.138	0.125	-0.856	0.249
GR3 - e-commerce dispute	379	2.76	1.142	5	1.3	1	5	0.218	0.125	-0.698	0.250
GR4 - consumer privacy	380	2.73	1.199	4	1.0	1	5	0.234	0.125	-0.789	0.250
GR5 - government requirements	379	2.72	1.073	5	1.3	1	5	0.135	0.125	-0.642	0.250
GR6 - e-government services	382	3.22	1.151	2	.5	1	5	-0.370	0.125	-0.636	0.249
GR7 - e-commerce commitment	380	3.51	1.093	4	1.0	1	5	-0.423	0.125	-0.473	0.250
SR1 - financial infrastructure	379	4.01	0.870	5	1.3	1	5	-0.772	0.125	0.216	0.250
SR2 - banks help	376	3.81	0.986	8	2.1	1	5	-0.759	0.126	0.208	0.251

	Case Statistics			Missing		Range		Normality Test			
	N	Mean	Std. dev.	Freq.	%	Low	High	Skewness	Std. Err.	Kurtosis	Std. Err.
SR3 - number of IT vendors	374	3.72	0.963	10	2.6	1	5	-0.565	0.126	-0.153	0.252
SR4 - IT affordable support	378	3.40	1.041	6	1.6	1	5	-0.319	0.125	-0.667	0.250
SR5 - IT training centres	379	3.16	1.113	5	1.3	1	5	-0.062	0.125	-0.848	0.250
SR6 - postal system	377	2.91	1.240	7	1.8	1	5	-0.033	0.126	-1.016	0.251
SR7 - delivery companies	380	3.27	1.190	4	1.0	1	5	-0.386	0.125	-0.824	0.250
TC1 - telecom infrastructure	379	3.58	1.045	5	1.3	1	5	-0.719	0.125	-0.068	0.250
TC2 - connection failure	380	3.01	1.205	4	1.0	1	5	-0.220	0.125	-1.052	0.250
TC3 - web site access	380	3.02	1.065	4	1.0	1	5	-0.016	0.125	-0.828	0.250
TC4 - secure e-transaction	376	3.11	1.043	8	2.1	1	5	-0.103	0.126	-0.487	0.251
TC5 - secured services	379	3.41	0.983	5	1.3	1	5	-0.457	0.125	0.030	0.250
TC6 - CIRC	376	3.31	1.140	8	2.1	1	5	-0.399	0.126	-0.587	0.251
CR1 - consumers technologies	379	3.72	0.973	5	1.3	1	5	-0.772	0.125	0.129	0.250
CR2 - consumers knowledge	378	3.19	1.052	6	1.6	1	5	-0.156	0.125	-0.676	0.250
CR3 - online banking	377	3.65	0.893	7	1.8	1	5	-0.649	0.126	0.129	0.251
CR4 - credit cards	378	3.53	1.020	6	1.6	1	5	-0.562	0.125	-0.279	0.250
CR5 - e-payment	379	3.44	1.018	5	1.3	1	5	-0.603	0.125	-0.237	0.250
TT1 - skills & knowledge	371	3.54	0.927	13	3.4	1	5	-0.444	0.127	-0.156	0.253
TT2 - competency	368	3.43	0.892	16	4.2	1	5	-0.330	0.127	-0.232	0.254
TT3 - reliability	364	3.39	0.876	20	5.2	1	5	-0.197	0.128	-0.148	0.255
TT4 - reputation	367	3.43	0.862	17	4.4	1	5	-0.414	0.127	0.049	0.254
TT5 - security of payments	367	3.36	0.909	17	4.4	1	5	-0.415	0.127	-0.248	0.254
TT6 - attitude of partiality	361	3.24	0.894	23	6.0	1	5	-0.111	0.128	-0.174	0.256
Business Sectors	378	NA	NA	6	1.6	1	8	NA	NA	NA	NA
Business Age	377	NA	NA	7	1.8	1	5	NA	NA	NA	NA
Number of Employees	374	NA	NA	10	2.6	1	1	NA	NA	NA	NA
Business Location	378	NA	NA	6	1.6	1	4	NA	NA	NA	NA
Business Scope	375	NA	NA	9	2.3	1	3	NA	NA	NA	NA
Participant Job	375	NA	NA	9	2.3	1	6	NA	NA	NA	NA
Participant Experience	377	NA	NA	7	1.8	1	4	NA	NA	NA	NA
Participant Age	377	NA	NA	7	1.8	1	3	NA	NA	NA	NA

NA = Not applicable to non-metric variables

As part of the research design, process readiness (PR) and governance variables (GV) are for adapter firms only and analysis conducted accordingly. In the research questionnaire, a screening question directed participants to skip these questions if their firms do not conduct e-commerce activities; thus created ignorable missing data (Hair et al., 2010). The extent of missing data amongst variables shows that e-commerce status and scope (EST and SCP), as well as two variables of government readiness (GR2 and GR6), have the least number of missing values, while process readiness (PR), governance (GV), trust (TT) and security (SC) variables have the highest number of missing values.

Although the overall non-ignorable missing values has been reduced to 2.2%, as presented in Figure 5.2, these missing values can be practically problematic (Hair et al., 2010). These authors argue that applying remedies for missing data is essential before conducting multivariate analyses, as it could significantly reduce the sample size. Since there are no offending variable with an excessive level of missing values in the dataset, as illustrated in Table 5.4, no variables deletion was applied in reducing the number of missing values in the current research; thus, the conceptual foundations of the research constructs were not changed by the elimination of any variable prior to conducting multivariate analyses.

Even though some remedies have been conducted to reduce the overall missing data, their extent is still relatively high, and hence justifying moving to Hair et al.'s (2010) third step: diagnosing the randomness of missing data patterns. Taking into account the ignorable missing data in process readiness and governance variables (PR and GV), an assessment of the randomness of missing data was carried out through group comparison of observations with missing versus valid data. The analysis of patterns of missing values did not show any particular pattern that the data are jointly missing in more than 1%.

The final test is an overall assessment of whether those missing data are completely missing at random (MCAR). The Little's MCAR test's result is significant (Chi-Square = 5300.598, DF = 4579), which rejects the null hypothesis for Little's MCAR test; thus the data are not missing completely at random, thus making case-wise deletion of missing values less preferable (SPSS, 2007). However, since the extent of missing data is acceptably low (2.2%) and only limited apparent non-random patterns present in missing data, then any imputation technique can be applied with no potential bias (Hair et al., 2010). Although any imputation methods can be applied when missing data are less than 10%, the high number of variables in the current dataset increased cases with missing data; thus the use of only valid cases is unsafe as it significantly reduces the sample size. Hence, the most widely used imputation method, mean substitution, was adopted.

5.5.2 Assessing Underlying Assumptions

Given that multivariate techniques are based on fundamental assumptions, Hair et al. (2010) discuss in their *Multivariate Data Analysis* book four fundamental assumptions that need to be assessed as they potentially affect most statistical analysis techniques. These assumptions are: normality, homoscedasticity, linearity and the absence of correlated errors. In particular, these authors stress that the most fundamental test is examining the shape of the distribution for all metric variables included in the analysis. As a base of many statistical tests, normality refers to "*the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution, the benchmark for statistical methods*" (Hair et al, 2010, p. 71).

While it can be tested visually through graphical histograms, normality can be assessed statistically using two measures: skewness, which describes the balance of the distribution (i.e., skewed or centred), and kurtosis, which refers to the height of the distribution (i.e., peakedness or flatness) compared with the normal distribution (Hair et al, 2010). These

authors further argue that all resulting statistical tests are affected when variation from normality is sufficiently large, although a large sample is likely to minimise its detrimental effects. It is anticipated that such an assessment would help identify the appropriate statistical analysis for assessing the research models and examining the study propositions. As presented in Table 5.4, normality tests show that there is a departure from the normality for many variables. It also shows that normality violations have different levels. Examples of the distributions are graphically illustrated in Figure 5.3.

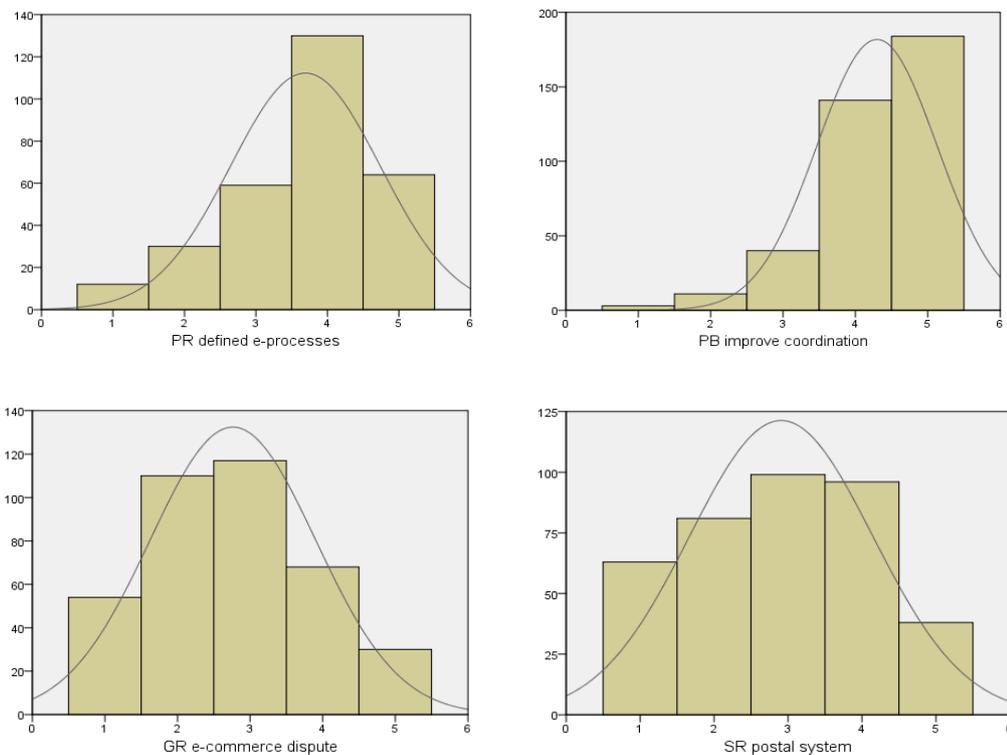


Figure 5.3: Examples of the distribution of study variables

Normal distribution produces skewness and kurtosis statistics that are very close to zero; thus the further the departure from zero (regardless of sign), the further the possibility of a non-normal distribution (Field, 2005). In particular, a z-score of an absolute value of more than 1.96 of skewness or kurtosis can be regarded as significant (Field, 2005). According to Field (2005), the z-score of skewness and kurtosis tests can be calculated from SPSS statistics by dividing the statistic value of skewness or kurtosis by its standard errors. The z-scores for skewness and kurtosis for the four examples in Figure 5.3 can be calculated to examine their normal distribution. The skewness z-scores for defined e-processes, improve coordination, e-commerce dispute and postal system are -5.263 , -9.952 , 1.744 and -0.262 respectively. These results indicate that the former two z-scores are significant at $p < 0.001$, while the latter ones are insignificant. The kurtosis z-scores of these variables are

1.679, 6.380, -2.792 and -4.048 for defined e-processes, improve coordination, e-commerce dispute and postal system respectively. These results indicate that all kurtosis z-scores are significant except the first one. In particular, the second and the fourth z-scores are significant at $p < 0.001$, whereas the third z-score is significant at $p < 0.01$. Diagrams in Figure 5.3 can visually illustrate these results.

5.6 Demographic Analysis

The demographic characteristics of the sample in this research include not only the characteristics of organisations, but also participant characteristics. Table 5.5 illustrates summary statistics of demographic characteristics of both participants and organisations. Organisational characteristics are described in this research through the following five aspects: business sector, geographical scope, business age, number of employees and location of headquarters. The results revealed that firms in the sample were mainly from three business sectors, namely, manufacturing, distribution and service sectors. The highest majority of firm headquarters (65.9%) located in Riyadh, while only 41.2% of these firms do business outside the Saudi Arabian boundary. The smallest segment in the sample is medium firms (19.8%), while small and large firms represent 38.8% each. New establishments represent 23.2%, while 33.6% have been in business for 20 years or more.

Table 5.5: Summary statistics of demographic characteristics of participants and enterprises

Characteristics	Freq.	Percent	Characteristics	Freq.	Percent
Business Sector			Location of Headquarter		
Manufacturing	125	32.6	Riyadh (The Capital City)	253	65.9
Distribution (Retail & Wholesales)	73	19.3	Jeddah & Western Area	63	16.4
IT & Communications	53	13.8	Dammam & Eastern Area	41	10.7
Financial Services & Insurance	31	8.1	Other	21	5.5
Other Business Services	31	8.1	Missing	6	1.6
Construction & Real estate	23	6.0	Participant Job		
Training & Consultation	20	5.2	President / General Manager	124	32.3
Other	22	5.7	Executive Manager	96	25.0
Missing	6	1.6	Other Senior Manager	54	14.1
Business Age (Years)			IT Manager	31	8.1
Less than 5	89	23.2	Senior IS/Engineer/Expert	21	5.5
5 – 9	75	19.5	Other	49	12.8
10 – 19	84	21.9	Missing	9	2.3
20 or more	129	33.6	Participant Experience (Years)		
Missing	7	1.8	Less than 5	74	19.3
Geographical Scope			5 – 9	115	29.9
Saudi Arabia	217	56.5	10 – 14	87	22.7
GCC / Middle East	77	20.1	15 or more	101	26.3
World Wide	81	21.1	Missing	7	1.8
Missing	9	2.3	Participant Age (Years)		
Number of Employees			Less than 25	27	7.0
Less than 50	149	38.8	25 – 34	147	38.3
50 – 250	76	19.8	35 – 44	142	37.0
More than 250	149	38.8	45 or more	61	15.9
Missing	10	2.6	Missing	7	1.8

Participant position, age and experience are considered for participants. As illustrated in Table 5.5, around one half of participants is more than 35 years old and had more than 10 years of experience. The majority of respondents (79.5%) are at management level, from which 57.3% are top level managers, suggesting good quality of the data source.

5.7 E-Commerce Scope and Utilisation

As discussed earlier in chapter four, this study adopted a six-level e-commerce maturity measure scale, with an assumption that the entry adoption is having an interactive status. Accordingly, the findings suggest that there were almost an equal number of adopter and non-adopter firms, as illustrated in Table 5.6. Firms that have an integrated Web (24.1%) are more than those that just have an interactive Web (18.4%) or transactive Web (7.1%), representing 49%, 37% and 14% amongst adopter firms respectively.

Table 5.6: Summary of e-commerce utilisation and scope of use

E-Commerce and Website Utilisation	Frequency	Percent
Not Connected (no Internet and no e-mail)	19	5.0
Connected (Internet with e-mail, but no Web site)	76	19.9
Static Web (publishing basic company information)	97	25.5
Interactive Web (accepting queries, e-mail, and user form entry).	70	18.4
Transactive Web (online selling and purchasing of products/services)	27	7.1
Integrated Web (integrated with suppliers, customers, and back office)	92	24.1
E-Commerce Scope of Use		
<i>Online Advertising and marketing</i>		
No	146	38.2
Yes	236	61.8
<i>Making sales online</i>		
No	289	75.7
Yes	93	24.3
<i>Making purchases online</i>		
No	273	71.5
Yes	109	28.5
<i>Exchange operational data with upstream suppliers</i>		
No	209	54.7
Yes	173	45.3
<i>Exchange operational data with downstream partners and customers</i>		
No	196	51.3
Yes	186	48.7
<i>After-sales customer service and support</i>		
No	242	63.4
Yes	140	36.6

For the scope of e-commerce use, the results have revealed that online advertising and marketing were practised by 61.8% of enterprises, as illustrated in Table 5.6. Exchange operational data with upstream suppliers as well as downstream partners and customers were practised by almost half of the enterprises, while customer services and after sale

supports accounted for only 36.6%. The least practised scopes were making online sales and purchases, which represent 24.3% and 28.5% respectively.

5.8 Assessing Possible Biases

Because the survey includes different respondent positions, one might suspect that these respondents may have different views for e-commerce determinants. To examine such a potential bias that could exist due to respondent positions, the sample was split into two groups: top-level managers (owner, president, vice president, general manager, executive manager, and board member) versus non top-level managers (other senior business manager, expert, and other employees). In addition to the use of one-way ANOVA to compare the mean of each research construct between the two groups, Kolmogorov-Smirnov (K-S) test was also conducted to further examine whether or not the sample distribution of these two groups were equal (Boes et al., 1974).

As shown in Table 5.7, the p -value for each factor is insignificant ($p \geq 0.05$), with only two exceptions – mimetic pressure and perceived costs. It also appears that top managers perceive lower mimetic pressure than non-top managers do. One possible explanation is that top managers did not feel any competitive advantage and success related to e-commerce. The results also indicate that top managers perceive costs related to e-commerce adoption and post-adoption to be higher than non-top managers do. One possible explanation is that non-top managers considered only the costs of IT related spending, whereas top managers, on the other hand, considered the costs of business units as well as the costs of IT related spending.

Table 5.7: Testing possible biases: top managers vs. non-top managers

Factor	Non-top managers		Top managers		One-way ANOVA		K-S Test	
	Mean	S.D.	Mean	S.D.	F-stat.	P-value	Z-score	P-value
PR Process Readiness	3.285	0.870	3.300	0.858	0.023	0.878	0.547	0.926
GV Governance	3.309	0.865	3.336	0.906	0.066	0.797	0.414	0.995
CM Commitment	3.321	0.993	3.458	0.974	1.682	0.195	0.779	0.578
HR Human Resources	3.681	0.792	3.563	0.852	1.726	0.190	0.969	0.305
TR Technology Resources	3.768	0.817	3.709	0.819	0.451	0.502	0.583	0.886
PC Perceived Costs	3.138	0.883	3.330	0.965	3.639	0.057	1.748	0.004
PB Perceived Benefits	4.078	0.837	4.151	0.696	0.829	0.363	0.515	0.953
CT Compatibility	3.675	0.900	3.752	0.814	0.712	0.399	0.447	0.988
SC Security Concerns	3.286	0.894	3.249	0.868	0.148	0.701	0.458	0.985
NP Normative Pressure	3.172	0.891	3.257	0.848	0.843	0.359	0.759	0.611
MP Mimetic Pressure	3.286	0.823	3.105	0.847	4.033	0.045	0.987	0.284
CP Coercive Pressure	2.957	0.838	2.917	0.848	0.193	0.660	0.488	0.971
GR Government Readiness	2.936	0.844	3.048	0.804	1.645	0.200	0.829	0.498
SR Supporting Industry Readiness	3.392	0.701	3.507	0.740	2.188	0.140	1.002	0.268
TC ICT Infrastructure Readiness	3.211	0.708	3.255	0.683	0.358	0.550	0.888	0.410
CR Consumer Readiness	3.476	0.743	3.521	0.715	0.333	0.564	0.484	0.973
TT Institutional Trust	3.394	0.680	3.398	0.694	0.004	0.953	0.824	0.505

To further examine the data set for potential bias that could exist due to IT knowledge of respondents, the sample was divided into two different groups: IS-respondents versus non IS-respondents. Except for security concerns, the results presented in Table 5.8 did not show any different perceptions between the two groups, as the p -values of e-commerce determinants are insignificant ($p \geq 0.05$). It appears that non IS-respondents perceived more security concerns than IS-respondents do, which could be attributed to their IT knowledge. Hence, it can be concluded that there are no major concerns over survey biases related to the position of the respondents.

Table 5.8: Testing possible biases: IS respondents vs. non-IS respondents

Factor	Non-IS Resp.		IS Resp.		One-way ANOVA		K-S Test	
	Mean	S.D.	Mean	S.D.	F-stat.	P-value	Z-score	P-value
PR Process Readiness	3.296	0.884	3.338	0.660	0.087	0.769	0.762	0.607
GV Governance	3.334	0.909	3.319	0.759	0.010	0.920	0.900	0.393
CM Commitment	3.442	0.981	3.359	0.920	0.323	0.570	0.653	0.787
HR Human Resources	3.598	0.849	3.699	0.735	0.657	0.418	0.557	0.916
TR Technology Resources	3.722	0.828	3.859	0.774	1.256	0.263	0.619	0.838
PC Perceived Costs	3.291	0.944	3.066	0.953	2.531	0.112	1.058	0.213
PB Perceived Benefits	4.147	0.727	4.024	0.865	1.198	0.274	0.719	0.680
CT Compatibility	3.753	0.844	3.626	0.872	1.015	0.314	0.640	0.807
SC Security Concerns	3.239	0.882	3.493	0.762	3.854	0.050	1.487	0.024
NP Normative Pressure	3.216	0.871	3.346	0.773	1.036	0.310	0.874	0.429
MP Mimetic Pressure	3.161	0.862	3.257	0.761	0.580	0.447	0.660	0.776
CP Coercive Pressure	2.930	0.847	3.020	0.828	0.508	0.476	0.570	0.901
GR Government Readiness	3.005	0.818	3.091	0.844	0.492	0.484	0.879	0.422
SR Supporting Industry Readiness	3.465	0.732	3.564	0.668	0.838	0.361	0.761	0.609
TC ICT Infrastructure Readiness	3.232	0.687	3.310	0.738	0.562	0.454	0.616	0.842
CR Consumer Readiness	3.529	0.726	3.387	0.662	1.747	0.187	0.810	0.529
TT Institutional Trust	3.390	0.701	3.499	0.608	1.139	0.287	0.929	0.354

Although respondents were given the chance to participate either online or offline, further examination was conducted for potential bias that could exist between these two channels. Hence, the sample was divided into two different groups: paper-based responses versus online-based responses. For the 17 e-commerce predictors, the results show differences between the groups in five factors. The p -values are statistically significant ($p < 0.05$) for commitment, normative pressure, government readiness, supporting industry readiness and institutional trust, as illustrated in Table 5.9. In particular, the results indicates that government readiness and supporting industry readiness are highly significant ($p < 0.001$), which could be attributed to the sense of freedom over the Internet. It is worth noting that 63% of received online questionnaires are from adopter firms compared to 43% of paper-based questionnaires. This could also suggest that adopter firms were not satisfied enough and had negative attitudes towards government and supporting industry readiness.

Table 5.9: Testing possible biases: paper responses vs. online responses

Factor	Paper-based		Online-based		One-way ANOVA		K-S Test	
	Mean	S.D.	Mean	S.D.	F-stat.	P-value	Z-score	P-value
PR Process Readiness	3.252	0.889	3.405	0.781	1.913	0.168	1.150	0.142
GV Governance	3.341	0.912	3.290	0.837	0.195	0.659	0.533	0.939
CM Commitment	3.492	0.965	3.261	0.999	4.868	0.028	1.271	0.079
HR Human Resources	3.575	0.836	3.657	0.827	0.845	0.358	0.677	0.749
TR Technology Resources	3.680	0.813	3.822	0.823	2.635	0.105	0.990	0.281
PC Perceived Costs	3.317	0.926	3.164	0.964	2.300	0.130	1.096	0.181
PB Perceived Benefits	4.172	0.720	4.040	0.791	2.743	0.098	0.701	0.709
CT Compatibility	3.765	0.833	3.652	0.864	1.578	0.210	0.687	0.732
SC Security Concerns	3.309	0.840	3.175	0.937	2.032	0.155	1.209	0.107
NP Normative Pressure	3.309	0.895	3.078	0.781	6.400	0.012	1.794	0.003
MP Mimetic Pressure	3.164	0.852	3.174	0.827	0.012	0.914	0.479	0.976
CP Coercive Pressure	2.953	0.885	2.891	0.763	0.472	0.493	0.895	0.399
GR Government Readiness	3.219	0.768	2.623	0.769	52.812	0.000	3.044	0.000
SR Supporting Industry Readiness	3.578	0.701	3.262	0.734	17.198	0.000	2.024	0.001
TC ICT Infrastructure Readiness	3.268	0.652	3.187	0.757	1.211	0.272	1.293	0.070
CR Consumer Readiness	3.546	0.688	3.429	0.782	2.309	0.129	1.334	0.057
TT Institutional Trust	3.462	0.669	3.276	0.708	6.492	0.011	1.576	0.014

Common method bias was also assessed (in section 6.2.3.1 of the next chapter) during the factor analysis process, and no significant common method bias was observed. Finally, non-response bias is another test that is recommended in order to generalise results from a sample to a population (Dooley and Lindner, 2003; Babbie, 2004; Lindner et al., 2001). Scholars have noted that handling non-response bias using early and late respondents as a proxy is not only valid, but also a reliable and generally well-accepted procedure (Lindner et al., 2001; Churchill, 1999). However, it was difficult to test non-response bias in this research due to the sampling design. In particular, the coordination via social networks as well as the use of personal distributions and the time it takes to follow-up make it difficult to determine whether a questionnaire was an early or late respondent.

5.9 Summary

This chapter described the research constructs and discussed the empirical setting of the survey. It gave emphasis to elaborating the construct conceptualisations and measurement scales. This study employed a comprehensive survey that covers different factors from different perspectives. Prior to the final distribution, the survey was translated and pre-tested and its content validity was assessed. The survey was distributed using personal distribution and via social networks. Descriptive statistics were produced to help detect missing data and to describe the sample. From 800 questionnaires sent to participants, 434 were returned. Cases with high missing data were omitted and mean substitution was employed as a remedy. The findings suggest that e-commerce adoption amongst firms was evenly distributed. There was a departure from normality at different levels for many variables and the results indicate that no major bias exists.

CHAPTER 6: Quantitative Data Analysis

6.1 Overview

In the previous chapter, empirical settings and descriptive analysis of the study variables were conducted, including missing data analysis as well as testing underlying assumptions and potential biases. This chapter consists of two main analyses: measurement analysis and structural analysis. For measurement analysis, the validity and reliability of the study constructs are examined quantitatively using the collected data. It starts by assessing the initial reliability of the research constructs. An exploratory factor analysis is conducted, where the underlying structure of the research constructs is statistically identified and the validity of these constructs is examined. It concludes by testing the validity and reliability of the resultant constructs and their summated scales. Using these represented constructed concepts, the structural analysis is then addressed to examine the research framework. In structural analysis, an inferential analysis is carried out to assess the research models and propositions. Prior to conducting the main data analysis, data validating for the resulted factors is conducted. Logistic regression analyses are then executed, where significant factors are identified. The research models are analysed and findings are presented for the three e-commerce settings, i.e. e-commerce adoption, utilisation and scope of use.

6.2 Measurement Model

In the current research, the operationalisation of the research variables was mainly adopted from previous studies. E-commerce adoption was measured using categorical scales, while the research constructs were mainly measured using a five-point Likert scales on 86 items.

These construct items were pre-tested qualitatively and a pilot study was conducted prior to data collection, as discussed in Chapter 5. To quantitatively test the measurement model using data collected in this research, Molla and Licker's (2005a) assessment process was adopted. Firstly, an initial reliability for each hypothesised construct was assessed to highlight unrelated items that would substantially decrease the reliability of the construct. Secondly, construct validity of each construct was evaluated using different techniques. Lastly, the reliability of each represented constructed concept was assessed.

6.2.1 Initial Reliability

Construct reliability refers to the degree of internal consistency amongst variables in a multi-item scale (Hair et al, 2010). Reliability is important even when using established measures with successful track records; particularly when considering issues related to a different context (Litwin, 1995). According to Hair et al. (2010), individual items of a summated scale should all be highly inter-correlated, and they suggest a set of diagnostic measures to examine internal consistency. The first measures are item-to-total correlation and inter-item correlation, with a threshold of 0.50 and 0.30 for the item-total correlation and inter-item correlation, respectively. The second measure is the reliability coefficient, which assesses the consistency of the entire scale. Cronbach alpha is the most widely used measure for reliability coefficient, with a lower limit of 0.70, although it may decrease to 0.60 in exploratory research (Hair et al, 2010).

Table 6.1: Initial reliability of the study constructs

	Factor	# of items	Mean	Cronbach alpha
PR	Process Readiness	10	3.291	0.919
GV	Governance	7	3.322	0.921
CM	Commitment	5	3.411	0.918
HR	Human Resources	4	3.604	0.794
TR	Technology Resources	5	3.730	0.851
PC	Perceived Costs	3	3.263	0.856
PB	Perceived Benefits	4	4.125	0.806
CT	Compatibility	4	3.725	0.859
SC	Security Concerns	3	3.262	0.857
NP	Normative Pressure	3	3.228	0.657
MP	Mimetic Pressure	3	3.168	0.738
CP	Coercive Pressure	4	2.931	0.764
GR	Government Readiness	7	3.009	0.837
SR	Supporting Industry Readiness	7	3.467	0.816
TC	ICT Infrastructure Readiness	6	3.240	0.716
CR	Consumer Readiness	5	3.505	0.787
TT	Institutional Trust	6	3.396	0.878
	Total	86	-	-

Cronbach alpha and item-scale correlation were calculated, as illustrated in Table 6.1 and appendix E (I), to assess the initial reliability of the hypothesised research constructs, i.e. Process readiness (PR), Governance (GV), Commitment (CM), Human resources (HR), Technology resources (TR), Perceived costs (PC), Perceived benefits (PB), Compatibility (CT), Security concerns (SC), Normative pressure (NP), Mimetic pressure (MP), Coercive pressure (CP), Government readiness (GR), Supporting industry readiness (SR), ICT infrastructure readiness (TC), Consumer readiness (CR), and Institutional trust (TT). Items were highlighted if their corrected item-scale correlations were below 0.40 or if their correlations substantially increased coefficient alpha when deleted. This threshold was comparable to those used in prior research, as stated by Molla and Licker (2005a), and followed Churchill's (1979) recommendations to a great extent.

The reliability assessment of the research constructs, as demonstrated in Appendix E (I), revealed a violation of the above criteria in three scale items (NP3: *Our firm participates extensively with other parties in e-commerce promotion and information*, GR5: *There are government requirements that would discourage the adoption and use of the Internet for business*, and TC3: *The possibility of not being able to access the firm's web site in Saudi Arabia is high and has a negative effect on the use of the Internet for business*) from normative pressure, government readiness, and ICT infrastructure readiness, respectively. Consequently, these items were highlighted so that they can be considered for elimination to ensure adequate measures of the research constructs.

Except for the normative pressure construct (NP), the Cronbach alpha values of the research constructs range from 0.72 to 0.92, which satisfy the minimum criterion of reliability (0.70) and provide evidence for the initial reliability of the research constructs. Although normative pressure (NP, alpha = 0.66) has less than the threshold reliability for exiting constructs (0.70), the third item of this construct (NR3) appears to be the cause of this low reliability alpha, as by eliminating it the reliability increases to an acceptable level (0.72). As an emerging environment, enterprises are not expected to be involved in such participations. It is also more likely that firms' participation is more common in EDI than in the context of Internet commerce, especially in an emerging community. Consequently, this problematic item (NR3) is highlighted for elimination from the construct, resulting in a complete set of constructs that exceeds the reliability threshold (> 0.70).

6.2.2 Measurement Validity

According to Hair et al. (2010), validity is the degree to which a scale or a set of measures accurately represents a particular concept. In addition to content validity, these authors suggest that convergent validity and discriminant validity are amongst the most widely accepted forms of validity. Content validity, also known as face validity, is a subjective early assessment of the correspondence between the individual items and the concept that it is supposed to measure through the judgement of experts or other means (Hair et al, 2010). Content validity was established in this research through a careful selection and refinement of items during the questionnaire development based on a comprehensive literature review as well as an exploratory study and experts' consultation. Standard valid and reliable measures were adopted (where available) and then sent to different academic and practical experts for evaluation and judgement.

Convergent and discriminant validity are elements of construct validity, which is an internal validity that “*determine (1) the extent to which the measure correlates with other measures designed to measure the same thing and (2) whether the measure behaves well as expected*” (Churchill, 1979, p.70). Convergent validity assesses the extent to which measurement items of the same concept are highly correlated, which indicates that the scale is measuring its intended concept (Hair et al, 2010). On the other hand, discriminant validity refers to the extent to which similar concepts have low correlations, which demonstrates the difference of the scale from other similar concepts (Hair et al, 2010). To evaluate the convergent and discriminant validity of the study instrument, factor analysis, Average Variance Extraction (AVE) and correlation matrix approach were applied.

6.2.3 Exploratory Factor Analysis

Depending on the objective of the research, exploratory factor or component analysis is an interdependence technique whose main objective is to determine the structure of the relationships amongst either variables or respondents, introducing the R-type or Q-type factor analysis method respectively (Hair et al., 2010). Focusing on the R-type factor analysis and the correlation matrix between variables not responses, factor analysis can be used as the first multivariate technique to extract a manageable number of common underlying latent dimensions, known as components or factors, that explain variations amongst a larger number of variables (Comrey, 1988; Fabrigar et al, 1999; Floyd and Widman, 1995; Preacher and MacCallum, 2003).

According to Hair et al. (2010), the main outcomes of exploratory factor analysis can be: (1) summarising the data in terms of deriving the main concepts represented in a small number of factors that underlie the original variables and/or (2) data reduction, deriving an empirical score for each factor to simplify subsequent analyses. They further declare that applying factor analysis to summarise the data for interpretation is sufficient to logically identify variables' structures and understand the interrelationships amongst them, while data reduction is required in order to identify appropriate variables (factors) for subsequent statistical analysis, whether through selecting represented variables or replacing original variables with a smaller set of summated scales or factor scores. In the current research, the 86 items of the research constructs were examined for the following reasons: firstly, to understand whether these variables can be grouped so that the big picture of e-commerce adoption can be seen; secondly, to reduce this large number of variables to a smaller set of factors so that other multivariate techniques can be made more frugal; thirdly, to assess the convergent validity and discriminant validity of the research constructs.

The hypothesised 17 constructs show good reliability coefficients, both in other studies and in this particular dataset, with Cronbach alpha that satisfied the minimum criteria. Hair et al. (2010) argue that the researcher must assess the factorability of the correlation matrix starting with a visual examination of the correlation matrix to identify significant correlations. Consequently, the overall significance of the correlation matrix as well as the Measure of Sampling Adequacy (MSA) was applied to test the factorability of the overall set of variables as well as each individual variable (Hair et al., 2010).

The inspection of the correlation matrix (Appendix D) revealed that there is a high percentage (65%) of significant correlations at the 0.01 level, which provides an adequate basis for proceeding to factor analysis examination. To further test the appropriateness of component analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was conducted, which represents the ratio of the squared correlation to the squared partial correlation between research variables (Field, 2005). Kaiser's MSA values that are below 0.5 are unacceptable, according to Hair et al. (2010). Table 6.2 illustrates the overall MSA value (0.886), which falls not only in the acceptable range (above 0.50), but also the range of being 'meritorious' (> 0.80) according to Kaiser's (1974) recommendations. The result of Bartlett's test, which assesses the overall significance of correlations, is significant in this dataset, as shown in Table 6.2. Hence, the factor model is appropriate in this dataset and the resulting factors have an objective basis (Hair et al., 2010; Field, 2005).

Table 6.2: KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.886
Bartlett's Test of Sphericity	Approx. Chi-square	16267.236
	df	3655
	Sig.	0.000

The Anti-image option in SPSS 18 produces an anti-image matrix which contains MSA for each variable along the diagonal (Field, 2005). The value of MSA for each variable identifies one variable (GR5) from the government readiness construct (GR5: *There are government requirements that would discourage the adoption and use of the Internet for business*) that has a low MSA value, which can be considered as a candidate for omission in the attempt to obtain a set of variables that can exceed the minimum acceptable level (above 0.50). Note that this variable (GR5) has been highlighted in the initial reliability test as a candidate for elimination. Therefore, GR5 was omitted in order to obtain a set of variables that can exceed the minimum acceptable MSA levels. Recalculating the MSA values revealed that the overall MSA value increased to 0.888 and all variables exceeded the threshold value (> 0.50), which is an indication that the fundamental requirements of the exploratory factor analysis is met.

The Reproduced option in SPSS examines the residuals of the model, which represents the differences between the model matrix and the observed data matrix (Field, 2005). Field (2005) suggests that the smaller the residuals the better, although there are no grounds for concern if it is less than 50%. The matrix of the current dataset indicates that only a few of these residuals (7%) have absolute values greater than 0.05, which is deemed sufficient. Taken together, these tests provide a minimum standard that should be passed prior to conducting factor analysis and proceeding to the next stages (Hair et al, 2010).

6.2.3.1 Factor Extraction

The current research adopted the Principal Component method of extraction and applied Kaiser's criterion of retaining factors with eigenvalues (i.e. variance extracted by the factors) greater than 1.0 in determining the number of factors to be retained. This criterion is accurate when the sample size is above 250 and the communality in average is higher than 0.60 (Field, 2005). The process of factor extraction resulted in 19 factors being retained, as illustrated in Table 6.3. These factors represent 71% of the variables' variance, which is deemed sufficient in term of total variances explained (Hair et al, 2010).

Table 6.3: Total variance explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	21.449	25.235	25.235	4.141	4.872	4.872
2	6.728	7.915	33.150	3.875	4.559	9.430
3	3.673	4.321	37.472	3.750	4.411	13.841
4	3.357	3.949	41.420	3.609	4.246	18.087
5	2.820	3.318	44.738	3.558	4.186	22.273
6	2.549	2.999	47.737	3.517	4.138	26.411
7	2.292	2.696	50.434	3.468	4.080	30.491
8	2.012	2.367	52.801	3.360	3.952	34.443
9	1.916	2.255	55.055	3.216	3.784	38.227
10	1.775	2.089	57.144	3.085	3.629	41.856
11	1.618	1.904	59.048	3.081	3.625	45.482
12	1.590	1.870	60.918	2.955	3.477	48.958
13	1.464	1.722	62.641	2.836	3.336	52.295
14	1.355	1.594	64.235	2.831	3.331	55.626
15	1.329	1.563	65.798	2.715	3.194	58.819
16	1.195	1.406	67.204	2.699	3.175	61.995
17	1.142	1.344	68.548	2.680	3.153	65.148
18	1.097	1.291	69.839	2.557	3.008	68.156
19	1.028	1.209	71.048	2.458	2.892	71.048

The size of the communality, which is an index for examining the variance of each variable in the factor solution, needs to be examined prior to proceeding with the rotation process to check whether any variable has low communality (less than 0.50) so that it should be omitted (Hair et al, 2010). As illustrated in Table 6.4, all items in the current data set exceed the communality threshold, with an average communality of 0.71. These variables share more than one-half of their variance with the factors and all communalities are sufficiently high to proceed to the next stage of factor analysis.

Table 6.4: Communalities of research (85) items

item	Extraction								
PR1	.646	CM1	.746	MP2	.684	SR6	.616	PC1	.777
PR2	.694	CM2	.772	MP3	.653	SR7	.538	PC2	.820
PR3	.748	CM3	.769	CP1	.763	TC1	.644	PC3	.822
PR4	.678	CM4	.782	CP2	.717	TC2	.667	CR1	.684
PR5	.622	CM5	.713	CP3	.758	TC3	.644	CR2	.655
PR6	.661	PB1	.682	CP4	.746	TC4	.593	CR3	.696
PR7	.735	PB2	.782	GR1	.729	TC5	.705	CR4	.729
PR8	.739	PB3	.761	GR2	.835	TC6	.634	CR5	.683
PR9	.719	PB4	.732	GR3	.845	HR1	.759	TT1	.739
PR10	.635	CT1	.661	GR4	.770	HR2	.781	TT2	.783
GV1	.696	CT2	.688	GR6	.680	HR3	.723	TT3	.775
GV2	.665	CT3	.792	GR7	.680	HR4	.670	TT4	.747
GV3	.735	CT4	.743	SR1	.622	TR1	.700	TT5	.679
GV4	.750	NP1	.658	SR2	.690	TR2	.643	TT6	.578
GV5	.717	NP2	.736	SR3	.697	TR3	.693	SC1	.776
GV6	.700	NP3	.582	SR4	.747	TR4	.761	SC2	.816
GV7	.653	MP1	.726	SR5	.713	TR5	.660	SC3	.750

The factor loadings, which play a key role in the interpretation process, represent the degree of correlation of each variable with each factor (Hair et al., 2010). The extraction matrix of the un-rotated factors in this study had substantial cross-loadings and did not

maximise the loadings of each variable on one factor. Thus, a rotation technique can be applied to get a better, clean set of factor loadings in more meaningful factor patterns to improve interpretation (Hair et al., 2010). Prior to moving to the rotation process, common method bias was tested using Harman's single-factor test according to Podsakoff et al. (2003). The un-rotated factor analysis suggests that common method bias is not a concern in the current dataset because no single-factor solution emerged from the factor analysis and the first factor (single-factor) explained only 25% of the variance.

6.2.3.2 Factor Rotation

In order to obtain a meaningful factor loading, the principal component matrix was rotated by different rotation methods (i.e., varimax, promax, equamax and quartimax). However, the results obtained from the equamax rotation had a higher effect in optimising the factor structure and redistributing the variance to the latter factors and appeared to be more meaningful for interpretation; therefore it was adopted. The equamax rotation, which is an orthogonal rotation method that is a combination of varimax and quartimax methods, minimises the number of variables with a significant loading on a factor and the number of constructed factors needed to explain a variable (IBM, 2011).

Information regarding the initial extraction and rotation of the 19 factors with eigenvalues greater than one is illustrated in Table 6.3. It illustrates the effect of rotation in optimising the factor structure and redistributing the variance to the latter factors. For the purpose of achieving possibly meaningful interpretation and given the sample size and the number of variables in this research, the loading threshold was set to 0.45. This threshold, which is considered as a fair loading according to Comrey and Lee's (1992) classification, is set low to support the interpretation process with as many significant loadings as possible (Hair et al, 2010). Using the iterative sequence of exploratory factor analysis and applying the aforementioned rules, thirteen items (PR8, GV1, GV3, GV4, GV6, GV7, NP3, MP3, CP2, GR5, SR6, SR7, and TC3) were eliminated, resulting in 18 distinct factors with 73 items, as shown in Table 6.5. Interestingly, items related to postal and delivery services (SR6 and SR7) were dropped for cross loadings with government readiness. In summary, principal component analysis with equamax rotation was utilised with the following set of rules: 1) a minimum eigenvalue of 1.0 as a threshold for factor extraction; 2) exclusion of single item factors for the sake of simplicity; 3) dropping items with a loading less than 0.45 in all factors from subsequent iterations; 4) dropping items with a loading higher than 0.45 in more than one factor from subsequent iterations.

Table 6.5: Final rotated component matrix of factor analysis

	Component																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
GR1 legal environment	.716	.059	.029	.074	-.086	.048	.053	-.113	.052	.098	-.010	.088	.292	.050	-.200	.142	-.045	.064
GR2 cyber crime	.865	.033	.053	.165	-.045	-.009	-.002	-.004	.064	.042	.021	.133	.170	.006	.039	.067	.096	.051
GR3 e-commerce dispute	.853	.032	.002	.115	-.070	-.017	-.010	.025	.177	.044	.057	.184	.111	-.008	.024	.034	.105	-.011
GR4 consumer privacy	.794	.029	.064	.059	-.013	.010	-.016	.009	.159	-.027	-.019	.188	.171	-.018	.117	.042	.161	.074
GR6 e-government services	.613	-.022	.011	-.031	.161	.198	.058	.180	.119	.143	-.109	.129	.061	.135	.246	.240	-.115	.105
GR7 government commitment	.485	-.015	.039	-.132	.248	.105	-.063	.106	.151	.125	.006	-.030	.132	.059	.330	.388	-.085	.109
PR1 defined e-processes	-.083	.621	.242	.006	.080	.178	.097	.055	.066	.288	.134	.119	.077	.083	.089	.045	.132	.055
PR2 working instruction	.003	.606	.152	.030	.165	.205	-.013	-.042	.101	.414	.111	.029	.073	-.038	.089	.129	.147	.049
PR3 defined SLA	.023	.679	.138	.098	.096	.081	-.014	-.030	.162	.266	.169	.035	.112	-.081	.211	.076	.200	.108
PR4 SLA penalty	.090	.659	.125	.087	.106	.078	.127	-.091	.191	.293	.130	.023	-.003	-.087	.083	-.052	.012	.181
PR5 project management	.175	.596	.261	.058	.075	.124	.164	-.074	-.056	.068	.103	.126	.076	-.058	.184	.095	.154	.077
PR6 online catalogue	-.005	.524	.274	.037	.167	.254	.219	.097	.092	.110	.153	.011	-.025	.046	-.058	.177	.201	.151
PR7 customer support	.008	.580	.172	.103	.194	.194	.186	.035	.044	.315	.134	-.042	-.027	-.062	.014	.189	.218	.191
CM1 business vision	.140	.211	.700	.075	.106	.257	.102	-.006	.158	.142	.156	.031	.105	-.023	.077	.127	.109	.153
CM2 strategy-led	.034	.164	.699	-.009	.101	.211	.242	-.053	.128	.201	.143	-.036	.103	.007	.037	.131	.127	.187
CM3 champions	-.025	.128	.701	.091	.221	.191	.154	.017	.135	.111	.103	.096	.029	-.006	.053	.166	.197	.201
CM4 senior management	-.009	.123	.622	-.044	.207	.289	.260	.071	.192	.208	.092	-.015	.003	.058	.054	.170	.192	.164
CM5 widely communicated	.097	.182	.525	.164	.174	.292	.219	.108	.156	.202	.216	.052	-.006	-.017	.089	.186	.108	.075
TT1 skills & knowledge	.201	.200	.021	.696	-.003	.119	.018	.189	.057	-.016	.126	.019	.047	-.019	.147	.195	.037	.124
TT2 competency	.080	.068	.009	.761	.000	.083	.056	.133	.199	.168	.096	.234	.057	-.004	.090	.042	.087	.012
TT3 reliability	.019	.026	.033	.780	.123	.061	.103	.074	.221	.117	.091	.106	.086	.004	.058	.029	.115	.091
TT4 reputation	.055	-.049	.155	.679	.154	.046	.044	.077	.290	.061	.013	.062	.070	.069	.117	.072	.080	.287
TT5 security of payments	.046	.143	.071	.473	.191	.050	.226	.181	.367	-.124	.030	.073	.037	.056	.135	.234	.130	.255
TT6 attitude of partiality	.013	-.155	-.029	.465	.159	.102	.122	.087	.352	.251	.019	.164	-.039	-.031	-.004	.047	.192	.163
TR1 Internet connection	.018	.009	.092	.141	.683	-.056	.236	-.014	.025	.179	.216	.026	.229	.044	.040	.074	.061	-.020
TR2 computerised systems	-.069	.049	.085	.105	.651	.170	.167	-.028	.083	.144	.179	.175	.069	-.039	-.051	.059	.059	.231
TR3 web-based applications	-.057	.221	.137	.026	.695	.201	.008	.086	.096	.117	.168	.016	.069	.000	.067	.134	.106	.109
TR4 systems integration	.050	.128	.218	.126	.702	.150	.093	.075	.147	.044	.253	.183	-.027	-.054	-.013	.024	.078	.118
TR5 LAN & WAN	-.035	.078	.166	.039	.652	.056	.065	.022	.135	.185	.221	-.103	-.015	-.018	.087	.196	.181	.023
CT1 culture & value	-.041	.082	.265	.052	.154	.609	.287	.049	.053	.118	.158	-.001	.065	-.051	.117	.172	.043	.086
CT2 distribution channels	.067	.219	.148	.140	.136	.647	.161	-.027	.155	.068	.140	.056	.060	-.031	.046	.070	.269	.021
CT3 selling process	-.044	.095	.234	.047	.110	.762	.202	-.102	.093	.058	.037	.064	.124	.067	.026	.082	.159	.110
CT4 procurement process	.108	.046	.133	.091	-.009	.762	.105	.016	.070	.203	.087	.051	.020	.056	.065	.044	.051	.184
PB1 reduce costs	.069	-.054	.051	.173	-.069	.030	.514	.097	-.072	.435	.267	.070	-.029	-.137	-.065	.036	.133	-.148
PB2 expand market	.019	.091	.177	.117	.090	.129	.811	.052	.087	.100	.074	.083	.014	.086	-.005	.016	-.002	.062
PB3 new businesses	-.049	.102	.153	.047	.075	.160	.795	.017	.138	-.018	.061	.056	.060	.064	.158	.047	.020	.053
PB4 improve coordination	-.148	.027	.066	-.032	.184	.262	.704	.052	.060	.120	.002	.000	-.079	.056	.040	.210	.005	.185
CR1 consumers technologies	-.067	-.048	-.022	.178	-.022	.047	-.091	.619	.039	.188	.067	-.151	.346	.120	.101	.179	-.135	.029
CR2 consumers knowledge	.035	-.054	.002	.187	.017	-.087	-.090	.696	.059	.123	.059	.085	.228	.030	.069	.048	-.109	.042
CR3 online banking	-.028	.056	-.003	.036	.137	.048	.026	.746	.086	-.090	.041	.179	-.029	-.040	-.106	.150	.127	-.027
CR4 credit cards	.173	-.008	.079	.111	-.042	-.014	.139	.727	-.009	-.143	-.064	.262	.032	-.076	-.070	-.036	.014	.127
CR5 e-payment	.070	-.042	.004	.012	-.010	-.022	.201	.711	.054	-.073	.181	.090	.094	-.151	-.102	.028	.214	-.043
SC1 hacking risks	.168	.087	.077	.223	-.045	.097	.010	.032	.768	.093	.047	.020	.161	-.046	-.061	.093	.123	-.044
SC2 data security	.125	.046	.128	.208	.069	.075	.124	.015	.777	.101	.044	.163	.111	.036	.036	.107	.098	.146
SC3 customers trust	.091	.035	.151	.147	.187	.056	.081	.096	.722	-.012	.118	.134	.049	.099	.124	.150	.097	.200
PR9 e-procurement scenarios	.132	.235	.111	.047	.121	.160	.058	-.119	.109	.661	.038	-.037	.116	.007	.128	.097	.131	.244
PR10 online suppliers	.085	.300	.138	.194	.221	.097	.131	-.089	.021	.616	-.013	.085	.052	-.036	.048	.016	.067	.162
GV2 decision-making authority	-.004	.356	.384	.044	.161	.126	.072	.065	.105	.463	.147	.182	.006	-.023	.092	-.025	.137	.122
GV5 business case	-.017	.249	.379	.041	.160	.182	.167	.067	.238	.485	.096	.096	.068	.021	.053	.055	.140	.096
HR1 IT expertise	-.006	.245	.075	.023	.284	.114	.136	.047	.165	-.040	.629	.254	.030	-.013	.017	.071	.157	.241
HR2 IT training	.018	.017	.063	.019	.150	.128	.112	-.027	.093	.127	.762	.142	.189	-.061	.076	.024	-.035	.183
HR3 external consultants	-.082	.012	.099	.152	.126	-.089	-.055	.094	-.107	-.011	.690	-.087	-.019	-.244	.135	.100	.159	-.090
HR4 qualified staff	-.013	.189	.143	.039	.268	.254	.094	.158	.166	.069	.580	.089	.087	.020	.147	.068	.086	.079
SR3 number of IT vendors	.024	-.022	-.017	.098	.047	-.038	.065	.021	.093	.142	-.003	.668	.220	.042	.038	.401	.017	.099
SR4 IT affordable support	.188	.049	-.012	.130	.027	-.018	.034	.101	.121	-.051	.070	.773	.224	.042	.077	.145	.045	.056
SR5 IT training centres	.152	.046	.017	.039	.031	.140	.027	.250	.086	.046	.164	.707	.059	.029	.019	.141	.062	.057
TC1 telecom infrastructure	.208	-.044	-.088	-.040	.071	.212	.064	.079	.123	.048	.183	.271	.499	-.012	-.071	.233	.154	-.202
TC2 connection failure	.097	.048	-.097	-.086	.070	.112	.045	.127	.143	.098	.120	.164	.654	-.059	.008	.030	.209	-.144
TC4 secure e-transaction	.133	.008	.185	.215	.023	-.027	.041	.106	-.016	.060	-.004	.425	.500	-.029	.066	-.054	.195	.019
TC5 secured services	.102	.083	.187	.155	.081	.014	-.025	.085	.097	-.080	-.131	.228	.684	.025	.110	.003	-.022	.212
TC6 CITC support	.263	-.008	.012	-.012	.001	-.005	-.061	.127	.050	.047	.205	.004	.659	.111	-.017	.210	-.013	.185
PC1 adoption cost	.007	.056	.076	.030	-.040	.045	-.043	.019	-.090	-.113	-.086	.110	-.060	.839	-.070	-.083	-.004	.038
PC2 training cost	.014	-.078	-.048	-.001	.012	.005	.063	-.058	.062	.118	-.025	-.009	.103	.882	-.068	-.009	.056	-.087
PC3 maintenance cost	.035	-.037	-.021	.005	.000	-.019	.086	-.052	.060	-.038	-.038	-.034	-.013	.888	-.063	-.030	.032	.006
CP1 suppliers pressure	.075	.022	-.050	.191	-.017	.043	.017	-.114	-.075	-.074	-.001	.016	.035	-.114	.740	.043	.049	.302
CP3 government pressure	.106	-.097	-.058	-.125	-.010	-.034	.095	.098	.090	.198	.179	.209	-.166	-.161	.611	-.023	.221	-.314
CP4 parent/dominant pressure	.057	.110	.074	.058	-.028	.021	.025	-.086	.016	.015	.077	-.028	.049	-.061	.854	.010	.091	.061
SR1 financial infrastructure	.033	.054	.128	.129	.064	.078	-.096	.045	-.037	-.038	.000	.139	.039	-.071	.023	.792	.032	.104
SR2 bank support	.085	-.034	.018	-.021	-.042	-.038	.260	.052	.203	.010	.085	.205	.057	-.105	.005	.730	.094	.020
MP1 online competitors	.057	.033	.022	.026	.002	.033	.043	.093	.096	.168	.024	.128	.000	.104	.180	.034	.722	.305
MP2 e-competitors benefits	.002	.080	.108	.088	.077	.093	-.095	-.051	.054	-.043	.044	-.044	.146	.083	.092	.069	.770	.095
NP1 online customers	.118	.053	.030	.067	.001	.157	.030	.191	.168	.152	.232	.111	.023	.038	.001	.021	.347	.545
NP2 online suppliers	-.006	-.005	-.108	.095	-.019	-.020	.049	-.060	.030	.091	.044							

The resulting factors can be interpreted roughly representing the following 18 constructed concepts: Process readiness (PR), Governance (GV), Commitment (CM), Technology resources (TR), Human resources (HR), Perceived costs (PC), Perceived benefits (PB), Compatibility (CT), Security concerns (SC), Mimetic pressure (MP), Normative pressure (NP), Coercive pressure (CP), Government readiness (GR), ICT infrastructure readiness (TC), Financial institution readiness (BK), IT industry readiness (IT), Consumer readiness (CR) and Institutional trust (TT), as illustrated in Figure 6.1.

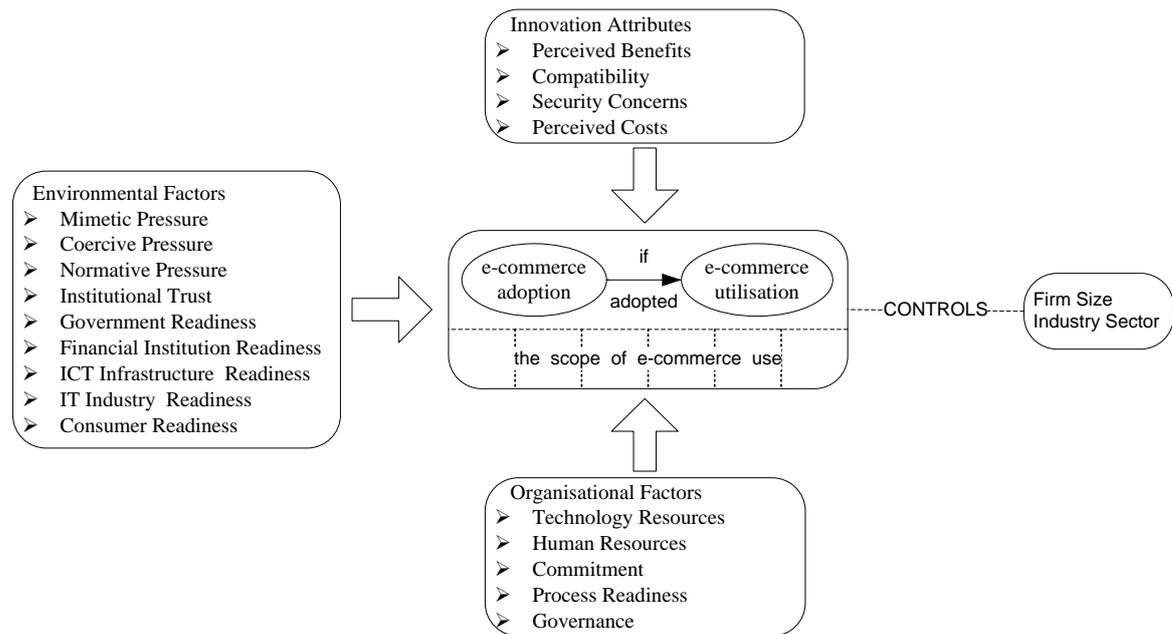


Figure 6.1: Conceptual framework for e-commerce adoption in developing countries

These sub-scales formed 18 factors, with relatively high loadings and minimal cross loadings. Comrey and Lee (1992) have classified the degree of loading into five categories ranging from poor (below 0.45) to excellent (0.71 or above). The results of the factor analysis in Table 6.5 do not have any poor loading, as the minimum factor loadings was 0.47, which is considered as a fair loading according to Comrey and Lee's classification. The results also suggest that 40% of the item loadings are excellent, while 15% of factor loadings are fair, as summaries in Table 6.6.

Table 6.6: Summary of factor loadings according to Comrey and Lee's (1992) classification

Loading Type	Loading range	Number of items	Percentage
Poor	0.32 to 0.44	0	0 %
Fair	0.45 to 0.54	11	15 %
Good	0.55 to 0.62	11	15 %
Very good	0.63 to 0.70	22	30 %
Excellent	0.71 or above	29	40 %
Total		73	100%

The factor analysis, as presented in Table 6.5, shows a relatively clear factor structure. The results indicate that the majority of items uniquely loaded with their hypothesised variables, with only few exceptions. Supplier related process readiness variables (PR9 and PR10) loaded with governance variables. Financial institution readiness variables (SR1 and SR2), which were expected to load with the supporting industry readiness variables, loaded in a unique new dimension, named financial institution readiness (BK). The name of supporting industry readiness was changed to IT industry readiness (IT) because the remaining items of the supporting industry readiness factor are related to the IT industry. The remaining factors held with their hypothesised scales, even though some items were omitted through the iterative process of exploratory factor analysis. The study framework was redesigned to reflect these changes, as illustrated in Figure 6.1.

The factor analysis process highlighted several points related to the study constructs. Firstly, no items were eliminated from innovation attributes. Secondly, all items dropped from organisational readiness are from the governance construct (GV), in addition to one item from process readiness (PR). Items from governance were dropped as a result of: (1) low-loadings in its hypothesised factor (GV) and (2) cross-loading with other factors, particularly commitment (CM). In their original scale development, one item (GV7) was designed and expected to load with its hypothesised factor (commitment), but loaded with governance instead; thus they attached GV7 within governance (Molla and Licker, 2005a). Consequently, it is not surprising to have cross-loadings of items on both governance and commitment constructs. In addition, during the piloting phase in this study as well as in another study using the same instrument, some items from the governance construct were dropped, as the concepts indicated by these items were not likely to be understood by companies in developing countries (Tan et al., 2007).

Thirdly, many items were eliminated from environmental factors. In particular, supporting industry readiness appears to be problematic, as their items did not fit. It appears that items in this construct do not share the same concept and may reflect different constructs. While most developing countries suffer from undeveloped infrastructure and lack support from various industries, the assessment of such industries is not necessarily considered the same amongst businesses. For instance, financial institutions in most GCC countries are more mature than comparable ones in other developing countries, whereas postal mail and delivery services are poor in such a region (Alfuraih, 2008; UPU, 2009). This variation

could explain the emergence of financial institution readiness as a new factor. Similarly, items relating to postal mail and delivery services were likely to be somehow in between supporting industries and the government; thus they were excluded. This might be related to the high dependency of local postal mail on the government readiness. IT-related items, on the other hand, were left alone to introduce the IT readiness construct.

6.2.4 Construct Validity and Reliability

Following Molla and Licker's (2005a) approach, convergent and discriminant validity, which are components of construct validity, were assessed in the present research initially through exploratory factor analysis and then through Average Variance Extracted (AVE) as well as the correlation matrix approach. In principal component analysis, the significant loading of scale items on a single factor indicates the unidimensionality and convergent validity of each construct, whereas discriminant validity, on the other hand, is supported by the elimination of cross-loading items.

Table 6.7: Summary of smallest within-factor (intra-factor) correlation in the scale

	Research construct	# of items	Number of within-factor (intra-factor) correlations in the scale	Smallest within-factor (intra-factor) correlation in the scale
PR	Process Readiness	7	28	0.447
GV	Governance	4	15	0.480
CM	Commitment	5	15	0.610
HR	Human Resources	4	10	0.364
TR	Technology Resources	5	15	0.477
PC	Perceived Costs	3	6	0.622
PB	Perceived Benefits	4	10	0.320
CT	Compatibility	4	10	0.502
SC	Security Concerns	3	6	0.541
NP	Normative Pressure	2	3	0.479
MP	Mimetic Pressure	2	3	0.502
CP	Coercive Pressure	3	6	0.255
GR	Government Readiness	6	21	0.385
BK	Financial Inst. Readiness	2	3	0.460
IT	IT industry readiness	3	6	0.494
TC	ICT Readiness	5	15	0.289
CR	Consumer Readiness	5	15	0.297
TT	Institutional Trust	6	21	0.323
	Total	73		

The correlation matrix approach (Appendix D) was applied for further evaluation of the convergent and discriminant validity. To further evaluate convergent validity, the diagonal (items of the same factor) is assessed by the extent to which the correlations are significant and large enough to suggest further validity assessment (Churchill, 1979). The results from the correlation matrix, as illustrated in Table 6.7, revealed that the smallest within-factor (intra-factor) correlation for each factor is large enough and significantly higher than zero, suggesting proceeding with discriminant validity for further validity analysis.

Table 6.8: Summary of *K*-count to test discriminant validity

	Research construct	# of items	Number of comparisons for each item in the scale	Maximum acceptable <i>K</i>	Instances of validity violation
PR	Process Readiness	7	66	33	-
GV	Governance	6	67	33	-
CM	Commitment	5	68	34	-
HR	Human Resources	4	69	34	-
TR	Technology Resources	5	68	34	-
PC	Perceived Costs	3	70	35	-
PB	Perceived Benefits	4	69	34	-
CT	Compatibility	4	69	34	-
SC	Security Concerns	3	70	35	-
NP	Normative Pressure	2	71	35	-
MP	Mimetic Pressure	2	71	35	-
CP	Coercive Pressure	3	70	35	-
GR	Government Readiness	5	68	34	-
BK	Financial Instit. Readiness	2	71	35	-
IT	IT industry readiness	3	70	35	-
TC	ICT Infrastructure Readiness	5	68	34	-
CR	Consumer Readiness	5	68	34	-
TT	Institutional Trust	6	67	33	-
	Total	73			-

To claim discriminant validity, an item should correlate more significantly with items of its own factor than with items of other factors (Molla and Licker, 2005a). These authors further suggest that the discriminant validity of each item can be assessed by counting the number of times (*K*) that the item correlates stronger with items of other factors than with items of its own factors. For example, the lowest item–factor correlation for CM1 is 0.610 (Table 6.7), which is higher than CM1’s 68 correlations with items of all other variables in the correlation matrix (as in Appendix D); that is, the value of *K* equals zero. To claim discriminant validity of a particular measure, the value of *K* should be less than one-half of the potential comparisons (Molla and Licker, 2005a). Table 6.8 summarises the values of *K*, which indicates no violation of the discriminant validity in all potential comparisons. The correlation matrix, from which the table was extracted (Appendix D), shows that for all the 73 items *K* was zero ($K = 0$) for 64% of the items, while 12% that are greater than five ($K > 5$), from which one ($K = 19$) that approached the threshold point.

Convergent validity and discriminant validity were further examined through Average Variance Extracted (AVE) and its square root, respectively (Fornell and Larcker, 1981). AVE estimates the average variation that a construct can explain in its observed indicators, with a lower AVE limit of 0.50, and the square root of the shared variance should be greater than the correlations between the construct and any other construct (Fornell and Larcker, 1981). As presented in Tables 6.9 and 6.10, these estimates meet the minimum threshold, thereby supporting both convergent and discriminant validity. These results in association with the factor analysis and correlation results provide sufficient evidence of construct validity; hence can ensure data quality.

Table 6.9: Correlation matrix of research variables ($N = 384$)

	PR	GV	CM	HR	TR	PC	PB	CT	SC	NP	MP	CP	GR	BK	IT	TC	CR	TT	
PR	Process Readiness	.985																	
GV	Governance	.737	.987																
CM	Commitment	.661	.642	.836															
HR	Human Resources	.466	.400	.512	.725														
TR	Technology Resources	.499	.505	.549	.623	.775													
PC	Perceived Costs	.073	.051	.053	.145	.075	.750												
PB	Perceived Benefits	.363	.348	.545	.293	.336	-.003	.784											
CT	Compatibility	.548	.506	.691	.431	.451	.043	.511	.817										
SC	Security Concerns	.337	.370	.406	.319	.367	-.007	.265	.331	.882									
NP	Normative Pressure	.381	.394	.466	.402	.375	.123	.263	.375	.374	.877								
MP	Mimetic Pressure	.346	.320	.384	.328	.300	.003	.212	.354	.343	.506	.875							
CP	Coercive Pressure	.207	.202	.267	.234	.172	.125	.164	.256	.189	.352	.312	.750						
GR	Government Readiness	.207	.253	.280	.197	.192	.012	.141	.239	.393	.293	.255	.281	.807					
BK	Financial Inst. Readiness	.199	.177	.279	.224	.243	.136	.205	.246	.337	.273	.195	.106	.284	.867				
IT	IT Industry Readiness	.209	.242	.176	.300	.286	.022	.167	.206	.341	.256	.200	.114	.390	.443	.842			
TC	ICT Infrastructure	.239	.275	.229	.267	.255	.021	.110	.233	.340	.235	.249	.122	.496	.307	.509	.702		
CR	Consumer Readiness	.059	.076	.130	.249	.212	.057	.080	.084	.230	.195	.121	-.026	.236	.234	.368	.366	.736	
TT	Institutional Trust	.323	.361	.431	.299	.368	-.005	.271	.364	.553	.465	.336	.337	.507	.308	.367	.375	.328	.790

Diagonal: $\sqrt{\text{AVE}}$

To examine construct reliability, Cronbach alpha is the most commonly used measure to test reliability coefficient, with a lower limit of 0.70, although it may decrease to 0.60 in exploratory research (Hair et al., 2010). The reliability assessment of the resulting factors implies that there are two weak items (PB1 and CP3) that their elimination would deliver a significant improvement to the reliability of their corresponding constructs; hence they were omitted. To assess the internal consistency of items measuring a particular construct, composite reliability has been computed for each factor (Fornell and Larcker, 1981). As shown in Table 6.10, the reliability results of the constructs satisfy the minimum criteria.

Table 6.10: Construct reliability and validity

Research Construct	# of items	Mean	Cronbach Alpha	Composite Reliability	AVE
PR Process Readiness	7	3.345	0.898	0.996	0.970
GV Governance	4	3.212	0.821	0.994	0.975
CM Commitment	5	3.411	0.918	0.920	0.699
HR Human Resources	4	3.604	0.794	0.805	0.526
TR Technology Resources	5	3.730	0.851	0.880	0.601
PC Perceived Costs	3	3.263	0.856	0.782	0.562
PB Perceived Benefits	3	4.175	0.822	0.889	0.728
CT Compatibility	4	3.725	0.859	0.888	0.667
SC Security Concerns	3	3.262	0.857	0.913	0.778
NP Normative Pressure	2	3.326	0.716	0.870	0.770
MP Mimetic Pressure	2	3.099	0.694	0.867	0.765
CP Coercive Pressure	2	3.003	0.720	0.792	0.670
GR Government Readiness	6	3.058	0.892	0.917	0.651
BK Financial Institution Readiness	2	3.908	0.670	0.858	0.752
IT IT industry readiness	3	3.425	0.795	0.879	0.709
TC ICT Infrastructure Readiness	5	3.284	0.743	0.829	0.493
CR Consumer Readiness	5	3.505	0.787	0.855	0.542
TT Institutional Trust	6	3.396	0.878	0.908	0.624
Total	71				

The relatively low alpha coefficients for the mimetic pressure construct (MP=0.69) and the financial institution readiness construct (BK=0.67) can be partly explained by the small number of items of these constructs (two items associated with each construct), as coefficient alpha tends to decrease when the number of indicators in a construct decreases (Malhotra and Birks, 2003). In summary, the reliability and validity results indicate that the measurement scales meet the minimum acceptable level.

6.2.5 Summated Scale

As one objective of the factor analysis is to identify factors for subsequent multivariate analyses, three main options are available (Hair et al., 2010). The first one is selecting a representative variable usually with the highest factor loading to represent a particular dimension, whereas the second and third options involve replacing the original set of variables with a new, smaller set of factors generated either from summated scales or factor scores (Hair et al, 2010). The objective of the latter options, as these authors claim, is to combine several indicators that are joined in a composite measure to represent a concept. They further argue that not only does a summated scale provide a means of overcoming to some extent the inherent measurement error of measured variables, but also it is able to represent the multiple aspects of a concept in a single scale.

This current research adopted the summated scale option and utilised the most common approach, the average of the items in the scale, to calculate the summated scale for subsequent analyses. The 18 factors extracted in the early factor analysis suggest that 18 summated scales should be constructed. The process of the factor analysis assisted in the construction of the summated scales in this research after evaluating their reliability coefficients. Therefore, all variables (items) loaded highly on a factor are combined in a single summated scale that represents a single concept (factor), which can be used to conduct further multivariate analyses.

6.3 Structural Model

To gain a better understanding of these variables and to meet the research objectives, further multivariate analyses need to be undertaken. In particular, a multivariate dependent analysis is needed to meet the objective of determining factors that affect e-commerce adoption, utilisation and scope of use. The appropriate statistical methods can be identified by looking at the dependent and independent variables.

The main dependent variable, e-commerce adoption, was measured in this research using a six-level categorical-type scale. In this study, the dependent variables are operationalised as categorical scales, while the independent variables were mainly operationalised using 18 metric scales, as well as two categorical variables (firm size and industry sector). When the dependent variable(s) (adoption, utilisation, scope of use) is categorical and the independent variables (factors) are metric, discriminant function analysis and logistic regression are both appropriate statistical techniques (Hair et al., 2010). The main goal of these two methods, according to Hair et al. (2010), is to correctly predict the category of the dependent variable for individual cases. Discriminant analysis and logistic regression in their basic forms are appropriate analytical techniques when only two classifications are involved, while multiple discriminant analysis as well as other forms of logistic regression can be used when more than two categories are involved (Hair et al, 2010).

Unlike discriminant function analysis and even techniques employing linear regression (e.g., ordinary least squares (OLS) regression), logistic regression requires considerably fewer assumptions and operates quite well with the general lack of fundamental assumptions, e.g., normality, linearity and homoscedasticity (Dewberry, 2004). *“It does not require any specific distributional form of the independent variables and issues such as heteroscedasticity do not come into play as they did in discriminant analysis. Moreover, logistic regression does not require linear relationships between the independent variables and the dependent variables as does multiple regression”* (Hair et al, 2010, p. 320). More importantly, in instances where there are categorical independent variables, however, logistic regression is preferred because discriminant analysis creates problems with the use of dummy variables (Hair et al, 2010). The sample for the present research meets the desired level ratio of observations to independent variables according to Hair et al.’s (2010) sampling guideline, (15 to 20 observations for each independent variable), with an average ratio of 19:1 (384 observations for 20 variables).

6.3.1 Data Validation

Given that multivariate techniques are based on fundamental assumptions, Hair et al. (2010) stress that the most fundamental test is examining normality for all metric variables included in the analysis. Therefore, normality was tested for all metric variables before analysing the current dataset. The overall results, as presented in Table 6.11, indicate that there is a departure, with different degrees, from the normal distribution for many research constructs. Normal distribution produces skewness and kurtosis statistics that are very

close to zero; thus the further the departure from zero (regardless of sign), the further the possibility of a non-normal distribution (Field, 2005). For instance, skewness and kurtosis z-scores can be calculated for perceived benefits (PB), compatibility (CT), coercive pressure (CP) and government readiness (GR) in order to assess their normal distribution. The z-scores of PB, CT, CP and GR are -7.808 , -5.688 , -0.925 and -0.280 for skewness, whereas they are 4.210 , 3.250 , -1.560 and -2.097 for kurtosis. These results indicate that these variables are not normally distributed, except one construct (CP).

Table 6.11: Summary statistics and normality tests ($N = 384$)

Explanatory Variables	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
PR Process Readiness	3.348	0.878	-0.472	0.141	0.111	0.281
GV Governance	3.208	0.924	-0.304	0.141	-0.246	0.282
CM Commitment	3.411	0.982	-0.462	0.125	-0.375	0.248
HR Human Resources	3.604	0.833	-0.410	0.125	-0.323	0.248
TR Technology Resources	3.730	0.818	-0.359	0.125	-0.359	0.248
PC Perceived Costs	3.263	0.941	-0.199	0.125	-0.460	0.248
PB Perceived Benefits	4.175	0.776	-0.976	0.125	1.044	0.248
CT Compatibility	3.725	0.844	-0.711	0.125	0.806	0.248
SC Security Concerns	3.262	0.876	-0.229	0.125	-0.245	0.248
NP Normative Pressure	3.326	0.986	-0.425	0.125	-0.319	0.248
MP Mimetic Pressure	3.099	0.915	-0.120	0.125	-0.201	0.248
CP Coercive Pressure	3.003	0.988	0.119	0.125	-0.387	0.248
GR Government Readiness	3.058	0.939	-0.035	0.125	-0.520	0.248
BK Financial Institution Readiness	3.908	0.799	-0.576	0.125	0.328	0.248
IT IT industry readiness	3.425	0.869	-0.154	0.125	-0.451	0.248
TC ICT infrastructure Readiness	3.284	0.757	-0.037	0.125	-0.340	0.248
CR Consumer Readiness	3.505	0.724	-0.264	0.125	-0.030	0.248
TT Institutional Trust	3.396	0.688	-0.143	0.125	0.386	0.248

The Pearson Correlation Matrix was then calculated to check for any collinearity, which “represents the degree to which any variable's effect can be predicted or accounted for by the other variables in the analysis” (Hair et al, 2010, p.21). Although strong correlations were observed between some of the independent variables, as presented in Table 6.9, none of the squared correlations reached the threshold point (0.80) to suggest a problem of collinearity between the research variables (Hair et al, 2010). Further multicollinearity diagnosis were carried out by assessing tolerance and variance inflation factor (VIF), which are the most common measures for collinearity (Hair et al., 2010). These two measures, according to Hair et al., assess the amount of variability amongst independent variables, where higher degrees of multicollinearity are reflected in lower tolerance and higher VIF values. A common multicollinearity cut-off point that indicates a problem is 0.1 for tolerance, which corresponds to $VIF = 10$, while tolerance below 0.2 indicates a potential problem (Hair et al, 2010; Field, 2005). Multicollinearity diagnostic results are illustrated in Table 6.12. The results revealed that none of these values is close to the cut-off threshold to indicate any serious or potential collinearity problem. Since all VIF values

are below 3 (with an average VIF of 1.8) and the tolerance statistics are all above 0.3, it can be concluded that collinearity is not a problem for the current dataset.

Table 6.12: Collinearity statistics

Independent Variable	Tolerance	VIF	Independent Variable	Tolerance	VIF
PR Process Readiness	0.368	2.715	NP Normative Pressure	0.613	1.630
GV Governance	0.386	2.588	MP Mimetic Pressure	0.708	1.412
CM Commitment	0.339	2.953	CP Coercive Pressure	0.778	1.285
HR Human Resources	0.530	1.888	GR Government Readiness	0.628	1.592
TR Technology Resources	0.503	1.990	BK Financial Inst. Readiness	0.728	1.373
PC Perceived Costs	0.891	1.123	IT IT industry readiness	0.568	1.761
PB Perceived Benefits	0.639	1.566	TC ICT Readiness	0.579	1.728
CT Compatibility	0.492	2.034	CR Consumer Readiness	0.733	1.365
SC Security Concerns	0.559	1.788	TT Institutional Trust	0.525	1.903

6.3.2 Research Models and Findings

As discussed earlier, the e-commerce status is measured using a six-item categorical scale, whereas the scope of e-commerce use is measured using an aggregated six-level ordered index. Hence, logistic regression, as discussed in the previous section, is an appropriate technique to model the propositions since the dependent variable is categorical and the independent variables are metric (and categorical), with less concern when violating the typical assumptions of traditional methods (Hair et al, 2010). To correctly predict the category of an outcome in logistic regression, a model that includes predictor variables is created to predict the response variable using different options.

One option is the forced entry method (confirmatory approach), in which variables are entered into the regression model in one block (Field, 2005). The other common option is the stepwise methods (forward or backward stepwise estimation), which tests the fit of the model after each coefficient is added or omitted (Field, 2005). Field (2005) suggests that the former is useful for theory testing, whereas the latter methods are recommended for exploratory research, where no theoretical background is available about which variables are most important. Stepwise methods are not generally recommended as when conducted, important decisions are based on mathematical rather than theoretical criteria. According to Hair et al. (2010), a stepwise procedure requires a larger sample and “*suffers from a greater tendency to become sample-specific*”, which could affect the generalisability of the results (p.175). In analysing the current dataset, the enter method was adopted and a five-percent ($\alpha = 0.05$) significance level was maintained. The following sections address the analysis and results of e-commerce adoption, utilisation and scope of use, using various types of logistic regression statistics.

6.3.2.1 E-Commerce Adoption

As discussed earlier, e-commerce indicator (adoption and utilisation) was measured in this research using a six-level categorical-type scale. At the first stage, e-commerce adoption is operationalised as a binary status of whether or not an organisation has attained at least an interactive e-commerce status (corresponding to the 4th option in the six-level e-commerce indicator) to be considered as an adopter firm. As a binary outcome, the binary logistic regression is an appropriate modelling technique to assess propositions related to e-commerce adoption. To test the adoption of e-commerce, the entry method was carried out in two blocks. The first block compares a constant only model against the final model with all metric explanatory variables, except process readiness (PR) and governance (GV) variables, which are intended for adopter firms only, as discussed in Chapter 5. In the next block, two categorical variables (dummy variables) were added to the model to control their effects (industry sector and business size).

According to Hair et al. (2010), the examination of the goodness fit of a logistic regression model can be drawn upon assessing the model's estimation fit or assessing the predictive accuracy of the model. This can be attained through three approaches: statistical measures of overall model fit, pseudo R^2 and classification accuracy (Hair et al., 2010). Each of these approaches is assessed for the first and the second block models that resulted from the entry logistic regression modelling procedure.

To start the analysis, the result of the baseline model (i.e., a model that does not include any explanatory variable) is calculated. Table 6.13 contains the base model results from binary logistic regression analysis. According to the results illustrated in Table 6.13, the overall probability of being in the adopter class (Adoption = 1) for the base model with only the intercept ($b = -0.027$) is not statistically significant ($p > 0.05$). To assess the overall fit of the base model, predictive accuracy can be examined.

Table 6.13: Variables in the equation and classification table for the baseline model

Factor	Coefficient	Wald Statistics	Significance	Odds Ratio
Constant	-0.027	0.067	0.795	0.973

Observed	Predicted		% Correct
	Non adopter firms	Adopter firms	
Non adopter firms	188	0	100.0
Adopter firms	183	0	0.0
Overall			50.7

The classification matrix represents the level of predictive accuracy achieved by the logistic model using the hit ratio measure, which represents the percentage of cases correctly classified (Hair et al., 2010). The predictions of the baseline model are made purely on whichever category occurred most often in the dataset. In the current dataset, the model always guesses ‘no’ because more companies did not achieve e-commerce adoption (188 adopters compared to 183 non-adopters). The overall percentage row, as shown in Table 6.13, indicates that this approach to prediction is correct 50.7 percent of the time, which is almost the same as chance or tossing a coin.

The next step is to evaluate the binary logistic regression with all explanatory variables to check that the proposed model (with explanatory predictors) is an improvement over the baseline model. According to Hair et al. (2010), binary logistic regression uses Chi-square statistical measure in order to test the significant difference between the Log-likelihoods, specifically the -2 Log Likelihood ($-2LL$), of the baseline model (with constant only) and other proposed models (with predictors). If the proposed model has a significantly reduced Log likelihood compared to the prior model, then the proposed model is explaining more of the variance in the outcome and is improved.

Table 6.14: Variables in the equation and classification table for the first block model ^a ($N = 371$)

Factor	Coefficient (S.E.)	Wald Statistics	Odds Ratio
CM Commitment	0.431 (0.227)	3.613	1.539
HR Human Resources	0.647 (0.230)**	7.926	1.910
TR Technology Resources	0.698 (0.236)**	8.764	2.011
PC Perceived Costs	-0.168 (0.147)	1.317	0.845
PB Perceived Benefits	0.504 (0.223)*	5.122	1.656
CT Compatibility	0.023 (0.237)	0.009	1.023
SC Security Concerns	-0.113 (0.206)	0.302	0.893
NP Normative Pressure	-0.361 (0.187)	3.736	0.697
MP Mimetic Pressure	0.981 (0.198)***	24.619	2.666
CP Coercive Pressure	-0.092 (0.161)	0.325	0.912
GR Government Readiness	-0.413 (0.183)*	5.088	0.662
BK Financial Institution Readiness	0.471 (0.201)*	5.517	1.602
IT IT industry readiness	-0.134 (0.203)	0.433	0.875
TC ICT Infrastructure Readiness	-0.362 (0.236)	2.354	0.696
CR Consumer Readiness	-0.247 (0.218)	1.284	0.781
TT Institutional Trust	0.119 (0.284)	0.174	1.126

Observed	Predicted		% Correct
	Non adopter firms	Adopter firms	
Non adopter firms	141	47	75.0
Adopter firms	46	137	74.9
Overall			74.9

a. Log likelihood ($-2LL = 356.038$, Chi-square = 158.209, $df = 16$, $p < 0.0005$); Hosmer & Lemeshow (Chi-square = 4.391, $df = 8$, $p = 0.820$); Cox & Snell R-Square = 0.347; Nagelkerke R-Square = 0.463;

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

For the first block model, all metric explanatory variables were added. With a value of 356.038 for $-2LL$, the result of the proposed model (Chi-square (16, $N = 371$) = 158.209) indicates that the new logistic model is statistically significant at the 0.000 level, as shown

in Table 6.14. This result suggests that these explanatory variables reliably predicted whether or not e-commerce was adopted. The second assessment of the overall fit is the discriminating power of the model by examining whether the results reach the necessary levels of practical significance (Hair et al., 2010). In addition to the overall measures, the group-specific measures were calculated for both adopters and non-adopters. The results, as illustrated in Table 6.14, indicate that the first block model correctly predicts 75.0 percent of businesses in the sample, which is better than the hit ratio of 50.7 percent that would be expected due to chance using proportional chance criteria. Detailed results of the first block are illustrated in Table 6.14, including the explanatory variables.

For the second block, two categorical independent variables (dummy variables) were added to the proposed model (industry sector and business size) to control their effects. In the second block, small firms and manufacturing sector were chosen as references for the business size and industry dummy variables respectively as they represent the majority. As illustrated in Table 6.15, the $-2LL$ value of the logistic regression analysis is 310.144 for the second block (final model).

Table 6.15: Variables in the equation and classification table for the second block model^a ($N = 371$)

Factor		Coefficient (S.E.)	Wald Statistics	Odds Ratio
CM	Commitment	0.554 (0.244)*	5.163	1.741
HR	Human Resources	0.458 (0.249)	3.374	1.580
TR	Technology Resources	0.411 (0.271)	2.298	1.508
PC	Perceived Costs	-0.053 (0.164)	0.106	0.948
PB	Perceived Benefits	0.573 (0.252)*	5.164	1.773
CT	Compatibility	0.252 (0.257)	0.966	1.287
SC	Security Concerns	-0.120 (0.222)	0.294	0.887
NP	Normative Pressure	-0.378 (0.209)	3.278	0.685
MP	Mimetic Pressure	0.823 (0.221)***	13.869	2.278
CP	Coercive Pressure	-0.039 (0.178)	0.047	0.962
GR	Government Readiness	-0.310 (0.201)	2.377	0.733
BK	Financial Institution Readiness	0.296 (0.225)	1.726	1.344
IT	IT industry readiness	0.009 (0.227)	0.002	1.010
TC	ICT Infrastructure Readiness	-0.233 (0.264)	0.780	0.792
CR	Consumer Readiness	-0.395 (0.237)	2.770	0.674
TT	Institutional Trust	0.148 (0.304)	0.236	1.159
BSEC	Business Sector		18.426	
	Industry – Distribution	0.109 (0.443)	0.060	1.115
	Industry – Financial Services	1.090 (0.610)	3.192	2.975
	Industry – IT & Communication	1.452 (0.509)**	8.135	4.271
	Industry – Other Business Services	1.445 (0.597)*	5.860	4.244
	Industry – Construction & Real Estate	1.246 (0.641)	3.783	3.478
	Industry – Training & Consultation	1.558 (0.692)*	5.071	4.748
	Industry – Other Business Sector	1.099 (0.623)	3.109	3.001
BEMP	Business Size		24.158	
	Size – Medium	1.087 (0.409)**	7.064	2.966
	Size – Large	1.901 (0.387)***	24.089	6.692

Observed	Predicted		% Correct
	Non adopter firms	Adopter firms	
Non adopter firms	153	35	81.4
Adopter firms	32	151	82.5
Overall			81.9

a. Log likelihood ($-2LL = 310.144$; Chi-square = 204.104 $df = 25$, $p < 0.0005$); Hosmer & Lemeshow (Chi-square = 5.725, $df = 8$, $p = 0.678$); Cox & Snell R-Square = 0.423; Nagelkerke R-Square = 0.564.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The binary logistic regression produces a statistically significant result (Chi-square = 45.859, $df = 9$, $p < 0.001$ for the block; and Chi-square = 204.104, $df = 25$, $p < 0.0005$ for the final model), indicating that there is a significant decrease in the $-2LL$ value. The new model correctly predicts 81.9% of firms in the sample (81.4% of the non-adopters and 82.5% of the adopters), as presented in Table 6.15. This result is better than the result of the first block model (74.9%) by 7.0%. Consequently, the modified model is statistically significant in discriminating e-commerce adopters from non-adopters.

The other most commonly used Goodness-of-fit tests for a logistic regression model are *Hosmer & Lemeshow's Chi-square* and *Pseudo R-square*. The Hosmer & Lemeshow's goodness-of-fit statistic is “based on grouping cases into deciles of risk and comparing the observed probability with the expected probability within each decile” (IBM, 2011). It is more robust, particularly for models with continuous variables and when the sample size is small (IBM, 2011). To examine whether or not the model is an adequate fit to the data, Hosmer & Lemeshow provides a Chi-square test of the actual and predicted values of the dependent variable and the better fit is indicated by a smaller deference (Hair et al., 2010). The null hypothesis is that the model is a good fit for the data, and it should be rejected when the null hypothesis is violated, i.e. $p < 0.05$. The results of Hosmer & Lemeshow test are summarised at the bottom of Table 6.14 and Table 6.15 for the first and second block models, respectively. The results indicate insignificant differences between actual and expected values for both the first ($p = 0.820$) and the second ($p = 0.678$) block models, indicating an acceptable model fit.

The most common way to evaluate the effectiveness of a regression model is to calculate R^2 , which represents the extent of the relationship between one or more independent variables and the response variable (Hair et al., 2010). The Pseudo R^2 statistic in logistic regression, as these authors state, approximate the amount of variance explained based on the reduction in the $-2LL$ value. Like R^2 in other statistical techniques (e.g., multiple regression), pseudo- R^2 results range between ‘0’, indicating poor model fit, and ‘1’, indicating perfect model fit (Hair et al., 2010). The value of ‘1’ suggests that the model accounts for 100% of the variance in the outcome, whereas the value of ‘0’ suggests that the model accounts for none of the variance. For the first block logistic regression model, the Nagelkerke R^2 result ($R^2 = 0.463$) indicates that the logistic regression with these predictors explains approximately 46.3% of the variation in e-commerce adoption. For the second block logistic regression model, the Nagelkerke R^2 result ($R^2 = 0.564$) suggests that

the second model with these additional dummy variables was improved by around 10% and explains at least one-half (56.4%) of the variation between the two groups of firms. Detail results of binary logistic analysis for the final model are presented in Table 6.15.

By re-visiting the classification metrics of the final model (Table 6.15), the logistic regression is correctly predicting a probability of around 0.81 (80:20 chance) for e-commerce adoption. To provide a useful visual guide for the accuracy of the final model in classifying individual cases, the classification plot from SPSS (Ver. 18) can be used. For e-commerce adoption, the plot shows the frequency of categorisations for different predicted probabilities as well as whether they were adopter ‘A’ or non-adopter ‘N’ categorisations, as presented in Figure 6.2.

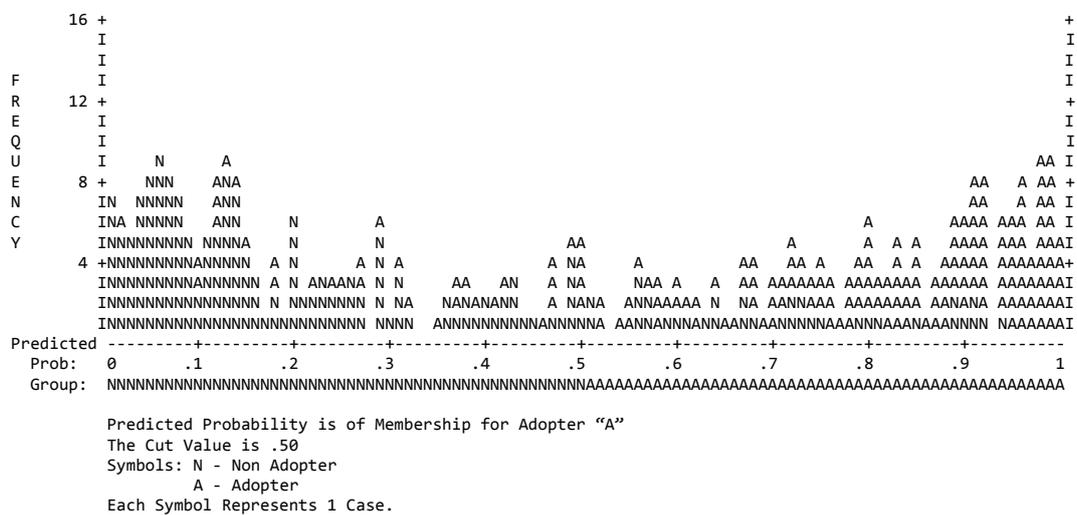


Figure 6.2: Observed groups and predicted probabilities

The classification graph shows that where the event did occur (adoption was achieved, as indicated by ‘A’ in the graph) the predicted probability was also high, and that where the event did not occur (adoption was not achieved, indicated by ‘N’ in the graph) the predicted probability was also low. It can be concluded from the graph that the model is good in predicting the outcome for individual cases, as there is quite a lot of cases that are actually towards the left and right ends of the graph and fewer cases are in the centre area of the plot (Field, 2005).

The most important results, however, are related to the effect of explanatory variables in the final logistic model (Table 6.15). These results need to be carefully examined because they are at the heart of evaluating the study propositions related to e-commerce adoption. In a form of a logit-transformed probability, logistic regression analysis allows to assess a

relationship between a binary outcome and predictor variables (UCLA, 2007a). In logistic regression, the coefficients of the explanatory variables can be estimated using either the odds value (i.e., the probability of the occurrence of an event divided by the probability of its absence) or the logit value (i.e., log of the odds) (Hair et. al, 2010).

In Table 6.15, an estimated coefficient represents the logit regression coefficient of the corresponding independent variable. In addition to the odds ratios (the exponentiation of the b coefficient), Wald statistic is also illustrated, which is a Chi-square test that logistic regression uses to assess the significance of each coefficient (Hair et. al., 2010; UCLA, 2007b). Unlike odds ratios that can only be positive, a logit coefficient can have both positive and negative values. While a positive coefficient indicates a higher predicted probability, a negative coefficient reduces the predicted probability (Hair et al, 2010). In logistic regression, a value of zero for a logit coefficient ($b = 0$) corresponds to an odds ratio of 1 or a probability of 0.50, indicating that the coefficient has no impact on the outcome (Hair et al, 2010). These authors emphasise that the coefficients of continuous variables and categorical variables in logistic regression need to be interpreted differently, as they have different impacts on the outcome.

The results revealed that commitment, perceived benefits and mimetic pressure are positively significant determinants for e-commerce adoption ($p < 0.05$), as shown in Table 6.15. The most significant predictor for e-commerce adoption, as indicated by the significance level, was mimetic pressure ($b = 0.823$, $p < 0.001$), followed by perceived benefits ($b = 0.573$, $p < 0.05$) and commitment ($b = 0.554$, $p < 0.05$). Hence, Saudi firms that encounter more mimetic pressure, have more commitment especially from their top management and perceive greater e-commerce benefits are likely to adopt e-commerce. For the non-metric control variables, the impact of firm size outweighs the impact of industry sector. These results indicate that there is a positive relationship between the number of employees and adoption e-commerce, whereas all sectors that had significant effects are from service-based industries, which were found to be significantly higher in adopting e-commerce than comparable Manufacturing companies. For example, there is a positive coefficient for IT and Communication firms ($b = 1.452$), indicating that they are $\text{Exp}(1.452) = 4.27$ times more likely to adopt e-commerce than comparable Manufacturing firms. The remaining factors did not have a significant effect as adopter and non-adopter firms have similar views about the impact of these factors on e-commerce adoption.

6.3.2.2 E-Commerce Utilisation

In the next stage, the analysis of e-commerce utilisation is only for adopter organisations that achieved at least an interactive e-commerce status. In the previous section, the binary logistic regression technique was employed to model a dichotomous (binary) outcome, i.e. whether or not an interactive e-commerce status was achieved. E-commerce utilisation, on the other hand, is defined in this research as a multichotomous outcome, in which three ordered levels of e-commerce utilisation were examined. When more than two outcome categories are involved, the binary logistic regression modelling cannot be used, but rather an extension of it can be applied (Hair et al, 2010). In this study, the level of e-commerce utilisation is specified by achieving one of the following ordered e-commerce statuses: Interactive Web, Transactive Web or Integrated Web status.

Even though multiple discriminant analysis and multinomial logistic regression are more general and allow for more than two response categories, they ignore any ordering of the values of the dependent variable (Norusis, 2011). The ordered logistic regression is an alternative statistical technique that incorporates the ordinal nature of a multichotomous dependent variable (Daykin and Moffatt, 2002; Norusis, 2011). Thus, the ordered logistic regression was adopted to test the utilisation model and the individual propositions by investigating the extent of e-commerce adoption of three ordered clusters: interactive, transactive and integrated e-commerce adopters.

In ordinal regression, the probability of an event is redefined to incorporate the cumulative probabilities (Strand et al., 2011). For the model estimation in ordinal regression, the link function specifies which transformation of the cumulative probabilities is applied to the ordinal categories (Garson, 2011). Although different link functions are available, the logit model is by far the most utilised link function in ordinal regression, because it offers more interpretable parameter estimates (Garson, 2011). Unlike the other link functions, if the logit link function is used, then the odds ratios has the same interpretation for the binary logistic regression (IBM, 2008). Therefore, it is a reasonable choice as a form of logistic regression modelling that is appropriate for examining e-commerce utilisation.

Nevertheless, the ordinal regression only applies to data that meet a key assumption called the assumption of proportional odds (Garson, 2011; Norusis, 2011). To assess whether one set of coefficients for all the categories is appropriate, the assumption of proportional odds assumes that predictor variables have the same effect on the proportional odds across the

different thresholds (Strand et al., 2011). This means that the coefficients that describe the relationship between each pair of outcome categories of the response variable are the same (UCLA, 2007c). If the general model gives a significantly better fit to the data than the ordinal (proportional odds) model (i.e., $p > 0.05$), then the assumption of proportional odds is rejected (Strand et al., 2011). The result of the assumption of proportional odds, known as the assumption of parallel lines in SPSS 18, is illustrated in Table 6.16. The test of parallel lines (proportional odds) compares the ordinal model (null hypothesis model) to a model with a separate set of coefficients for each threshold (general model). The null hypothesis of this Chi-square test assumes that the relationship between all pairs of groups is the same across response groups, which is the conclusion drawn for the current dataset, given the insignificant result ($p = 0.575$) of the assumption of parallel lines, as illustrated in Table 6.16. Therefore, the assumption of proportional odds is met.

Table 6.16: Test of parallel lines^b

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Null Hypothesis	255.301			
General	230.305 ^a	24.996 ^a	27	0.575

a. The Chi-Square statistic is computed based on the log-likelihood of last iteration of the general model.

b. Link function: Logit.

The next statistic is intended to test the Goodness-of-Fit of the model. The first goodness-of-fit test uses Chi-square method to assess how much predicted cell frequencies differ from observed frequencies, from which the usual Pearson and Deviance goodness-of-fit measures are computed (Garson, 2011). Although the deviance version is more commonly cited, both goodness-of-fit statistics should be used for models that have relatively large expected values in each cell (Norusis, 2011). If the null hypothesis is not rejected (i.e., $p > 0.05$), then it can be concluded that the data and the model predictions are similar and that the model is good. However, if the assumption of a good fit is rejected (i.e., $p < 0.05$), then the model does not fit the data very well. The computed Chi-square coefficients for the current analysis, as shown in Table 6.17, suggest that the model fits the data adequately.

Table 6.17: Goodness-of-fit test

	Chi-Square	df	Sig.
Pearson	311.760	333	0.793
Deviance	255.301	333	0.999

Link function: Logit.

With many metric predictors, however, it is expected to have a reasonably high percentage of empty cells, which is a warning for the accuracy of the goodness-of-fit test (Garson, 2011). Therefore, further inspections are needed to test the predictive power of the model. As discussed in the previous section, the overall logistic regression model can be assessed

by looking at the change in the likelihood function ($-2LL$) when explanatory variables are added to the base model, i.e. intercept only model (Norusis, 2011). The change in $-2LL$ has a Chi-square distribution even when there are cells with small observed and predicted counts (Norusis, 2011). As illustrated in Table 6.18, the difference between the two log-likelihoods (Chi-square (27, $N = 183$) = 110.396) are significant.

Table 6.18: Model fitting information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	365.697			
Final	255.301	110.396	27	.000

Link function: Logit.

This result suggests that the $-2LL$ value for the baseline model (365.697) is significantly different from the corresponding value for the full model (255.301), suggesting a rejection of the null hypothesis that the intercept-only model is as good as the model with the predictors. For assessing the practical significance of the overall model fit, the pseudo- R^2 statistics are performed. These statistics are used to measure the strength of the association between the predictor variables and the outcome (Hair et al., 2010). As illustrated in Table 6.19, the Nagelkerke R^2 indicates that the model can account for at least one-half (52.4%) of effect size for e-commerce utilisation.

Table 6.19: Results of ordered logistic regression analysis^a ($N = 183$)

	Factor	Coefficient (S.E.)	Wald Statistics	Odds Ratio
PR	Process Readiness	1.231 (0.405)**	9.246	3.426
GV	Governance	0.486 (0.329)	2.182	1.625
CM	Commitment	1.143 (0.413)**	7.675	3.136
HR	Human Resources	0.359 (0.356)	1.016	1.431
TR	Technology Resources	-0.068 (0.378)	0.032	0.934
PC	Perceived Costs	0.172 (0.223)	0.595	1.188
PB	Perceived Benefits	-0.020 (0.379)	0.003	0.981
CT	Compatibility	-0.606 (0.376)	2.594	0.546
SC	Security Concerns	-0.791 (0.291)**	7.371	0.453
NP	Normative Pressure	-0.346 (0.285)	1.470	0.708
MP	Mimetic Pressure	0.349 (0.268)	1.702	1.418
CP	Coercive Pressure	-0.015 (0.216)	0.005	0.985
GR	Government Readiness	0.510 (0.237)*	4.642	1.665
BK	Financial Institution Readiness	-0.327 (0.309)	1.120	0.721
IT	IT industry readiness	0.031 (0.281)	0.012	1.031
TC	ICT Infrastructure Readiness	0.142 (0.313)	0.204	1.152
CR	Consumer Readiness	-0.098 (0.293)	0.113	0.906
TT	Institutional Trust	0.388 (0.365)	1.127	1.474
BSEC	Business Sector			
	Industry – Distribution	0.012 (0.613)	0.000	1.012
	Industry – Financial Services	-0.212 (0.674)	0.098	0.809
	Industry – IT & Communication	0.104 (0.532)	0.038	1.110
	Industry – Other Business Services	-0.580 (0.732)	0.628	0.560
	Industry – Construction & Real Estate	-1.531 (0.987)	2.406	0.216
	Industry – Training & Consultation	-0.307 (0.878)	0.122	0.736
	Industry – Other Business Sector	-0.874 (0.906)	0.931	0.417
BEMP	Business Size			
	Size – Medium	0.146 (0.596)	0.060	1.158
	Size – Large	0.954 (0.498)	3.666	2.597

a. Log likelihood (Chi-square = 110.396; $-2LL = 255.301$); Cox & Snell $R^2 = 0.453$; Nagelkerke $R^2 = 0.524$; McFadden = 0.302
 * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

To assess the model discriminating power, the predicted probability of each response category was calculated so that a case is assigned to the response category for which it has the highest predicted probability (Norusis, 2011). The classification table, known as the confusion matrix or hit rate table, is obtained by cross tabulating the grouping variable (utilisation status) by the predicted probability in order to show the classification accuracy (Garson, 2011; Norusis, 2011). It was known from the overall fit that the proposed model adequately fits data, which can be confirmed from the classification table, as presented in Table 6.20. The results suggest that 75.8% and 87.8% are correctly assigned to the initial and advance-adopter firms respectively using the predicted probability. By a common definition, the hit rate by chance would be guessing whichever category occurred most often in the dataset (advance category), which gives a chance hit rate of approximately 49% in the current dataset. The resulting misclassification rate is around 29.5%, whereas the total of the correct classifications = 129 out of 183 responses, which approximately amounts to a 70.5% hit rate. This result suggests a good improvement (21%) upon chance predictions and confirms the finding of the effect size obtained by the pseudo- R^2 statistics.

Table 6.20: Classification table of e-commerce utilisation ($N = 183$)

		Predicted Response Category			Total
		Initial	Middle	Advance	
Utilisation Status	Initial	50	0	16	66
	Middle	12	0	15	27
	Advance	11	0	79	90
Total		73	0	110	183
Total of Most Occurred Category		= 90			
Percent of Correct Guessing		= 49.2 %			
Total of Correct Prediction		= 129			
Percent of Correct Prediction		= 70.5 %			

The results of the confusion matrix also suggest that none of the small number of the middle class is correctly assigned. Such a result could be because of the unbalanced distribution of the classes. To investigate this further, a balanced sample was examined using two techniques. The first one is by reducing the number of cases in the initial and advance classes to be equivalent to the middle class, and the second technique is by duplicating the cases in the middle class to be balanced with the other classes. In both cases, it ends up that 63% and 52% of the middle cases were correctly assigned to their corresponding class in the reduced and duplicated cases, respectively. Hence, it can be concluded that the missing prediction for the middle class in the above classification matrix is due to the unbalanced distribution amongst classes. The misclassification rate should not be a concern, as the goal of the analysis is to study the association between the independent variables and the outcome. Further discussion of this problem is beyond the scope of the current research and is open for further research.

The final and most important results are related to the explanatory variables in the research model, as presented in Table 6.19. These results need to be examined because they are at the heart of answering questions related to the factors that affect organisations in Saudi Arabia to extensively utilise e-commerce. The analysis of the ordered logistic regression model indicate that process readiness, commitment, government readiness, and security had significant coefficients different from zero (i.e., $p < 0.05$), while other variables have no effect on e-commerce utilisation (i.e., $p > 0.05$).

The results suggest that significant positive relationships exist between e-commerce utilisation and process readiness, commitment and government readiness. This means that as these factors increase, so does the probability of being in one of the higher categories of e-commerce utilisation. Security, on the other hand, has a significant negative relationship with e-commerce utilisation. Consequently, organisations that have high process readiness and commitment and perceive greater government readiness are more likely to extensively utilise e-commerce, but they are likely to have more security concerns throughout their e-commerce utilisation. The results indicate that process readiness ($b = 1.231$, $p < 0.01$) is the most significant determinant of the extent of e-commerce adoption, as indicated by the significance level, followed by commitment ($b = 1.143$, $p < 0.01$), security ($b = -0.791$, $p < 0.01$) and government readiness ($b = 0.510$, $p < 0.05$). Of the control variables, neither industry sector nor firm size had a significant impact on e-commerce utilisation.

6.3.2.3 E-Commerce Scope of Use

Following similar studies, the scope of e-commerce use is defined in this research as the extent of e-commerce use for six different value chain activities over the Internet, namely, advertising and marketing, data exchange with customers, data exchange with suppliers, online sales, online purchase and after-sale service and support. The scope of e-commerce use was measured by an index that was created by aggregating these six Internet activities (Gibbs and Kraemer, 2004; Zhu et al., 2006b). The dependent variable, the scope of e-commerce use, is the total number of these five Internet activities, ranging from 0 to 6 and creating seven ordered levels of e-commerce use, with level 6 implying the highest.

Unlike standard linear regression (e.g. OLS), logistic regression requires considerably fewer assumptions (Dewberry, 2004). In particular, normality cannot be assumed with a categorical outcome since residuals can only take one value for each combination of the predictors (Flom, 2013). There was also a departure from the normal distribution for many constructs, as discussed earlier in section 6.3.1. In techniques employing linear regression

analysis, such as OLS and even its extensions, the levels of the outcome is assumed to be equivalent throughout the range of the response (IBM, 2011). When the outcome is not continuous, “*the OLS model makes nonsensical predictions*” (Flom, 2013, p. 1). Logistic regression, on the other hand, transforms the outcome and uses the log of the odds ratio of being in a particular category rather than using the categorical outcome (Flom, 2013). Ordinal regression is an extension of the linear regression to ordinal data (Norusis, 2011). While the scope of e-commerce use is obviously an ordered outcome, it is an aggregated variable and the difference between the levels of the scope is not necessarily consistent and can be quite arbitrary and “*recoding the outcome will give very different results*” (Flom, 2013, p. 1). Thus, ordered logistic regression is seen as an appropriate technique to examine the scope of e-commerce use in this research (Moffatt, 2011).

As discussed in the previous section, the ordinal regression only applies to data that meet the assumption of proportional odds, where the ordinal model is compared to the general model (Garson, 2011; Norusis, 2011). The null hypothesis of this Chi-square test assumes that the relationship between all pairs of groups is the same across response groups, which is the conclusion drawn for the current dataset. Hence, the assumption of parallel lines is met, suggesting proceeding for further analysis. The next statistic is intended to assess whether the current dataset is consistent with the generated model using Pearson and Deviance goodness-of-fit measures. In these tests, a conclusion can be made that the data and the model predictions are similar and the model fits the data if null hypothesis is not rejected, i.e. $p > 0.05$. As illustrated in Table 6.21, the null hypothesis is accepted ($p = 0.623$), suggesting that the scope of e-commerce model fits the data well.

Table 6.21: Goodness-of-fit test

	Chi-Square	df	Sig.
Pearson	2149.776	2171	0.623
Deviance	1132.950	2171	1.000

Link function: Logit.

To further inspect the predictive power of the model, the overall model can be assessed by looking at the change in the likelihood function ($-2LL$) when the explanatory variables are added to the base model, i.e. intercept only model (Norusis, 2011). As presented in Table 6.22, the difference between the two log-likelihoods (Chi-square (25, $N = 372$) = 167.304) has a significant level of less than 0.0005. This result suggests that the $-2LL$ value for the baseline model (1301.640) is significantly different from the corresponding value for the full model (1134.337), suggesting a rejection of the null hypothesis.

Table 6.22: Model fitting information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1301.640			
Final	1134.337	167.304	25	.000

Link function: Logit.

An inspection of the Pseudo- R^2 is performed to gain a further indication of the predictive power of the research model. The pseudo- R^2 statistics are performed to test the practical significance of the overall model fit by assessing the strength of the association between the predictor variables and the outcome (Hair et al., 2010). By looking at the model fit as presented in Table 6.23, the Nagelkerke R^2 indicates that the model can account for 37% of the effect size for the scope of e-commerce use. This result, along with the previous goodness-of-fit tests, can be taken as an indication of the predictive power of this model.

Table 6.23: Results of e-commerce scope of use analysis^a

Factor	Coefficient (S.E.)	Wald Statistics	Odds Ratio
CM Commitment	0.593 (0.173)***	11.778	1.809
HR Human Resources	0.207 (0.163)	1.617	1.230
TR Technology Resources	0.074 (0.172)	0.187	1.077
PC Perceived Costs	-0.081 (0.107)	0.573	0.922
PB Perceived Benefits	0.400 (0.162)*	6.122	1.492
CT Compatibility	0.106 (0.169)	0.391	1.112
SC Security Concerns	0.225 (0.149)	2.295	1.252
NP Normative Pressure	0.215 (0.132)	2.639	1.239
MP Mimetic Pressure	0.286 (0.137)*	4.345	1.331
CP Coercive Pressure	-0.223 (0.112)*	3.969	0.800
GR Government Readiness	-0.352 (0.133)**	6.982	0.704
BK Financial Institution Readiness	0.408 (0.150)**	7.362	1.504
IT IT industry readiness	-0.409 (0.146)**	7.831	0.664
TC Consumer Readiness	-0.046 (0.169)	0.073	0.955
CR ICT Infrastructure Readiness	-0.123 (0.155)	0.626	0.885
TT Institutional Trust	-0.289 (0.204)	2.006	0.749
BSEC Business Sector			
Industry – Distribution	0.659 (0.291)*	5.121	1.932
Industry – Financial Services	-0.275 (0.386)	0.510	0.759
Industry – IT & Communication	1.578 (0.325)***	23.530	4.845
Industry – Other Business Services	0.029 (0.401)	0.005	1.030
Industry – Construction & Real Estate	-0.005 (0.446)	0.000	0.995
Industry – Training & Consultation	-0.766 (0.485)	2.487	0.465
Industry – Other Business Sector	0.347 (0.465)	0.555	1.415
BEMP Business Size			
Size – Medium	0.032 (0.285)	0.012	1.032
Size – Large	0.222 (0.257)	0.749	1.249

a. Log likelihood (Chi-square = 1134.337; -2 LL = 167.304); Cox & Snell $R^2 = 0.362$; Nagelkerke $R^2 = 0.373$; McFadden = 0.128

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The final statistics are the most important results, which are related to the explanatory variables in the regression model (Table 6.23). These results are examined because they are at the heart of answering questions about the factors that affect e-commerce scope of use. In addition to commitment, perceived benefits, mimetic pressure, coercive pressure and the readiness of the government, financial institutions and IT industry are significantly different from zero ($p < 0.05$). The most significant factor for the scope of e-commerce use were commitment ($b = 0.593$, $p < 0.001$), IT industry readiness ($b = 0.409$, $p < 0.01$),

financial institution readiness ($b = -0.408, p < 0.01$) and government readiness ($b = -0.352, p < 0.01$), followed by perceived benefits ($b = 0.400, p < 0.05$), mimetic pressure ($b = 0.286, p < 0.05$) and coercive pressure ($b = -0.223, p < 0.05$), while the other metric variables did not have a significant impact on the scope of e-commerce use.

Commitment, perceived benefits, mimetic pressure and financial institution readiness affect the scope of e-commerce use positively, whereas government readiness, IT industry readiness and coercive pressure affect the scope of e-commerce use negatively. Therefore, firms that have more commitment and perceive greater mimetic pressure and financial institution readiness are likely to utilise e-commerce more broadly across their value chains, but they have concerns with regards to coercive pressure as well as the readiness of IT industry and the government. For the control variables, industry sector was found to have a significant effect on e-commerce scope of use, whereas firm size had no effect.

6.4 Summary

This chapter discussed the survey results. The measurement model was evaluated for reliability, convergent validity and discriminant validity. The process started by testing the initial reliability of the hypothesised constructs. It then followed by addressing the issue of construct validity through factor analysis. The iterative procedure of the factor analysis produced 18 factors. Although factor analysis provides evidence for construct validity, convergent and discriminant validity were further examined via the correlation approach as well as Average Variance Extracted (AVE) and its square root. Lastly, the construct reliability was evaluated by assessing the reliability coefficients (Cronbach alpha). The results generally satisfied the minimum criterion of validity and reliability.

After examining underlying assumptions, research models were analysed for e-commerce adoption, utilisation and scope of use. Binary logistic regression was executed for the former, whereas ordered logistic regression was used for the latter ones. The findings revealed that commitment, perceived benefits and mimetic pressure are determinants for e-commerce adoption, in addition to business size and industry sector. Process readiness, commitment, government readiness, security and business size had significant impacts on e-commerce utilisation, while commitment, perceived benefits, mimetic pressure, coercive pressure, IT industry readiness, financial industry readiness, government readiness and industry sector are significant determinants for e-commerce scope of use.

CHAPTER 7: Discussion of Findings

7.1 Overview

In the previous chapters, data analyses were conducted and the findings were presented in detail. The present chapter discusses interpretations of the study findings. In particular, the researcher intends to link the findings of the survey with prior research conducted on IT innovation adoption and diffusion as well as the findings of the exploratory investigation presented in Chapter 4.

7.2 Discussion of Findings

To extend our understanding of e-commerce phenomenon at an organisational level in high-income developing countries, the current research investigated e-commerce adoption and post-adoption at different level of analysis. In contrast to stand-alone IT innovations, the adoption and use of Internet-based innovations goes beyond organisational boundaries and requires an in-depth analysis of the readiness of the external environment (Molla and Licker, 2005b). Unlike previous studies, the current research adopted a multi-perspective approach and examined various adoption stages, namely, adoption, extent of adoption and scope of use. The study framework was analysed based on three theoretical foundations, namely, (1) innovation perspective, (2) institutional perspective, and (3) the readiness perspective. Grounded in the TEO framework, this study investigated organisational and environmental contexts in addition to innovation attributes. The research framework was empirically tested to address these issues using a unique dataset from Saudi Arabia. Before proceeding to the discussion sections, it might be useful to briefly highlight the survey findings, which are summarised in Table 7.1.

Table 7.1: Summary of the impact of research factors on e-commerce adoption stages

	Research Factor	Adoption	Scope of use	Utilisation
	Organisational Factors			
PR	Process Readiness	n/a	n/a	1.231 (0.405)**
GV	Governance	n/a	n/a	0.486 (0.329)
CM	Commitment	0.554 (0.244)*	0.593 (0.173)***	1.143 (0.413)**
HR	Human Resources	0.458 (0.249)	0.207 (0.163)	0.359 (0.356)
TR	Technology Resources	0.411 (0.271)	0.074 (0.172)	-0.068 (0.378)
	Innovation Attributes			
PC	Perceived Costs	-0.053 (0.164)	-0.081 (0.107)	0.172 (0.223)
PB	Perceived Benefits	0.573 (0.252)*	0.400 (0.162)*	-0.020 (0.379)
CT	Compatibility	0.252 (0.257)	0.106 (0.169)	-0.606 (0.376)
SC	Security	-0.120 (0.222)	0.225 (0.149)	-0.791 (0.291)**
	Environmental Factors			
NP	Normative Pressure	-0.378 (0.209)	0.215 (0.132)	-0.346 (0.285)
MP	Mimetic Pressure	0.823 (0.221)***	0.286 (0.137)*	0.349 (0.268)
CP	Coercive Pressure	-0.039 (0.178)	-0.223 (0.112)*	-0.015 (0.216)
GR	Government Readiness	-0.310 (0.201)	-0.352 (0.133)**	0.510 (0.237)*
BK	Financial Institution Readiness	0.296 (0.225)	0.408 (0.150)**	-0.327 (0.309)
IT	IT industry readiness	0.009 (0.227)	-0.409 (0.146)**	0.031 (0.281)
TC	ICT Infrastructure Readiness	-0.233 (0.264)	-0.046 (0.169)	0.142 (0.313)
CR	Consumer Readiness	-0.395 (0.237)	-0.123 (0.155)	-0.098 (0.293)
TT	Institutional Trust	0.148 (0.304)	-0.289 (0.204)	0.388 (0.365)
	Control Variables			
BSEC	Business Sector			
	Distribution	0.109 (0.443)	0.659 (0.291)*	0.012 (0.613)
	Financial Services	1.090 (0.610)	-0.275 (0.386)	-0.212 (0.674)
	IT & Communication	1.452 (0.509)**	1.578 (0.325)***	0.104 (0.532)
	Other Business Services	1.445 (0.597)*	0.029 (0.401)	-0.580 (0.732)
	Construction & Real Estate	1.246 (0.641)	-0.005 (0.446)	-1.531 (0.987)
	Training & Consultation	1.558 (0.692)*	-0.766 (0.485)	-0.307 (0.878)
	Other Business Sector	1.099 (0.623)	0.347 (0.465)	-0.874 (0.906)
BEMP	Business Size			
	Medium	1.087 (0.409)**	0.032 (0.285)	0.146 (0.596)
	Large	1.901 (0.387)***	0.222 (0.257)	0.954 (0.498)
	<i>Nagelkerke R-Square</i>	$R^2 = 0.564$	$R^2 = 0.373$	$R^2 = 0.524$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The findings show that perceived benefits and mimetic pressure are more influential for e-commerce adoption and scope of use than the extent of e-commerce utilisation amongst adopter enterprises. In addition to coercive pressure, the readiness of financial institutions, IT industry and the government all influence e-commerce use across the value chain. For adopter companies, the extent of e-commerce adoption is influenced by process readiness, government readiness and security. Commitment, especially from top management, stands as a key determinant that links the three e-commerce settings, i.e. e-commerce adoption, e-commerce utilisation, and the scope of e-commerce use.

The findings revealed that the proposed models are sufficiently reliable in discriminating not only adopters from non-adopters but also the degree of e-commerce adoption as well as the scope of e-commerce use across the value chain. Interpretations based on the survey findings are discussed in the following sections. In particular, the literature, as well as the findings of the exploratory study presented in Chapter 4, is linked to justify and/or explain the survey findings, which are graphically conceptualised in Figure 7.1.

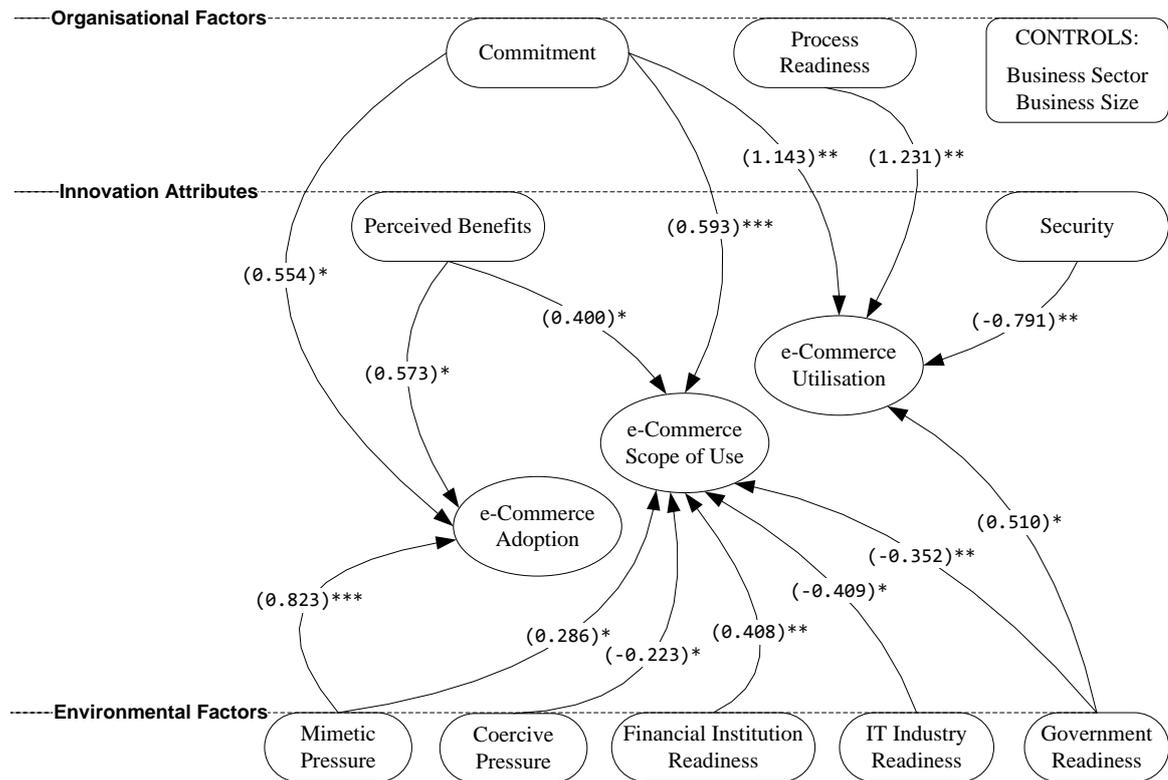


Figure 7.1: The impact of research constructs on e-commerce adoption stages

7.2.1 Innovation Attributes

The survey analysis revealed that perceived benefits is a significant factor that positively influences Saudi firms not only to adopt e-commerce, but also to use it along value chain activities. Such a finding supports the conventional wisdom that perceived usefulness is a key determinant of innovation adoption (Davis, 1989; Roger, 2003). In cross-country studies, this factor was found to be a strong predictor for the use of business activities over the Internet (Gibbs and Kraemer, 2004; Zhu et al., 2006b). This finding can be explained by the lack of recognition of e-commerce strategic benefits amongst non-adopter firms and enterprises with a low e-commerce use in Saudi Arabia. This explanation is supported by the exploratory findings (section 4.6.2.1), as non-adopter and entry-level adopter firms primarily focused on operational benefits, e.g. cost reduction and efficiency; “*No benefits or income from it [the website], it is just for information*” (Case F7).

Although some ICT initiatives and awareness programmes have been instigated by the Saudi government in the last few years, the focus is mostly on the public sector (and citizens to some extent), whereas little attention has been paid to the private sector. For instance, the Saudi government has established a large scale project for the e-Government Program (Yesser) that provides the required information and support for governmental

agencies to provide e-government services (MCIT, 2011d). Moreover, the ‘Dissemination of Digital Culture and Knowledge Lectures initiative’ and the ‘E-Training Caravans’ are awareness programmes related to ICT literacy and use amongst Saudi citizens, particularly youth as well as students at an early age and low-income residents (MCIT, 2011h; 2011g). *“I don't think there is any e-commerce awareness. I have been invited once to attend a forum on e-government. There might be some e-commerce invitations, but it is very limited and focused on general information for public”* (Case F2).

The findings also revealed that perceived benefits did not have a significant impact on e-commerce utilisation amongst adopter companies. One possible explanation is that firms in Saudi Arabia that have adopted e-commerce might not be reaping the expected strategic benefits and competitive advantages when they extensively utilise e-commerce. While e-commerce was felt to provide positive benefits to enterprises in Saudi Arabia, it is more likely to be below the expectation of those adopters and hence did not lead to a higher utilisation. This explanation supports the exploratory findings (section 4.6.2.1) in that the low level of e-commerce utilisation amongst Saudi companies was not perceived as a competitive disadvantage, and some adopter enterprises had concerns related to the extent of success amongst competitors; *“The one thing that is a disincentive is that no trader could do it [advanced e-commerce]”* (Case F10).

Although it has no impact on e-commerce adoption and scope of use, the results have revealed that security negatively influences e-commerce utilisation. Such a finding is inconsistent with most prior studies that found adopters to have fewer security concerns on the use of Internet-based innovations (Zhu et al., 2006b). One possible explanation is that adopter firms are likely to face serious security scares while conducting businesses over the Internet, as revealed in the exploratory study (4.6.2.4). *“Security issues were the main concern we had ... 10% of the daily calls were for changes to the passwords of customer accounts because of hacking that was happening on a significant scale”* (Case F8). Studies conducted within the country have revealed that security issues, especially hacking, are a major e-commerce concern amongst Saudi enterprises (Al-Otaibi and Al-Zahrani, 2003; Aldwsry and Mayhew, 2011). Such a finding has raised security and legal protection concerns for business conducted over the Internet in Saudi Arabia, which would require more effort and awareness-raising, *“to dispel myths and concerns regarding security of transactions and privacy of data”* (Sait et al., 2004, p.72).

Inconsistent with the conventional wisdom, the findings revealed that compatibility and perceived costs do not have a significant impact on e-commerce adoption, utilisation or scope of use. Therefore, Saudi companies at different levels of e-commerce utilisation and non-adopters have similar views about e-commerce compatibility and perceived costs. While studies on IT innovation adoption have suggested a negative relationship between IT innovation adoption and perceived costs (Tornatzky and Klein, 1982; Zhu et al., 2006b), emerging studies have revealed different views over the influence of compatibility on Internet-based innovation adoption. Gibbs and Kraemer (2004) found no relationship between compatibility and the scope of e-commerce use, whereas Zhu et al. (2006b) found it to be a significant determinant for e-business use. Teo et al. (2009) in another study found no significant relationship between e-procurement adoption and perceived costs.

One possible explanation for these insignificant findings is that some non-adopter firms in Saudi Arabia may have already made the requisite organisational changes, but halted their decision to adopt or utilise e-commerce for other reasons. The findings of the exploratory study (section 4.6.2.5) revealed that some non-adopter firms had invested a great deal in IT and did not have any compatibility or cost concerns (e.g. Case 4), while some adopter firms, on the other hand, believed that *“The available financial support was a problem when adopting e-commerce ... there was a need for hardware, but no budget for it ... there was a need for experts, but they weren't available ... At this time it is difficult to be skilled and advanced in e-commerce ... Due to the lack of sufficient budget”* (Case F8).

7.2.2 Organisational Factors

Inconsistent with prior IT innovation studies, technology and human resources does not have a significant impact on e-commerce adoption and post-adoption, as by controlling business size and industry, these internal resources became insignificant. Such a finding contradicts the conventional wisdom of the influence of organisational resources on IT innovation adoption (Iacovou et al., 1995; Kwon and Zmud, 1987). It is also inconsistent with the findings of emerging studies on Internet-based innovation adoption and post-adoption in the global context (Xu et al., 2004; Zhu and Kraemer, 2005; Zhu et al., 2006b). Molla and Licker (2005b), on the other hand, found technological and human resources to be significant for initial e-commerce adoption and insignificant for the extent of adoption in developing countries. The insignificant impact of technology and human resources amongst firms in this study could suggest that some non-adopter firms have already established their internal resources, whereas other adopter enterprises suffer from

a lack of certain IT components. This conclusion is observed in the exploratory results (section 4.6.3.1), as some non-adopter companies considered IT consultants and training in addition to the advanced IT technologies in place (e.g. Case 4), whereas other adopter enterprises (Case F8 and F10) suffered from unqualified staff and management as well as a lack of IT training. Such a finding suggests that internal resources might be needed for e-commerce adoption and subsequent utilisation; however, high internal resources do not necessarily lead to a high level of e-commerce utilisation.

The findings demonstrate the importance of commitment amongst Saudi firms, especially from top management, as a key determinant for all e-commerce settings, i.e. e-commerce adoption, utilisation and scope of use. This is consistent with the conventional wisdom of the role of commitment on IT innovation adoption (Teo et al., 2004; Jeyaraj et al., 2006). This finding is supported by the findings of the exploratory study (section 4.6.3.2), as advanced adopter organisations had a clear e-commerce strategy and their e-commerce implementation and initiatives are supported and championed by management staff, while other firms had a lower level of commitment and management support; *“There is no clear vision. There is limited support [for e-commerce]”* (Case F7). Such a finding confirms the conclusion that top management support is amongst the key determinants of e-commerce adoption and stands as the only predictor that links individual and organisational adoption of IT innovations (Jeyaraj et al., 2006). One possible justification of such an outcome is that organisational support and commitment is likely to help overcome difficulties and facilitate the adoption and post-adoption of IT technologies.

In this research, process readiness and governance of e-commerce were investigated for adopter firms only. The former, which is neglected in most innovation adoption studies, is found to be a strong determinant for e-commerce utilisation, emphasising its importance in high-income developing countries. This finding confirms the conclusion of the exploratory study (section 4.6.3.3) in that firms that lack process readiness face serious challenges when utilising advanced e-commerce. *“Because we didn't have defined process in our business, everything became difficult. Customer care couldn't solve customers' problems and complaints. Sales personnel couldn't process the existing orders. We didn't have mature processes or a mature business approach aligned with the existing IT systems”* (Case F1). Such a finding supports Cooper and Zmud's (1990) argument that the utilisation stage demands changes in business process and structure. It could also be used to suggest that the key determinant of e-commerce adoption moves from the basic use of

such a technology to deeper strategies and deployment, as e-commerce evolves (Zhu and Kraemer, 2005). In particular, moving beyond the entry-level of e-commerce utilisation requires concrete efforts to business processes and the way to manage them, as conducting business over the Internet mandates digital transformation of traditional systems, which are heavily dependent on physical processes (Zhu and Kraemer, 2005).

Governance, on the other hand, appears to be insignificant although it is an important determinant for e-commerce utilisation and implementation in studies in the developing world (e.g., Molla and Licker, 2005b; Alwabel and Zairi, 2005). One possible explanation is that best practice in governance may be a paradigm that is not fully comprehended amongst enterprises in Saudi Arabia, as during the exploratory and piloting phase, certain concepts within the governance construct were not adequately understood by some of the sampled companies in this research; this is also the case across the developing world (Tan et al., 2007). Kurnia et al. (2009) found the impact of governance to be insignificant in determining advanced e-commerce technologies, attributing that to the lack of specialised infrastructure, business coordination and detailed procedures amongst SMEs in Malaysia. Likewise, Tan et al. (2007) concluded that businesses with high values in governance were not likely to have adopted e-commerce. Unlike enterprises in the developed world, Zhu et al. (2006a) found that firms in developing countries encounter managerial obstacles (e.g., making the necessary organisational changes, acquiring staff with e-business expertise, integrating the Internet into the business strategy); therefore emphasising the importance of building IT managerial skills to overcome such obstacles.

For the control variables, business sector has no effect on e-commerce utilisation, while industry differences in terms of e-commerce adoption and scope of use are evident. Unlike other industry sectors, the findings indicate that service-based firms in Saudi Arabia adopt e-commerce more readily than comparable Manufacturing firms. Similarly, enterprises from the distribution sector as well as IT and communication enterprises use more e-commerce along their value chain activities than comparable Manufacturing organisations. Such a finding confirms the importance of the meso-level (i.e. industry) in e-commerce adoption and use, as Saudi companies from different industrial sectors tend to adopt and assimilate e-commerce differently across their respective value chain activities.

The firm size effect, on the other hand, is significantly positive for e-commerce adoption. This finding can be explained by the common belief that large firms tend to enjoy the

resource advantages required for e-commerce investment (Rogers, 1983). However, firm size did not have a significant impact on the post-adoption stages. In e-commerce post-adoption research, firm size has been found to have different impacts on adoption stages. In particular, firm size was found to have a positive impact on the initial adoption stage, while it has a negative impact in the latter stages (Zhu et al., 2006a). Another study found firm size to be insignificant for the scope of e-commerce use (Gibbs and Kraemer, 2004). Such a finding suggests that small enterprises in Saudi Arabia may have the advantage, allowing them to utilise e-commerce across their value chain activities as extensively as large companies (Gibbs and Kraemer, 2004).

7.2.3 Environmental Factors

The research findings show that mimetic pressure is a key determinant not only for e-commerce adoption but also for e-commerce use in Saudi Arabia; this is consistent with the conventional wisdom of the role of institutional pressure on IT innovation adoption (Teo et al., 2003; Zhu et al., 2006b; Gibbs and Kraemer, 2004). While such a finding may suggest that firms felt the need to adopt e-commerce to gain competitive advantage, it may also suggest that companies responded to the mimetic pressure by adopting e-commerce in order to keep up with competitors based on their degree of adoption and their perceived success (Sadowski et al., 2002; Teo et al., 2003). Such a finding is also in line with the finding of the exploratory investigation (section 4.6.4.1), as most competitors of advanced adopters were more capable for e-commerce than other firms in the sample; “*Competition has a big role and we try to be in a better position among competitors in e-services*” (Case F6). Non-adopter firms, on the other hand, believed that they “*are at the same level as other companies [in e-commerce]. ... We don't want the beginning to be from us. We want to see others' success. ... We don't want to be who tries it first*” (Case F9). Such a finding emphasises the importance of this institutional influence in the region as a major facilitator to go online and use e-commerce more broadly across the value chain.

The findings also revealed that mimetic pressure does not have a significant impact on e-commerce utilisation amongst adopter firms in Saudi Arabia. In a cross-country study for e-business assimilation, Zhu et al. (2006a) found that competition has a positive impact for e-business adoption, but negatively impacts routinisation (i.e., full scale deployment of e-business), “*suggesting that too much competition is not necessarily good for technology assimilation because it drives firms to chase the latest technologies without learning how to use existing ones effectively*” (p.1557). Similarly, Kuan and Chau (2001) found that

small companies that adopted EDI perceived significantly lower industry pressure than non-adopter firms. Unlike markets in the developed world, in which firms can obtain more information about the e-commerce development of competitors, market imperfections are likely to weaken competitive pressure to extensively utilise e-commerce in less-developed countries (Dewan and Kraemer, 2000; Zhu and Kraemer, 2005). In particular, the lack of perceived success amongst competitors in developing countries works as a barrier for e-commerce utilisation, as revealed by the exploratory research (section 4.6.4.1); “*The one thing that is a disincentive is that no trader can do it [advanced e-commerce]. ... The [X] company few years ago adopted e-commerce, but failed to continue*” (Case F10).

Coercive pressure negatively influences the scope of e-commerce use, although it has no impact on the adoption and utilisation. Such a finding could be attributed to the immature institutional structure for local markets in most developing countries (Zhu et al., 2004). While an enterprise may use e-commerce as a response to a powerful business partner in its environment, the immature market in Saudi Arabia is likely to minimise this pressure. Some adopter firms in such a market may encounter powerful partners that do not accept the use of electronic channels in doing business with them, or even seek to control their e-commerce use. Such a finding was highlighted in the exploratory study (section 4.6.4.2). For example, one respondent (Case F2) declared that they requested large companies as well as other public organisations to communicate with them via e-mail, but they did not accept the request. Another respondent (Case F8) declared that “*the mother company controlled and enforced us to be at this level [of e-commerce] and not to include any e-payment method online.... We even have no refund system ... and instead, we have to transfer the credits to another service that the customer chooses ... which caused many problems with customers*”.

Inconsistent with the literature, normative pressure is insignificant in this research. The relatively low readiness of market forces within the country could possibly explain such a finding. In other words, e-commerce maturity amongst market forces within Saudi Arabia seems not to be high enough to influence e-commerce adoption and post-adoption. When those adopters introduced e-commerce to their companies, the adoption decision might have been based on other factors, such as perceived e-commerce benefits and/or mimetic pressure. Such an explanation is consistent with the exploratory findings (sections 4.6.4.2 and 4.6.4.3), as the vast majority of the interviewees explained that there were not many customers or suppliers using e-commerce technologies within the country; “*We as Saudis*

haven't reached the maturity level [of e-commerce] ... customers and trading partners aren't e-ready. ... Now we are at the same level as other companies” (Case F9).

The findings indicate that institutional trust and consumer readiness are also insignificant, suggesting that adopter firms at different levels of utilisation as well as non-adopters have similar views about these factors. This is consistent with the findings of the exploratory study (section 4.6.4.4 and 4.6.4.8), where most respondents from both adopter and non-adopter companies believed that Saudi people are not ready to adopt Internet commerce; *“Consumer e-readiness differs in transactional and non-transactional activities. It is around 10% in transactional activities, and 60 to 70% in non-transactional activities. ... Saudi consumers aren't ready for online purchase. ... They don't understand the flow of orders [shopping cart]” (Case F1).* The vast majority of those respondents believed that consumer culture is a major challenge for e-commerce adoption within the country; hence, identifying various cultural aspects that may manifest while conducting e-commerce.

Consistent with Hofstede’s (1991) rankings, this research highlighted some cultural issues of the business and legal environment within Saudi Arabia. According to DePauw (2006), Saudi Arabia is a collectivist society, in which members act for a group goal rather than any individual goal. Due to such a collective nature, relationships are likely to influence business dealings in Saudi Arabia (Idris, 2007); *“... people here have a different culture and don't want to buy directly, but want to see other options. ... Most people like to buy after consultation and not directly. People here don't read and don't come specifying what they want to buy. ... I have never been asked about manuals of a specific product to be read before buying ... but instead, a consumer says "I want to do such and such" ... and s/he wants a suggestion” (Case F3).* It is also believed that Saudi Arabia has a high level of uncertainty avoidance, which could be attributed to the very conservative nature of its society and the many rules that restrict freedom and that hinder change from the outside (DePauw, 2006). *“Uncertainty avoidance deals with a society's tolerance for uncertainty and ambiguity. It indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations. Unstructured situations are novel, unknown, surprising, different from usual” (Hofstede, 2013).*

E-commerce in Saudi Arabia can be considered as an ‘unstructured situation’ that is likely to be encountered by uncertainty avoidance as well as a low level of tolerance; *“Even though we can offer some services online through signals, consumers may think that we*

are spying on them ... as happened in similar situations” (Case F7). While some firms in Saudi Arabia have been focusing on customer satisfaction and offering their services over the Internet, *“the employees who got the orders noticed that those consumers who had ordered online suddenly got worried and started flooding us with calls, saying “What’s happened to my order?” ... People don’t trust that the service will be delivered without complaints*” (Case F1). The trust concern amongst most respondents in the exploratory investigation (section 4.6.4.4) could also be attributed to uncertainty avoidance. This could be translated into the desire for face-to-face interactions to build relationships with trust; *“We use bank LC when buying, and it is the right way. I guarantee my right and they guarantee theirs. ... We are afraid of fraud because we buy in huge quantities*” (Case F2). Even though adopter enterprises at different e-commerce stages and non-adopter firms have similar views with regard to institutional trust as well as consumer readiness, their influence should not be underestimated.

The findings indicate that government readiness proved to have various impacts on the e-commerce adoption stages. Although government readiness has no impact on e-commerce adoption, it negatively affects the scope of e-commerce, while its impact is positive on e-commerce utilisation amongst adopter enterprises; thus challenging conventional wisdom. In developing countries, government readiness has been found to be a key determinant for e-commerce post-adoption (Molla and Licker, 2005b; Gibbs and Kraemer, 2004). In their cross-country research, Zhu et al. (2006a) found that the regulatory environment is a key factor for e-business assimilation in the developing world, particularly at the initiation stage. Due to uncertainty avoidance, there is a notion to prefer government interventions in e-business practices amongst companies in Saudi Arabia (Cassell and Blake, 2011); *“When the government recommends dealing electronically, we will certainly do so because of its influential power. ... Whenever e-government is provided and applied, all will follow it like a herd, because the economy in this country is based on government support ... and it is the leader*” (Case F2). This finding emphasises the importance of government intervention to facilitate e-commerce adoption and post-adoption amongst firms in developing countries (Montealegre, 1999; Molla and Licker, 2005b).

The negative effect of government readiness on the scope of e-commerce use could be attributed to concerns regarding the lack of government support and commitment, as revealed by the exploratory study (sections 4.6.4.6); *“The government is now focusing only on the public sector. There is no information that is specific for e-commerce. There is*

no support for e-commerce ... There is no EFT between firms, and the government doesn't encourage it...” (Case F1). In recent research, 81.6% of participants believe that Saudi Arabia needs to establish sophisticated laws that would protect the right of participating parties conducting e-commerce transactions (Alhomaid, 2010). The current Cyber Crime law in Saudi Arabia focuses on the IT legal system that safeguards the rights of the legal use of computers and information networks (Albur, 2008). Thus, such a negative effect could be due to concerns regarding the inadequate regulatory environment even amongst adopter firms, as revealed by the exploratory study (sections 4.6.4.6.1); *“For e-commerce, it is not clear whom to deal with in case of disputes ... When there is a conflict in something, there is no specific judicial authority we can refer to. ... In reality, there are no clear laws ... There is no regulatory environment that supports e-commerce”* (Case F1). In other words, there have been no publicised disputes within Saudi Arabia to establish a precedent for dispute resolution since Internet access became legal (EIU, 2007). Such an explanation supports the importance of establishing an appropriate institutional framework and sophisticated laws that could minimise such concerns (Kraemer et al., 2006).

While ICT infrastructure readiness has no significant effect in this research, the readiness of financial institutions and the IT industry has a significant impact on e-commerce scope of use, which is positive for the former and negative for the latter. The literature suggests that the availability of supporting services within a country that promotes e-commerce is a major determinant of its adoption (Doolin et al, 2003; Srinivasan et al, 2002). While it has no significant impact on initial adoption, Molla and Licker (2005b) found that supporting industry readiness has a significant impact on the extent of e-commerce adoption. Kurnia et al. (2009), on the other hand, found a negative relationship between the adoption of e-commerce technologies and perceived supporting services. While both adopter and non-adopter firms in Saudi Arabia have similar views with regard to ICT infrastructure, they both agree, as reported in the exploratory research (section 4.6.4.7.1), that *“it is getting better, but not enough. There are areas even in the large cities that have no Internet connection, and the cost is very high for the middle class”* (Case F8).

The significant positive relationship of financial institution readiness emphasises its role in e-commerce use, as supported by the exploratory study (section 4.6.4.5); *“We can't forget the support of [Y] bank for our integration with them when using Visa cards in our sales ... such support is very important”* (Case F1). The negative effect of IT industry readiness, on the other hand, could suggest that adopter firms perceive the IT industry readiness as

below expectation in terms of availability and affordability to satisfy the requirements of e-commerce use across the value chain, as revealed by the exploratory findings (section 4.6.4.7.3); *“The aim of IT companies is getting money and they are very expensive; and this is why SMEs cannot go forward; and there are not enough of them. There are some companies but the ones that can really do it are very small in number”* (Case F2). Even though items related to postal and delivery services (SR6 and SR7) were dropped for cross loadings with government readiness, the findings of the exploratory study as well as prior studies in the country indicate that it is a major constraint for e-commerce adoption in Saudi Arabia; *“The Saudi post is very, very weak in their addressing system and postal services. ... There are neither efficient, affordable postal services nor delivery systems. There is no addressing system and there is a huge corruption in the Saudi post”* (Case F1). These environmental barriers require more efforts by the government to overcome them.

7.2.4 Discussion Notes

Together, the above discussion offers insight into how e-commerce diffusion is influenced by various determinants from different perspectives, and how these effects vary across the e-commerce adoption stages in this high-income developing country. In his DOI theory, Rogers (2003) defines five categories of adopters as a classification of innovativeness, namely, innovators, early adopters, early majority, late majority and laggards. That is, for any new innovation, innovators are usually willing to take risks and be the first to adopt an innovation (Rogers, 2003). As e-commerce is at an early development stage within Saudi Arabia, it can be argued that most e-commerce adopter firms belong to the innovator or early adopter categories, who is likely to adopt e-commerce regardless of difficulties and challenges (Rogers, 2003). In the exploratory study, while many adopter firms, especially advanced adopters, were innovators and tried radical solutions for the challenges they encountered, most non-adopter enterprises believe that they *“are at the same level as other companies [in e-commerce]. ... We don't want the beginning to be from us. We want to see others' success. ... We don't want to be who tries it first”* (Case F9).

Accordingly, the not-very-strong impacts of many determinants should not be used to underscore their significant role on e-commerce adoption and post-adoption in high-income developing countries. In the same way, they could however be used to justify how some determinants have insignificant or even negative impacts, as those innovators were not likely to make their decisions purely based on their evaluation of such factors. Once more, all factors that negatively influence e-commerce use are from the environmental

context, whereas the one innovation attribute, security, negatively influences adopter firms when extensively utilising e-commerce are related to current laws and regulations.

In Saudi Arabia, there are many official laws and regulations, but in reality they are not practised or followed. When evaluating e-commerce conditions and components, adopter firms are likely to have more knowledge about the current state of e-commerce conditions and components than non-adopter firms. In particular, advanced adopter firms have more experience and have encountered the challenges associated with utilising e-commerce across the value chain in such an emerging market; *“In reality, there are no clear laws ... There is no regulatory environment that supports e-commerce”* (Case F1). The evaluation of non-adopter and low level adopter firms, on the other hand, is mainly based on the available official documents and their awareness about them; *“Even though we haven't reached the maturity and stability yet, after adopting cyber crime laws, at least there is an official system”* (Case F4). Such an argument supports the preliminary conclusion that adopter enterprises were not satisfied enough and had a negative attitude towards the readiness of the government as well as supporting industries, suggested during assessing possible bias related to survey forms (section 5.8). Future research in the region may need to focus on these issues so that concrete conclusions can be drawn.

7.3 Summary

In this chapter, interpretations were discussed based on the study findings across three e-commerce settings, i.e. e-commerce adoption, e-commerce utilisation and the scope of e-commerce use. This chapter has justified the study findings, linking them with previous work in similar contexts as well as with the findings of the exploratory study presented in Chapter 4. The findings have offered insight into how e-commerce adoption is influenced by contextual factors across the adoption stages. In summary, this research has provided a more holistic view than that currently available in the literature on e-commerce adoption in developing countries, by considering various issues at different levels of analysis and at various adoption stages. The next chapter intends to draw conclusions from this research by discussing the research contributions and implications.

CHAPTER 8: Research Conclusion

8.1 Overview

This final chapter draws conclusions for the current research. It starts with summarising the research and its major findings, and it then identifies the key contributions to the body of knowledge and implications for business managers and policy makers. It concludes by discussing the research limitations and addressing avenues for future work.

8.2 Research Summary

After providing a background to the study context, the research problem and motivations were defined, from which the research aim and objectives were drawn. As discussed in the first chapter, this research has been undertaken to investigate e-commerce adoption in high-income developing countries at an organisational level, taking Saudi Arabia as a case study. In particular, this research has been conducted: (1) to devise a multi-perspective framework and to specify the theoretical perspectives that can be employed to study e-commerce adoption and post-adoption in high-income developing countries; (2) to explore the e-commerce situation in Saudi Arabia and to gain insights into various issues that may affect e-commerce adoption and post-adoption within the country; (3) to identify the particular factors that influence e-commerce adoption and post-adoption, and how these effects vary at the different stages; and (4) to identify managerial and policy implications related to e-commerce adoption and post-adoption in this little-explored country. To meet the research objectives, Gidden's (1984) levels of understanding were translated into two phases based on the post-positivism paradigm, as discussed in the methodology chapter (Chapter 3). In particular, the first and second objectives were met through an exploratory phase, while the third and fourth objectives were met via an explanatory phase.

In particular, *to devise a multi-perspective framework and to specify the theoretical perspectives that can be employed to study e-commerce adoption and post-adoption in high-income developing countries*, an exploratory phase was conducted. The exploratory phase consisted of a literature review (Chapter 2) and an exploratory study (Chapter 4). To identify a knowledge gap and to propose a theoretical framework, a thorough literature review was conducted, with special emphasis paid to major theories as well as frameworks adopted to investigate e-commerce from different perspectives. The chapter concluded by providing a preliminary framework based on the interactionism perspective for examining e-commerce adoption in developing countries. Due to the lack of e-commerce research in the region, an exploratory study was conducted *to explore the e-commerce situation in Saudi Arabia and to gain insights into various issues that may affect e-commerce adoption and post-adoption within the country*. In the exploratory research, ten companies were investigated, where managerial staff were interviewed. The qualitative data were analysed using thematic analysis for each case and in relation to the other cases according to their extent of e-commerce adoption. The results of the exploratory study, in association with relevant literature, provided insights and helped enhance the research framework.

Unlike traditional studies, which tended to focus on a single domain and a single adoption stage, this research incorporated a multi-perspective view and examined different adoption stages, namely, adoption, extent of adoption (utilisation), and scope of use. Grounded in the TOE framework, the research framework encompasses innovation attributes (derived from the DOI theory), external pressures (from institutional theory), and organisational readiness and external readiness (from the PERM model). Taking these together and collating their various aspects such that the intended framework fits the purposes of this research, the proposed framework therefore consists of four innovation attributes, five organisational factors, and eight environmental factors, in addition to two organisational characteristics. For the innovation attributes, perceived benefits, compatibility, perceived costs and security were investigated. The organisational factors encompass technology resources, human resources, commitment, process readiness and governance; firm size and industry are also included to control their effects. The environmental factors encompass mimetic pressure, normative pressure, coercive pressure, ICT infrastructure readiness, supporting industry readiness, government readiness, consumer readiness and institutional trust. The exploratory phase concluded by discussing these constructs and raising the research propositions, as addressed in Chapter 4.

The explanatory phase started by addressing the empirical settings for the survey study, particularly construct conceptualisation and operationalisation, as discussed in Chapter 5. In the survey study, the measurement scales were designed to investigate how the innovation attributes, organisational factors and environmental factors affect e-commerce adoption, utilisation and scope of use. Prior to the final distribution of the survey, the questionnaire was translated, pre-tested and piloted. Data were collected from private Saudi Arabian organisations, where 800 firms were targeted by the means of purposive and response-driven sampling. To ensure data quality, management staff were targeted as the best source of data collection in this research. After the survey administration, descriptive statistics were employed to assist in detecting mistakes and missing data as well as in describing the demographic characteristics of the sample. Cases with high missing values were omitted and mean substitution was employed as a remedy for the remaining missing values. Of the 800 distributed survey questionnaires, there were 384 usable questionnaires, i.e. a response rate of 48.0%. In addition to describing the demographic characteristics of the study sample, normality assessments and potential bias examinations were addressed in Chapter 5 as parts of the data validation.

To identify the specific factors that affect e-commerce adoption and post-adoption, and how these effects vary at the different stages, the study framework was carefully assessed; this involved the assessment of measurement as well as structural models, as discussed in Chapter 6. While the measurement model was concerned with reliability and validity evaluation, the structural models involved testing the research models and propositions related to e-commerce adoption and post-adoption. The process started with an initial reliability test and an exploratory factor analysis. Construct validity and reliability were evaluated, which generally satisfied the minimum criteria. Inferential analyses were then conducted to test models and propositions related to e-commerce adoption, utilisation and scope of use (using binary logistic regression for adoption and ordered logistic regression for utilisation and scope of use). The study findings revealed that commitment, perceived benefits and mimetic pressure are significant determinants for e-commerce adoption, in addition to business size and industry sector. Process readiness, commitment, government readiness and security significantly impact e-commerce utilisation, while commitment, perceived benefits, mimetic pressure, coercive pressure, government readiness, financial industry readiness, IT industry readiness and industry sector are significant determinants for the scope of e-commerce of use.

To help identify managerial and policy implications related to e-commerce adoption and post-adoption in this little-explored country, interpretations based on the study findings were discussed, as presented in Chapter 7. The discussion assisted to justify the research findings of the three e-commerce settings, and to link them with previous works in the field as well as the findings of the exploratory phase. While the statistical findings assisted to test the research framework, the qualitative analysis of the open questions triangulates the quantitative findings of e-commerce adoption stages amongst firms in Saudi Arabia. This thesis concluded by addressing the study contributions, implications and future work, which are presented later in this chapter. In summary, this research has delivered a holistic view for e-commerce adoption and post-adoption in high-income developing countries.

8.3 Contributions to the Body of Knowledge

This research set out to meet a number of objectives, which were accomplished as follows. (1) *To devise a multi-perspective framework and specify what theoretical perspectives can be used to examine e-commerce adoption and post-adoption in high-income developing countries*, an exploratory phase was conducted via reviewing the literature of e-commerce adoption and diffusion in developing countries and conducting an exploratory study. The literature review assisted the proposal of a preliminary framework that consists of various factors at different levels of analysis and at various adoption stages. The findings of the exploratory study, in line with relevant literature, were used to extend and confirm choices of the contextual factors; therefore, the study framework was refined and the propositions were formulated. The qualitative findings of the exploratory study assisted (2) *to explore the e-commerce situation in Saudi Arabia at an organisational level and to gain insight into various issues that may affect e-commerce adoption and post-adoption within the country*. The exploratory phase is followed with an explanatory phase in order to examine the research framework. In the explanatory phase, the problem was formulated in testable forms and the survey strategy was adopted to gather quantitative data, which in turn was analysed in order (3) *to identify the particular factors that affect e-commerce adoption and post-adoption, and how these effects vary at the different stages*. Together, interpretations of the research findings from the two phases assisted (4) *to identify managerial and policy implications related to e-commerce adoption and post-adoption in such a region*. From the research process, several methodological and theoretical contributions have emerged, which are discussed in the following paragraphs.

Firstly, the use of a mixed-method approach has provided new insights into the adoption process of e-commerce in high-income developing countries. In particular, this research has shown the applicability of starting with a qualitative exploratory stage, which not only contributed to the design of the research framework, but also in explaining the research findings. This research has also shown the applicability of response-driven sampling via social networks in mitigating the risk of a low response rate, as suggested by prior studies in the country (Al-Sudairy, 2000; Al-Maliki, 2005). In particular, it has highlighted the importance of social influence and personal visits in achieving a high response rate, as those Saudi managers gave a high priority to the questionnaire and showed full enthusiasm and support to the researcher during the data collection process. In addition, this research supports Zaharna's (1995) argument that Arab is an oral dominant society, as during the data collection process many participants preferred to talk about the phenomenon rather than to write about it. This research has also made a theoretical contribution by validating various constructs used in the research framework, which can be utilised to examine other emerging IT innovations, such as mobile commerce and social network applications.

Secondly, instead of focusing on a single domain, this research has responded to Zwass's (2003) call to investigate e-commerce in its entirety and to address its all-important issues by considering a multi-perspective approach and integrating determinants from different theories to provide a broader understanding. Based on prior literature and an exploratory investigation, a comprehensive framework has been proposed that comprises factors from the well-established DOI theory, institutional theory, the PERM model and the TOE framework. In particular, the research framework encompasses innovation attributes from the DOI theory, external pressures from institutional theory and internal and external readiness from the PERM model, in addition to other contextual factors from the TOE framework. One unique contribution of this research is considering determinants from the readiness perspective in association with innovation and institutional theories to develop a broader understanding of the e-commerce adoption process at an organisational level. In particular, few studies have considered business process readiness (Barua et al., 2001) and consumer readiness (Zhu et al., 2003) on e-commerce adoption studies.

Thirdly, this research has extended the innovation adoption literature and has enriched our understanding of the innovation adoption process at an organisational level. In particular, it has recognised e-commerce as a complex innovation and has responded to scholars (e.g., Fichman, 2000; Zhu et al., 2006a) who have called for researchers to view the diffusion of

IT innovation as a multi-stage process and to address different adoption stages. Such a conceptualisation also responds to Klein and Sorra's (1996) call to focus on multi-level frameworks in order to understand innovation adoption at an organisational level and have answered researchers who have encouraged further investigation of IT innovation post-adoption (e.g., Zhu and Kraemer, 2005; Zhu et al., 2006b). More importantly, this research is amongst the few efforts that have investigated different adoption stages in a single study. In addition to e-commerce adoption, this research went further and investigated post-adoption stages (e-commerce utilisation and scope of use) in order to address the likely different impacts across the adoption stages. This conceptualisation helped confirm the preliminary conclusion that different adoption stages have different determinants with different magnitudes (Zhu et al., 2006a).

Last but not least, this research has evaluated the applicability of innovation adoption theories, developed to study innovation diffusion in other parts of the world, to understand various innovation adoption stages in the context of high-income developing countries. In particular, it is one of the initial efforts that have addressed issues related to e-commerce adoption and post-adoption at the firm level in the GCC region. This research filled the knowledge gap in IT innovation adoption research by investigating various adoption stages of e-commerce in these high-income developing countries, in which e-commerce research is very limited (Alrawi and Sabry, 2009; Yasin and Yavas, 2007).

The bulk of the conceptual works and empirical studies on “E” are in the context of North America, Europe and Japan. There is a paucity of writings focusing on “E” issues in other parts of the world One of these overlooked areas is the Arab countries, where writings still focus on end-user computing rather than on “E” and its role in business.

(Yasin and Yavas, 2007, p. 69)

Overall, mimetic pressure and perceived benefits are more influential for the adoption of e-commerce and scope of use than the extent of e-commerce adoption amongst adopter firms. Coercive pressure as well as the readiness of the government, financial institutions and IT industry affects the scope of e-commerce use. For adopter firms, the extent of e-commerce adoption is influenced by the readiness of e-business processes, government readiness and security. Commitment, especially from top managers, is a key determinant that links e-commerce adoption to the extent of adoption and scope of use. While most factors have a positive impact on e-commerce adoption and post-adoption, IT industry readiness, government readiness, coercive pressure and security have a negative impact on post-adoption stages, as summarised in Figure 8.1.



Figure 8.1: Summary of the research findings

Nevertheless, other issues and concerns have been highlighted by the qualitative findings of the exploratory study. For instance, the lack of the postal addressing is a major concern amongst Saudi organisations, whereas uncertainty avoidance and collectivist culture are associated with e-commerce adoption and use in Saudi Arabia. While this research has contributed to the literature by presenting new insights into e-commerce adoption and post-adoption in this little-explored region, future studies in the region may need to focus on specific issues so that concrete conclusions can be drawn.

This research has utilised findings from prior innovation adoption studies in association with findings from an exploratory study in order to provide a holistic view of e-commerce adoption and post-adoption in Saudi Arabia. Instead of picking determinants from a list of factors, this research used the exploratory findings in order to focus on the critical factors in the study context and enhance the study framework before conducting the explanatory study. Based on quantitative and qualitative data, this research has provided new insights into the adoption process of e-commerce in Saudi Arabia, which could be generalised to other high-income developing countries, particularly the little-explored GCC countries. Together, the research findings have offered new insights into how e-commerce diffusion is influenced by various determinants from different perspectives and how these effects vary across e-commerce adoption stages in this high-income developing country.

8.4 Research Implications

This research has contributed to both a practitioner and research perspective. In addition to theoretical contributions, several implications inferred from the findings for both business managers and policy makers are discussed in the following sections.

8.4.1 Managerial Implications

The results of this research have offered an evaluation framework to assess internal and external conditions under which e-commerce operates in order to assist in identifying potential risks and facilitating a better return on investments. Although the study findings underscore certain components of organisational readiness, business managers could consider evaluating their internal readiness and the appropriate e-commerce adoption stage for their organisational characteristics. While the findings are true for companies in Saudi Arabia, they imply room for enterprises with different characteristics to improve their predictions through managerial action. In this research, large firms are seen to adopt e-commerce as they enjoy the resource advantages, but they are less likely to achieve deeper e-commerce usage. That is, small firms may face limited capabilities in the adoption stage, whereas large firms are likely to encounter structural inertia beyond the initial adoption (Zhu et al., 2006a). Such differential effects could help determine where managers need to concentrate their resources. Similarly, there are some industry sectors in Saudi Arabia that are more advanced in e-commerce, such as the service-based and distribution sectors. Firms in those sectors may find a favourable environment and face fewer external barriers to adopt and extensively use e-commerce than other sectors in the region.

The research findings demonstrate the importance of commitment, especially from top management, across the entire adoption process. Thus, business managers in Saudi Arabia may need to show strong commitment and effectively implement e-business processes and structure. They may need to go beyond merely considering financial investment and strive to provide both technical as well as organisational support in order to reduce uncertainties relating to change and to promote a favourable e-commerce atmosphere. To derive greater e-commerce adoption and usage, business managers may need to understand the potential benefits of e-commerce by learning from adopter experiences and by joining appropriate training programmes. In particular, they may need to realise that real e-commerce benefits are related to promoting deeper usage and integrating e-commerce applications within business processes rather than just establishing a web presence (Molla and Licker, 2005b).

From a managerial perspective, e-commerce diffusion needs to be seen as a multi-stage change-management process to ensure smooth e-commerce utilisation. Business managers in Saudi Arabia could put higher priority on the readiness of e-business processes and on linking them to support information processes across the value chain. At the same time,

they should realise that effective e-commerce projects would require business process re-engineering and organisational reconfiguration (Davenport, 1993; Fichman, 2000; Devaraj and Kohli, 2003). In particular, when Internet-based technologies diffuse locally and become essential, managers could pursue e-commerce utilisation more proactively, given the potential of extracting the benefits of e-commerce utilisation from achieving better e-commerce business processes.

Business managers in Saudi Arabia could also consider evaluating the readiness of the external environment in which they run their businesses, as several barriers are likely to influence the success of e-commerce adoption and digital transformation in this immature environment. In particular, business managers could consider evaluating the readiness of the IT industry, financial industry, delivery services and the government. For instance, they could evaluate the available e-commerce laws and online payment systems as well as their applicability in supporting their online mission. At the same time, companies should think more broadly to overcome some of the environmental barriers addressed in the findings of the research's two phases. They could use advanced technologies and seek certain e-commerce functions from the developed world (Kshetri, 2007). For instance, local companies could work with banks in developed countries to set up their e-payment systems in order to overcome legal barriers. To overcome concerns relating to the postal addressing system, firms in Saudi Arabia could sign partnership deals with multinational delivery companies and use advanced technologies to help identifying customer locations, such as the Global Positioning System (GPS) and Internet maps (e.g. Google Maps).

Unlike firms in the developed world, the available e-commerce business models are not equally attractive to businesses in developing countries unless they are used effectively in such 'imperfect' markets (Tung et al., 2006; Kshetri, 2007). Therefore, managers could continuously examine their competitive environment and their extent of success in order to understand the potential impact of the market changes on their e-commerce strategies. Managers could target segments of the population that experience fewer barriers as their early adopters. With the recent large-scale scholarship programmes in Saudi Arabia and the increased number of overseas Saudi students, especially in the UK and the USA, Saudi firms could sign partnership deals with companies from such countries and target those Saudi students as they could be amongst the 'e-ready' segments.

To overcome uncertainty avoidance within Saudi society (as addressed in the exploratory study), Saudi companies could provide various payment methods. In addition to online payment, business managers could consider providing the cash-on-delivery method as an alternative payment method, where consumers in Saudi Arabia could order online and pay in cash on delivery. To respond to the collectivist culture associated with Saudi society, business managers could facilitate the use of online discussion forums and/or social network applications, given the popularity of such applications and forums amongst Saudi Internet users. This would help consumers become more involved with other community members in seeking consultation to shape their business decisions. As this subject is beyond the scope of this study, future research may need to focus on e-commerce business models in the region so that concrete conclusions can be drawn.

8.4.2 Policy Implications

To increase e-commerce diffusion in Saudi Arabia, e-commerce should be considered not only as a business issue, but also as a policy issue to ensure that a positive environment is created. Given the present increase in the number of Internet users in Saudi Arabia as well as the government's considerable support for IT infrastructure, the growth of e-commerce in Saudi Arabia could involve reviewing e-commerce policies and initiatives, as follows:

First, provide more awareness-raising programmes and disseminate pertinent information relating to e-commerce and its adoption and implementation for the private sector.

The lack of awareness relating to e-commerce benefits within the business community in Saudi Arabia is likely to hinder its adoption and use. To create demand for e-commerce, there is a need for more awareness-raising programmes to highlight the potential benefits of e-commerce for all businesses. Technology vendors could be involved in designing and offering appropriate e-commerce awareness programmes to firms in Saudi Arabia. These could be promoted through the coordination of the competent authorities in each industrial sector with the government as well as other supporting agencies. Policy makers may need to focus on providing relevant information on e-commerce and its adoption and utilisation to help Saudi enterprises realise the commercial benefits. They could develop training strategies that actively inform industry managers of the benefits of e-commerce through seminars, workshops and presentations that provide a supportive business environment and build a positive image of e-commerce. To do so, they could begin with those segments whose characteristics indicate that they are potential e-commerce early adopters, such as service-based enterprises and large companies.

Second, establish an appropriate regulatory framework and e-commerce laws that would build confidence and protect all parties doing business over the Internet.

The study findings emphasise the importance of government readiness, particularly in the e-commerce post-adoption stages. Hence, the government could encourage e-commerce post-adoption by “*regulating the Internet to make it a trustworthy business platform (e.g., dealing with fraud and credit card misuse)*” (Xu et al., 2004, p.17). The government could provide an appropriate regulatory framework and enforce effective e-commerce laws that would protect all parties doing business over the Internet within the country. In particular, special attention should be paid to e-commerce disputes and their resolution. Moreover, IT companies and technology vendors could increase trust and confidence in the technology by providing strict security measures for e-commerce websites, including secure browsing mechanisms (https), encrypted data exchanges, digital certificates and login time-based sessions. More importantly, concerns related to security and legal protection for business conducted over the Internet require more effort and awareness-raising on the part of the Saudi government as well as other supporting agencies, “*to dispel myths and concerns regarding security of transactions and privacy of data*” (Sait et al., 2004, p.72).

Third, provide promotional campaigns, incentives, subsidies and support relating to e-commerce development to Saudi firms, including financial and technical support.

Unlike firms in the developed world, firms in Saudi Arabia are faced with an immature competitive environment, which necessitates more effort in promoting e-commerce. To increase the rate of e-commerce adoption amongst enterprises within the country, the government could encourage service providers and IT companies to offer affordable e-commerce services as well as their much-needed support. In this study, many participants believe that “*there are no governmental or non-governmental agencies that could help or direct me, as it is not there. ... I think such a support is very important, but it is far away*” (Case F2). Thus, both governmental and non-governmental bodies could work together to initiate appropriate e-commerce support and initiatives. The Saudi government could work with responsible authorities in each industrial sector to promote e-commerce adoption and utilisation, by instigating training programmes, especially for SME companies. They could consider offering a trial period to demonstrate e-commerce use prior to its final utilisation, as each stage in the adoption process is a potential rejection point (Zaltman et al., 1973). They could help local firms evaluate the internal readiness required for successful e-commerce adoption and help them understand the requirements of e-commerce adoption

and post-adoption. Technology vendors and mediating institutions could learn from the problems that firms in Saudi Arabia encounter, such as those relating to process readiness, and take a proactive role in promoting successful e-commerce development.

Fourth, provide various types of e-payment methods that are reliable and affordable in order to facilitate e-commerce adoption and post-adoption within the country.

This research emphasises the importance of financial institution readiness on the scope of e-commerce use. Although the available e-payment system (i.e. SADAD) can be used to transfer money to registered organisations through Saudi bank accounts, SADAD has been criticised for being expensive, especially for SME enterprises, and the requirements as well as difficulties associated with it threatened its benefits. Hence, the government could work with Saudi banks to provide other secure e-payment methods that are affordable and reliable to facilitate e-commerce use across the value chain. They could provide awareness and training programmes relating to the new e-payment methods in order to mitigate uncertainty avoidance and build confidence in the technology necessary in this emerging environment. Such cooperation would help in developing institutional trust and in creating a favourable adoption atmosphere that supports successful e-commerce utilisation.

Fifth, establish an efficient postal addressing system as well as reliable delivery services in Saudi Arabia in order to facilitate the delivery of goods purchased online.

Alharby (2006) pointed out that the IT infrastructure (national telecom) in Saudi Arabia is well equipped with hardware and software but that other supportive infrastructures, such as the logistics sector, are lacking. In particular, the postal addressing system and delivery services are major concerns for e-commerce adoption in Saudi Arabia, as revealed by the exploratory research; “*There are neither efficient, affordable postal services nor delivery systems. There is no addressing system and there is a huge corruption in the Saudi post*” (Case F1). The postal addressing system within the country is not efficient and the Saudi postal mail is slow and unreliable, which negatively influences e-commerce adoption (Al-Otaibi and Al-Zahrani, 2003; Alharby, 2006; Sait et al., 2004). Therefore, the Saudi government could encourage the Saudi post to invest in establishing a postal address system and delivery services that are efficient and reliable. For successful e-commerce diffusion throughout the country, the postal addressing system should be accessible to both local and multinational delivery companies. The postal mail should be affordable, efficient and reliable with various delivery options in terms of costs, time and guarantee in order to build trust and overcome cultural barriers.

Sixth, establish and organise an e-marketplace that can be used as a trading network that allows firms in Saudi Arabia to reach their local partners and customers online.

The findings emphasise the central role of the government in Saudi Arabia, as many firms in the country believe in the importance of government intervention and involvement. Due to uncertainty avoidance, there is a notion to prefer government interventions in e-business practices amongst firms in Saudi Arabia (Cassell and Blake, 2011); “*When the government recommends dealing electronically, we will certainly do so due to its influential power. ... the economy in this country is based on government support ... and it is the leader*” (Case F9). This high dependency on the government should encourage policymakers to provide solutions that enable Saudi firms to be involved in e-commerce in an easy and effective way, such as e-marketplace. An e-marketplace is a web-based collaborating and trading solution that enables companies to discover and collaborate with other businesses easily and effectively on a global scale (Ariba, 2013). It provides various e-commerce-related functions and allows other firms or individuals to gain access to new suppliers or buyers for their products and to develop trading networks, making e-commerce processes easier and more efficient (Wordpress, 2012). Although some e-marketplaces have been operating in the country for some time (e.g., e-mall.com.sa; taufeer.com), they typically operate as e-retail sites and offer strict spaces for third parties. These e-marketplaces were not initiated by the government, and hence they have not been attractive to businesses in Saudi Arabia. While some have failed to continue to provide e-marketplace services (e.g. taufeer.com), others provide very strict e-marketplace services (e.g. www.e-mall.com.sa). Therefore, the government could to initiate such services and to be involved in such a project if local firms are to be encouraged to shift their traditional business practices toward the Internet. Such efforts would help develop confidence and support the move towards e-commerce.

Last but not least, despite the central role of the government, more efforts could be made by the experiences of adopter firms to provide a realistic solution to challenges that they have encountered. Policy makers could consider an appropriate e-commerce strategy that combines government intervention with adopters’ experiences in a way that facilitates e-commerce adoption and post-adoption. Competent authorities in each industrial sector as well as governmental bodies could be involved in e-commerce issues and challenges. Such involvement could be conducted by devising both coercive and non-coercive strategies and plans in order to build a positive environment over the Internet. Local firms, on the other hand, need to be ready for such a move towards e-commerce practices.

8.5 Limitations and Future Work

This research makes a significant contribution by devising a multi-perspective framework that measures various adoption stages in a little-explored region. The results are relevant to firms across different sizes and industries in Saudi Arabia. However, IT innovation adoption research at an organisational level has several ‘inherent limitations’, such as the narrow sampling frame as well as the potential single-respondent bias (Doherty and King, 2001). Therefore, care should be taken when generalising the research findings because of certain aspects in the sampling frame and design. Despite the applicability of starting with an exploratory study, a future study could divide the comprehensive interview into stages, in which several data collection techniques can be used to gather data from more than one participant. Follow-up studies with a larger random sample could facilitate the use of a hold-out sample and provide better statistical power and more generalisable results.

Further studies in the region would be extremely useful and could test whether the results obtained from this research are replicable. As this study has focused on e-commerce in general, future research could be conducted in the region using other new e-commerce settings, such as social-network commerce. Future research in the GCC region could test these determinants using a cross-country sample, while exploring country differences. As the focus of this research is not on a single business sector or a specific business size, the results might have been affected by variance in these control variables (i.e., industry and size). Sampling a particular business size or specific business sector could be considered as a subject for research in the region. In particular, further studies could be conducted on petrochemical firms or on small enterprises in the GCC region.

Researchers have suggested that innovation diffusion is a socialisation process, in which attitudes toward behaviours develop over time (Zmud, 1982; Ouchi, 1979). The changes that were effected in organisational strategies and e-business models after the ‘dot-com bubble’ suggest that changes may have taken place in some organisations whilst studying the phenomenon (Geoffrion and Krishnan, 2003; Zhu et al., 2006a). As the current results are based on a cross-sectional design conducted at a single point in time, a longitudinal design may be useful, as companies in the region are in a progressive stage of e-commerce development. In longitudinal studies, researchers analyse processes in a dynamic context, such as the technology evolution and utilisation process (Zhu et al. 2004). By comparing data collected at different times, insights can be gained about the process of e-commerce adoption stages in this dynamic environment.

Although most of the research constructs were empirically tested in prior studies as well as the current research, further studies are needed to confirm the external validity of the study findings. Future research could move the focus to other potentially important issues and concerns, particularly those that have only been considered in a few studies. In particular, future studies could focus on other crucial issues, such as process readiness, legislation and culture, so that concrete conclusions can be drawn. *“Applying [cultural dimensions] to make sense of what happens in the world always has to take into account other factors as well as culture”* (Hofstede, 2013).

8.6 Conclusion

Given the widespread adoption of the Internet but the slower-than-anticipated growth of e-commerce in the GCC region, there was undoubtedly a need to understand in greater depth the key areas that are considered significant to the success of e-commerce in this region. Taking this on board and after a thorough investigation of the literature, a framework was generated and refined through an exploratory study to investigate e-commerce adoption and post-adoption in high-income developing countries. The research framework went beyond organisational boundaries and investigated environmental factors and innovation attributes. More broadly, this study has provided a holistic view of e-commerce adoption in developing countries by considering various determinants from different perspectives. Unlike the majority of IT innovation adoption studies, this research went further and investigated the determinants of e-commerce adoption and e-commerce scope of use, in addition to e-commerce utilisation amongst adopter firms in this little-explored region.

The study framework was empirically assessed using a unique dataset from Saudi Arabia. Based on the study framework, the empirical results have revealed several major findings that have differential effects on the adoption stages. In summary, mimetic pressure and perceived benefits are more influential for the adoption of e-commerce and scope of use than the extent of e-commerce utilisation amongst adopter companies. As organisations in developing countries adopt ever-more sophisticated e-commerce practices, the maturity of e-commerce adoption is affected by process readiness, and security, in addition to coercive pressure and the influence of the readiness of financial institutions, IT industry and the government on the scope of e-commerce use across value chain activities. Commitment is a key determinant that links e-commerce adoption to the extent of adoption and use.

This research has provided new insights and has contributed to the literature by addressing innovation diffusion in a rarely investigated region by focusing not only on e-commerce adoption, but also on e-commerce utilisation and scope of use. The research findings have confirmed the preliminary conclusion that the factors that influence an enterprise to adopt e-commerce are not necessarily the same for different adoption stages or for different e-commerce technologies (Molla and Licker, 2005b; Zhu et al., 2006a; Kurnia et al., 2009). Such a conclusion is consistent with the suggestion that there could be a contrast between factors facilitating an innovation in its early stage and those facilitating the latter stage (Swanson, 1994). This difference suggests that the key determinants may shift at different adoption stages as e-commerce evolves. Hence, understanding which factors are relevant for a specific stage is important in order to formulate an appropriate strategy.

In conclusion, e-commerce diffusion in high-income developing countries is both similar to and different from other parts of the world, and the differences are at least as important as the similarities. In particular, studying various perspectives at different adoption stages suggests that managers need to pay special attention to issues at each stage and how these effects are shaped by the national environment and policies. It has been shown that while e-commerce is growing slowly in Saudi Arabia, organisations are taking different paths to Internet-based e-commerce. Therefore, business managers and policy makers are urged to carefully study the insights and lessons uncovered in this thesis.

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APPENDICES

APPENDIX (A): Exploratory Study: Supporting Letter from the Academic Advisor

School of Computing Sciences

University of East Anglia
Norwich NR4 7TJ
United Kingdom

24th August 2009.

To Whom It May Concern:

Re: Mubarek Aldwsry

Mubarek Aldwsry is a research postgraduate student in the School of Computing Sciences at the University of East Anglia, Norwich. His investigations are concentrating on the area of e-commerce adoption and diffusion in Saudi Arabia.

Mubarek's research involves him in collecting data from a number of different sources. At the moment he is involved in an exploratory study with a small number of companies, in order to learn more about the factors that influence e-commerce adoption in Saudi Arabia. Talking to representatives of companies such as yours is critical to the success of this project – we would be very grateful for your participation in this stage of our research. Of course, the information that you provide will remain confidential and be used solely for the purposes of this research.

Thank you in advance for any assistance you can give Mubarek. Please feel free to contact me if you require any further information.

Yours faithfully

A handwritten signature in dark ink, appearing to read 'P. J. Mayhew', is written in a cursive style.

Dr P. J. Mayhew
Mubarek's supervisor
(p.mayhew@uea.ac.uk)

APPENDIX (A): Exploratory Study Guide

Interview No. _____

Date of interview: / / 2009

Name of the company: _____

Industry sector that the company belong to:

Manufactory sector Distribution sector Service sector Other:

Name of the Participant: _____

The address and the contact details: _____

1. In which level of e-commerce utilisation can you describe your organisation at this moment?

No connection to the Internet	Connected to the Internet	Static Web	Interactive Web	Transactive Web	Integrated Web
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2. Do you think that e-commerce utilisation of your company would change in the near future? Explain?

3. What is the scope of e-commerce use (*breadth*) in your company?

Advertising & Marketing	Online Purchase	Online Sale	After-sale Support	Exchange with Suppliers	Exchange with Customers	Formal Integration
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4. What types of e-commerce activities (*depth*) does your company participate in?

B-to-B Sales	B-to-C Sales	B-to-B Services	B-to-C Services	Procurement of goods	Procurement of suppliers	Other:
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5. What are the main reasons that pushed/would push your firm to adopt and utilise e-commerce?

6. What are the main concerns that held/would hold your firm back from adopting or using e-commerce?

7. To what extent are your business processes are computerised and integrated?

8. Does your organisation have an IT department?

9. What types of network-based connectivity does your company currently have?

10. What type of bandwidth connectivity and speed to the Internet does your company currently have?

11. What modes of communication do by your firm use with your suppliers and customers?

Postal mail Courier Phone Fax e-mail website form Others:

12. What of the following technology resources does your company have?

e-mail Internet Web site Intranet Extranet EDI EFT Call Center

13. Is there a use of e-mail for communication within your company or suppliers and customers?

14. Does your firm develop software in house? If yes, in what degree?

15. Does your firm have enough IT staff and experts who can manage your IT and e-commerce projects?

16. Does your firm hire outside consultants to assist with e-commerce and IT development?

17. Are there qualified management in your firm who had the knowledge to manage e-commerce?

18. Do employees at your firm get the training required for e-commerce when needed? If no, why?

19. What is the percentage of annual IT spending of total budget in your company?

20. Did you feel that the resources that management allocate on IT systems are adequate? If no, why?

21. Do you think that the cost of e-commerce development and operation is high for your firm? Explain?

22. Do you think that e-commerce fits well your company's values, practices, IT infrastructure? Explain?

23. Do you think that your organisation has a positive attitude toward e-commerce? Explain?
24. Did your company face any difficulties in locating information or learning e-commerce? Explain?
25. Did your firm face technical or non-technical constraints to adopt e-commerce? If yes, what are they?
26. Do you have any security concern with regard to e-commerce adoption and use in your firm? Explain?
27. Does your business have a clear vision and/or a strategy on e-commerce? Explain?
28. Do you think that management is supportive and champions e-commerce initiatives? Explain?
29. Do roles and responsibilities are clearly defined for e-commerce initiative at your company? Explain?
30. Do you feel that government awareness and initiatives are adequate for encouraging businesses as well as public to conduct e-commerce activities? Explain?
31. Do you think that the government supports firms in their e-commerce adoption and implementation?
32. Did you your firm get any support or be invited to any e-commerce awareness? If yes, what are they?
33. Do you think that there are a legal environment and effective laws to promote e-commerce? Explain?
34. Do your firm currently make any business with the government?
35. Does your company deals with the government electronically? If no, why?
36. Do you feel that current e-government services acts as a driver to conduct e-commerce? Explain?
37. Do you feel that the telecom infrastructure is reliable and efficient to support e-commerce? Explain?
38. Do you think that the infrastructure of financial and commercial institutions is capable of supporting e-commerce transactions? Explain?
39. Do you think that there is an efficient support from the local IT industry and that local IT vendors can affordably provide needed technologies required for e-commerce environment? Explain?
40. Do you think local postal and delivery services are efficient and affordable to support e-commerce environment within the country? Explain?
41. Do you feel that there are adequate IT training centers that can help to run e-commerce? Explain?
42. How many competitors do you have? Who are they?
43. Can you estimate the percentage of your competitors that use e-commerce?
44. Did your competitors that were e-capable place pressure on your firm to adopt e-commerce? Explain?
45. Was there any external party that influenced your decision to adopt e-commerce? If yes, who are they?
46. How many suppliers and customers do you have?
47. Do you feel that your business partners (suppliers and customers) are e-ready to use e-commerce?
48. Can you estimate the percentage of your business partners that are e-ready to use e-commerce?
49. Was there any request from you or your partners to deal with them electronically? If yes, explain?
50. Was there any external support from/to a business partner with regard to e-commerce? If yes, explain?
51. Did your firm receive any external support related to e-commerce implementation? If yes, explain?
52. Do you have any trust concern with regard to e-commerce adoption and use in your firm? Explain?
53. Do you feel that there is an affordable Internet access in Saudi Arabia for both public and businesses?
54. Do you feel that Saudi people are aware enough of e-commerce activities within the county? Explain?
55. Do you think that consumers perceive e-commerce as beneficial or risky? Explain?
56. In general, do you think that people in Saudi Arabia are e-ready for online purchase? Explain?
57. Can you list the benefits of e-commerce technology to your firm (in order of importance if possible)? (e.g., improve efficiency, improve customer services, expand business reach, and reduce costs).
58. Given e-commerce costs and benefits, do you feel that e-commerce adoption is justified? Explain?

Organisation Characteristics:

59. What are your responsibilities?
60. How long is your experience in the organisation?
61. Can you describe your business in terms of its services and products?
62. How long has the business been operating?
63. How many EFT (equivalent full time) employees are there in your company?
64. Does your company have multi-establishments? If yes, are any of them outside the country?
65. Is there anything else that you think could affect e-commerce adoption and use in your firm? Explain?
66. Would you like to add anything else? If yes, what would you like to say?
67. If more information is needed, would you be willing to participate again?

Thank you for your participation. Your effort is really appreciated.

APPENDIX (B): Research Constructs and their Measurement Items

PR	Process readiness refers not only to the handling of the processes in the company internally, but also process related to the interaction with suppliers and customers.
PR1	E-Business processes are clearly defined and followed in our organisation.
PR2	For each e-business process, we have a detailed working instruction.
PR3	We define internal/external Service Level Agreement (SLA) for every e-business process.
PR4	In our firm, penalty is executed for every unsuccessful SLA.
PR5	E-Commerce initiatives and implementation in our company are managed by a defined project management process.
PR6	There is a business process to control our online product catalogue.
PR7	There is a well defined business process to support/manage our online customers.
PR8	Our firm has standard operating procedures that cover all online ordering scenarios.
PR9	Our firm has standard operating procedures that cover all online procurement scenarios.
PR10	Our firm has a well defined process of sharing product roadmap and/or demand forecast with our online suppliers.
GV	Governance reflects the strategic, tactical and operational model that organisations put in place to govern their business activities and e-commerce initiatives
GV1	Roles, responsibilities and accountability are clearly defined within each e-commerce initiative.
GV2	Decision-making authority has been clearly assigned for all e-commerce initiatives.
GV3	We thoroughly analyse the possible changes to be caused in our organisation, suppliers, partners, and customers as a result of each e-commerce implementation.
GV4	We follow a systematic process for managing change issues as a result of e-commerce implementation.
GV5	We define a business case for each e-commerce implementation or initiative.
GV6	We have clearly defined metrics for assessing the impact of our e-commerce initiatives.
GV7	Our employees at all levels support our e-commerce initiatives.
CM	Commitment Reflects enough support for e-commerce from every organisational level, especially high-level management to champion e-commerce initiatives.
CM1	Our business has a clear vision on e-commerce.
CM2	Our e-commerce implementations are strategy-led.
CM3	All our e-commerce initiatives have champions.
CM4	Senior management champions our e-commerce initiatives and implementations.
CM5	Our vision of e-commerce activities is widely communicated and understood throughout the company.
TR	Technology Resources Refers to the availability of the ICT base of an organisation and assesses the extent of existing computerised systems and applications
TR1	Our firm has a very high speed connection to the Internet.
TR2	Our business processes are well managed or supported by computerised systems.
TR3	Our systems have been developed using web-based or multi-tier applications.
TR4	Our computerised systems and web applications are integrated.
TR5	Our firm is well computerised with LAN and WAN connectivity among our departments and branches.

HR	Human Resources Refers to the availability and accessibility of staff with adequate ICT experience and with IT knowledge to adequately manage the technology
HR1	Our firm has the necessary IT expertise and know-how to acquire the technology.
HR2	Employees at our firm get IT training when needed.
HR3	Our firm hires outside consultants to assist with IT systems development.
HR4	There is an adequate and qualified management and staff in our firm who have the knowledge and expertise to manage e-commerce environment.
PC	Perceived Costs Reflects the availability of cost/financial resources and assesses perceived costs related to e-commerce adopting, training, and maintenance
PC1	The cost of adopting e-commerce technologies is very high for our business.
PC2	The amount of money and time invested in training employees to use e-commerce technologies are very high.
PC3	By adopting e-commerce technologies, the cost of maintenance and support of these technologies is very high for our business.
PB	Perceived Benefits Refers to the degree to which e-commerce can provide strategic benefits to a firm.
PB1	Our firm is motivated to adopt e-commerce to reduce costs.
PB2	Our firm is motivated to adopt e-commerce to expand market for existing products or services.
PB3	Our firm is motivated to adopt e-commerce to enter new businesses or markets.
PB4	Our firm is motivated to adopt e-commerce to improve coordination with customers or suppliers.
CT	Compatibility Refers to the degree to which e-commerce is consistent with current business processes, practices, and value systems
CT1	e-Commerce is compatible and consistent with our company's culture and value systems.
CT2	e-Commerce is compatible and consistent with existing distribution channels.
CT3	e-Commerce is compatible and consistent with our firm's current selling process.
CT4	e-Commerce is compatible and consistent with our firm's current procurement process.
SC	Security Refers to the degree to which the Internet is deemed insecure for data exchange and e-transactions with both suppliers and customers
SC1	Our firm has complete confidence in the ability to prevent hacking risks over the Internet.
SC2	Our firm has complete confidence in the ability to maintain security of data and transactions over the Internet.
SC3	Our firm has complete confidence in our customers have confidence in the security of data and privacy over the Internet.
NP	Normative Pressure Refers to not only by the extent of adoption by business partners, but also by the participation of any organisational bodies that endorse e-commerce
NP1	The percentage of e-commerce adoption by our firm's customers is high.
NP2	The percentage of e-commerce adoption by our firm's suppliers is high.
NP3	Our firm participates extensively with other parties in e-commerce promotion and information.

MP	Mimetic Pressure Refers to not only by the extent of adoption by competitors, but also by the perception of adoption success of competitors
MP1	The percentage of e-commerce adoption by our firm's competitors is high.
MP2	Our main adopter competitors have not benefited greatly from e-commerce.
MP3	Our main adopter competitors are perceived favourably by others (e.g., suppliers or customers).
CP	Coercive Pressure Refers to the extent of dominance of and conformity with suppliers, customers, parent/dominant corporate, and the government
CP1	Our firm is pressured by its dominant suppliers to deal with them electronically.
CP2	Our firm is pressured by its dominant customers to deal with them electronically.
CP3	Our firm is required to deal with the government electronically.
CP4	Our firm is required to adopt e-commerce by the parent company or other large dominant corporations.
GR	Government Readiness Refers to the degree to which the government encourage e-commerce adoption by utilising supportive business and laws
GR1	The legal environment is conducive to conduct business on the Internet.
GR2	There are effective laws to combat cyber crime.
GR3	There are effective laws to resolve e-commerce dispute.
GR4	There are effective laws to protect consumer privacy.
GR5	There are government requirements that would discourage the adoption and use of the Internet for business.
GR6	There are efficient and affordable e-government services that can motivate the use of the Internet for business.
GR7	The government demonstrates strong commitment to promote e-commerce.
SR	Supporting Industry Readiness Refers to the availability, affordability, and/or reliability of support-giving institutions whose activities may affect e-commerce initiatives.
SR1	The technology infrastructure of commercial and financial institutions is capable for supporting e-commerce transactions.
SR2	Local banks and financial institutions can help us in our e-commerce (e.g., e-payment).
SR3	There is an adequate number of IT vendors that can provide us with needed hardware and software.
SR4	There is efficient and affordable support from the local IT industry to support our move on the Internet.
SR5	There is an adequate number of IT training centres that can help us knowing how to run our e-commerce business.
SR6	There is an efficient postal and addressing system to support our move on the Internet.
SR7	There is an adequate number of delivery companies that can provide affordable solutions to e-commerce business.
TC	ICT Infrastructure Readiness Reflects to the availability, affordability, and/or reliability of ICT infrastructure
TC1	There is an efficient and affordable telecom infrastructure to support e-commerce locally.
TC2	The number of Internet connection failure is small when using services offered by telecom companies.

TC3	The possibility of not being able to access the firm's web site is high and has a negative effect on the use of the Internet for business.
TC4	Secure e-transaction (SET) and/or secure e-commerce environment (SCCE) services are easily available and affordable.
TC5	Telecom companies and Internet service providers trying to offer a secured services over the internet as possible.
TC6	CITC in Saudi Arabia offers local web sites registration and hosting with low costs to support our move on the Internet.
CR	Consumer Readiness Reflects the organisation's assessment of consumer readiness toward e-commerce activities.
CR1	We believe that Saudi consumers have technologies needed to start using online activities.
CR2	We believe that Saudi consumers are aware enough and have the knowledge to start online shopping.
CR3	We believe that Saudi consumers accept online banking and use it in their daily lives.
CR4	We believe that Saudi consumers use credit cards in their daily lives and have positive attitudes toward them.
CR5	We believe that Saudi consumers are willing to use e-payment for online activities.
TT	Institutional Trust Refers to the degree to which business partners will perform potential transactions according to the firms' expectations
TT1	Our firm has complete confidence in the technological skills and e-commerce knowledge of our trading partners.
TT2	Our firm has complete confidence in the competency of our trading partners to appropriately undertake e-commerce.
TT3	Our firm has complete confidence in the reliability of our trading partners to appropriately undertake e-commerce.
TT4	Our firm has complete confidence in the reputation of our trading partners to appropriately undertake e-commerce.
TT5	Our firm has complete confidence in the security of payments from our trading partners when undertaking e-commerce activities.
TT6	Our firm has complete confidence in that our trading partners don't have an attitude of partiality in e-commerce activities.

APPENDIX (C): Survey Questionnaire**I. English Version**

Dear participant,

As you are aware, there has been an increasing use of Information and Communication Technology (ICT) in most industries all over the world, and Saudi Arabia is no exception. ICT has changed the nature of doing business in ways that many have yet recognised. One aspect of the ICT use is Electronic Commerce (e-commerce), which is the focus of this study. A questionnaire has been developed as part of on-going post graduate study in the school of computing sciences at University of East Anglia in the UK. Further information about the University can be found in the following Web site www.uea.ac.uk.

The purpose of this study is to identify factors, both internal and external, that affect e-commerce adoption and utilisation on Saudi private organisations. Data collected through this questionnaire will be used for academic and research purpose only. All your identity will be kept confidential and will not be revealed under any circumstances. The success of this project depends on your participation, which is highly appreciated. Therefore, we ask you to give some time to participate in filling this questionnaire.

Thank you in advance for your participation

Researcher : Mubarak Aldwsry
e-mail : aldwsry@gmail.com
Phone : 0554442226
Fax : 012296767

e-Commerce Utilisation in Saudi Private Organisations

Study Terms and Abbreviations:

- The terms organisation, company and firm are used interchangeably in this study to mean any Saudi private organisation, regardless of its ownership or size.
- “**Web Site**” is a collection of related web pages or documents on the Internet that can be considered as resources for electronic businesses over the Internet.
- “**e-Commerce**” in this study refers to any business activities conducted over the Internet. It includes not only online buying and selling, but also any electronic inquiry, data exchange, or customer survives.
- “**e-Commerce initiatives**” refer to any ideas, promotions, and projects that can support e-commerce implementation within the company.
- “**SLA**” (Service Level Agreement) is a negotiated agreement between two parties where one is the customer and the other is the service provider. The SLA records a common understanding about services, priorities, responsibilities, guarantees, and warranties.
- “**CITC**” is an abbreviation for Communications and Information Technology Commission in Saudi Arabia.

First: With regard to e-commerce activities:

A. Which of the following best describe your current e-commerce status? (Please, check only one option)

Not connected (i.e. no connection to the Internet and no e-mail).

Connected (i.e. connected to the Internet with e-mail, but no web site).

Static Web, (i.e. publishing basic company information on the Web).

Interactive Web, (i.e. accepting queries, e-mail, and form entry from users).

Transactive Web, (i.e. online selling and purchasing of products and services, e.g. customer service).

Integrated Web, (i.e. a web site integrated with suppliers, customers, and other back office systems allowing most business transactions to be conducted electronically).

B. Which of the following Internet applications are in use in your business activities? (Please, check as many as apply)

Advertising and marketing.

Making sales online.

Making purchases online.

Exchange operational data with upstream suppliers.

Exchange operational data with downstream business partners and customers.

After-sales customer service and support.

Second: Indicate your agreement by typing "✓" sign in the appropriate box for each statement in the following sections?

Note: In the agreement scale, "Neutral" is to be selected when you neither agree nor disagree with a statement.

Please, move to section (3) if there are no e-commerce activities at your firm.

1 With regard to your e-business processes :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
e-Business processes are clearly defined and followed in our organisation.	<input type="checkbox"/>				
For each e-business process, we have a detailed working instruction.	<input type="checkbox"/>				
We define internal/external Service Level Agreement (SLA) for every e-business process.	<input type="checkbox"/>				
In our firm, penalty is executed for every unsuccessful SLA.	<input type="checkbox"/>				
e-Commerce initiatives and implementation in our company are managed by a defined project management process.	<input type="checkbox"/>				
There is a business process to control our online product catalogue.	<input type="checkbox"/>				
There is a well defined business process to support/manage our online customers.	<input type="checkbox"/>				
Our firm has standard operating procedures that cover all online ordering scenarios.	<input type="checkbox"/>				
Our firm has standard operating procedures that cover all online procurement scenarios.	<input type="checkbox"/>				
Our firm has a well defined process of sharing product roadmap and/or demand forecast with our online suppliers.	<input type="checkbox"/>				

2 With regard to your e-commerce governance:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Roles, responsibilities and accountability are clearly defined within each e-commerce initiative.	<input type="checkbox"/>				
Decision-making authority has been clearly assigned for all e-commerce initiatives.	<input type="checkbox"/>				
We thoroughly analyse the possible changes to be caused in our organisation, suppliers, partners, and customers as a result of each e-commerce implementation.	<input type="checkbox"/>				
We follow a systematic process for managing change issues as a result of e-commerce implementation.	<input type="checkbox"/>				
We define a business case for each e-commerce implementation or initiative.	<input type="checkbox"/>				
We have clearly defined metrics for assessing the impact of our e-commerce initiatives.	<input type="checkbox"/>				
Our employees at all levels support our e-commerce initiatives.	<input type="checkbox"/>				

3 With regard to e-commerce strategies :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our business has a clear vision on e-commerce.	<input type="checkbox"/>				
Our e-commerce implementations are strategy-led.	<input type="checkbox"/>				
All our e-commerce initiatives have champions.	<input type="checkbox"/>				
Senior management champions our e-commerce initiatives and implementations.	<input type="checkbox"/>				
Our vision of e-commerce activities is widely communicated and understood throughout the company.	<input type="checkbox"/>				

4 Our firm is motivated to adopt e-commerce :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
to reduce costs.	<input type="checkbox"/>				
to expand market for existing products or services.	<input type="checkbox"/>				
to enter new businesses or markets.	<input type="checkbox"/>				
to improve coordination with customers or suppliers.	<input type="checkbox"/>				
5 In our firm, e-commerce is compatible and consistence with :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
our company's culture and value systems.	<input type="checkbox"/>				
existing distribution channels.	<input type="checkbox"/>				
our firm's current selling process.	<input type="checkbox"/>				
our firm's current procurement process.	<input type="checkbox"/>				
6 With regard to e-commerce pressure and competition :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The percentage of e-commerce adoption by our firm's customers is high.	<input type="checkbox"/>				
The percentage of e-commerce adoption by our firm's suppliers is high.	<input type="checkbox"/>				
The percentage of e-commerce adoption by our firm's competitors is high.	<input type="checkbox"/>				
Our main adopter competitors have not benefited greatly from e-commerce.	<input type="checkbox"/>				
Our main adopter competitors are perceived favourably by others (e.g., suppliers or customers).	<input type="checkbox"/>				
Our firm participates extensively with other parties in e-commerce promotion and information.	<input type="checkbox"/>				
Our firm is pressured by its dominant suppliers to deal with them electronically.	<input type="checkbox"/>				
Our firm is pressured by its dominant customers to deal with them electronically.	<input type="checkbox"/>				
Our firm is required to deal with the government electronically.	<input type="checkbox"/>				
Our firm is required to adopt e-commerce by the parent company or other large dominant corporations.	<input type="checkbox"/>				
7 With regard to government readiness, we believe that :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The legal environment is conducive to conduct business on the Internet.	<input type="checkbox"/>				
There are effective laws to combat cyber crime.	<input type="checkbox"/>				
There are effective laws to resolve e-commerce dispute.	<input type="checkbox"/>				
There are effective laws to protect consumer privacy.	<input type="checkbox"/>				
There are government requirements that would discourage the adoption and use of the Internet for business.	<input type="checkbox"/>				
There are efficient and affordable e-government services that can motivate the use of the Internet for business.	<input type="checkbox"/>				
The government demonstrates strong commitment to promote e-commerce.	<input type="checkbox"/>				
8 With regard to supporting industry readiness, we believe that :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The technology infrastructure of commercial and financial institutions is capable for supporting e-commerce transactions.	<input type="checkbox"/>				
Local banks and financial institutions can help us in our e-commerce (e.g., e-payment).	<input type="checkbox"/>				

There is an adequate number of IT vendors that can provide us with needed hardware and software.	<input type="checkbox"/>				
There is efficient and affordable support from the local IT industry to support our move on the Internet.	<input type="checkbox"/>				
There is an adequate number of IT training centres that can help us knowing how to run our e-commerce business.	<input type="checkbox"/>				
There is an efficient postal and addressing system to support our move on the Internet.	<input type="checkbox"/>				
There is an adequate number of delivery companies that can provide affordable solutions to e-commerce business.	<input type="checkbox"/>				

9 With regard to local ICT Infrastructure, we believe that :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
There is an efficient and affordable telecom infrastructure to support e-commerce locally.	<input type="checkbox"/>				
The number of Internet connection failure is small when using services offered by telecom companies.	<input type="checkbox"/>				
The possibility of not being able to access the firm's web site is high and has a negative effect on the use of the Internet for business.	<input type="checkbox"/>				
Secure e-transaction (SET) and/or secure e-commerce environment (SCCE) services are easily available and affordable.	<input type="checkbox"/>				
Telecom companies and Internet service providers trying to offer a secured services over the internet as possible.	<input type="checkbox"/>				
CITC in Saudi Arabia offers local web sites registration and hosting with low costs to support our move on the Internet.	<input type="checkbox"/>				

10 With regard to our internal resources :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm has the necessary IT expertise and know-how to acquire the technology.	<input type="checkbox"/>				
Employees at our firm get IT training when needed.	<input type="checkbox"/>				
Our firm hires outside consultants to assist with IT systems development.	<input type="checkbox"/>				
There is an adequate and qualified management and staff in our firm who have the knowledge and expertise to manage e-commerce environment.	<input type="checkbox"/>				
Our firm has a very high speed connection to the Internet.	<input type="checkbox"/>				
Our business processes are well managed or supported by computerised systems.	<input type="checkbox"/>				
Our systems have been developed using web-based or multi-tier applications.	<input type="checkbox"/>				
Our computerised systems and web applications are integrated.	<input type="checkbox"/>				
Our firm is well computerised with LAN and WAN connectivity among our departments and branches.	<input type="checkbox"/>				
The cost of adopting e-commerce technologies is very high for our business.	<input type="checkbox"/>				
The amount of money and time invested in training employees to use e-commerce technologies are very high.	<input type="checkbox"/>				
By adopting e-commerce technologies, the cost of maintenance and support of these technologies is very high for our business.	<input type="checkbox"/>				

11 With regard to consumer readiness, we believe that Saudi consumers:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
have technologies needed to start using online activities.	<input type="checkbox"/>				
are aware enough and have the knowledge to start online shopping.	<input type="checkbox"/>				
accept online banking and use it in their daily lives.	<input type="checkbox"/>				
use credit cards in their daily lives and have positive attitudes toward them.	<input type="checkbox"/>				

are willing to use e-payment for online activities.	<input type="checkbox"/>				
12 With regard to trust, our firm has complete confidence in :	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
the technological skills and e-commerce knowledge of our trading partners.	<input type="checkbox"/>				
the competency of our trading partners to appropriately undertake e-commerce.	<input type="checkbox"/>				
the reliability of our trading partners to appropriately undertake e-commerce.	<input type="checkbox"/>				
the reputation of our trading partners to appropriately undertake e-commerce.	<input type="checkbox"/>				
the security of payments from our trading partners when undertaking e-commerce activities.	<input type="checkbox"/>				
that our trading partners don't have an attitude of partiality in e-commerce activities.	<input type="checkbox"/>				
the ability to prevent hacking risks over the Internet.	<input type="checkbox"/>				
the ability to maintain security of data and transactions over the Internet.	<input type="checkbox"/>				
our customers have confidence in the security of data and privacy over the Internet.	<input type="checkbox"/>				

13 General Information :

The firm's business sector :

Manufacturing Distribution (retail/wholesale) Financial Services Other, specify:

The business been operating for :

less than 5 years 5–9 years 10–14 years 15-19 years 20 years or more

The number of employees working in your organisation :

less than 10 10–49 50–249 250–999 1000 or more

Location of the main office :

Riyadh Dammam Jeddah Other, specify:

The geographical range (scope) of your organisation :

Local city Saudi Arabia GCC region Middle East Worldwide

Your position in the organisation :

General manager Executive manager IT manager Other, specify:

Your experience :

less than 5 years 5–9 years 10–14 years 15-19 years 20 years or more

Your age :

less than 25 years 25–34 years 35–44 years 45-54 years 55 years or more

Finally, we'd like to thank you so much for completing this questionnaire, and we appreciate any suggestion or comments related to the study. If you are interested in the study results, please provide us with your contact information through our e-mail (aldwsry@gmail.com).

APPENDIX (C): Survey questionnaire**II. Arabic version**

عزيزي المشارك،

السلام عليكم ورحمة الله وبركاته، وبعد ...

فإن الاستخدام المتزايد لتقنية المعلومات في معظم القطاعات غير أساليب العمل التقليدية التي يعرفها الكثيرون. وهذه الدراسة تتناول إحدى أهم نواحي استخدام الاتصالات وتقنية المعلومات في الأعمال التجارية، وهي التجارة الإلكترونية. وقد تم إعداد هذه الاستبانة لإكمال بحث الدراسات العليا في نظم وتقنية المعلومات بجامعة إيست أنجليا بالمملكة المتحدة، والتي يمكن الحصول على معلومات عنها من خلال موقع الويب التالي www.uea.ac.uk

الهدف من هذه الدراسة هو تحديد العوامل، سواءً الداخلية أو الخارجية، والتي قد تؤثر على الشركات والمؤسسات التجارية في المملكة العربية السعودية أثناء استخدام أو تخطيط وتبني التجارة الإلكترونية. البيانات التي سيتم جمعها من خلال هذه الاستبانة ستستخدم لأغراض البحث والدراسة الأكاديمية فقط. جميع إجاباتكم ستبقى محل السرية لذا راعينا عدم التطرق لشخصية المشاركين أو المؤسسات في هذه الاستبانة. إن نجاح هذا المشروع يعتمد ويتوقف على مشاركاتكم، والتي هي محل تقديرنا. لذا نأمل منكم التكرم بإعطاء بعض الوقت للمشاركة بهذه الاستبانة. شاكرٌ لكم ومقدرٌ مشاركتكم .

الباحث : مبارك بن عبدالله الدوسري

بريد إلكتروني: aldwsry@gmail.com

هاتف : 0554442226

فاكس : 012296767

التجارة الإلكترونية لدى مؤسسات القطاع الخاص في المملكة العربية السعودية

مصطلحات الدراسة :

- عبارة "مؤسسة" تم اختيارها في هذه الدراسة للتعبير عن أي شركة أو منظمة تجارية غير حكومية ، بغض النظر عن ملكيتها أو حجمها.
- "موقع ويب" (Web Site) هو عبارة عن مجموعة من الصفحات على الإنترنت مرتبطة ببعضها البعض ، والتي تعتبر وثائق أو موارد للمعلومات والتعاملات الإلكترونية على شبكة الإنترنت العالمية.
- "التجارة الإلكترونية" (e-commerce) تشير في دراستنا إلى أي نشاط تجاري إلكتروني تقوم به المؤسسات التجارية عبر مواقع الويب على الإنترنت ، ولا تقتصر على عمليات البيع والشراء الإلكتروني فحسب، بل تشمل استقبال الطلبات والاستفسار وتبادل البيانات إلكترونياً والدعاية والتسويق وخدمة العملاء عن طريق الإنترنت.
- "المبادرات الإلكترونية" (e-commerce initiatives) تشمل جميع الأفكار والمشاريع الإلكترونية التي يتم صياغتها للتحفيز أو المساهمة في تطبيق التجارة الإلكترونية في المؤسسة.
- "اتفاقية مستوى الخدمة" (SLA: Service Level Agreement) هي اتفاقية تتم بين طرفين تجاريين يتم من خلالها تحديد الخدمات، والأولويات، والمسؤوليات، والضمانات التي يجب تحققها في السلعة أو الخدمة المطلوبة.

أ- أي من العبارات التالية أكثر ملاءمة لوصف وضع التجارة الإلكترونية الحالي في مؤسستكم؟ (اختر عبارة واحدة فقط):

[]	غير متصل	: غير متصل بالإنترنت ولا يوجد بريد إلكتروني للمؤسسة.
[]	متصل	: متصل بالإنترنت ويوجد بريد إلكتروني، ولكن لا يوجد موقع ويب على الإنترنت.
[]	موقع دعائي	: موقع ويب لنشر المعلومات الأساسية للمؤسسة على شبكة الإنترنت.
[]	موقع تفاعلي	: موقع ويب تفاعلي يقبل الاستفسارات والبريد الإلكتروني وتعبئة النماذج من المستخدمين.
[]	موقع تجاري	: موقع ويب تجاري على الإنترنت لبيع وشراء المنتجات وتقديم الخدمات مثل خدمة العملاء.
[]	موقع تكاملي	: موقع ويب يتكامل مع الموردين والعملاء و أنظمة المؤسسة الداخلية مما يمكن من إجراء معظم التعاملات التجارية إلكترونياً.

ب- أي من النشاطات التجارية التالية يتم تطبيقها إلكترونياً في مؤسستكم؟ (ضع علامة "✓" أمام ما يتم تطبيقه من نشاطات):

[]	الدعاية والتسويق إلكترونياً.
[]	إجراء عمليات بيع إلكترونية.
[]	إجراء عمليات شراء إلكترونية.
[]	تبادل البيانات مع الموردين إلكترونياً.
[]	تبادل البيانات مع العملاء إلكترونياً.
[]	خدمة ودعم العملاء إلكترونياً لما بعد البيع.

ثانياً: نرجو وضع علامة "□" على اختيار واحد في المربع المناسب لكل جملة من الجمل في الفقرات التالية.
ملاحظة: في مقياس التقييم، "محايد" يتم اختيارها عند عدم الترويج من ناحية الموافقة أو الرفض للجملة.

□ <u>انتقل إلى</u> الفقرة رقم (3) إذا كانت مؤسستكم ليس لديها أي تعاملات أو مبادرات إلكترونية.				
1 فيما يتعلق بالعمليات الإلكترونية في مؤسستكم :				
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
العمليات الإلكترونية في مؤسستنا مقننة بوضوح ويتم تطبيقها بدقة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يوجد لدينا دليل تعليمات مفصل لكل عملية من العمليات الإلكترونية في المؤسسة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يتم تحديد اتفاقية مستوى الخدمة (SLA) داخلياً أو خارجياً لكل عملية من عمليات المؤسسة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يتم فرض جزاءات عند الإخلال بأي من اتفاقيات مستوى الخدمة (SLA).				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
مبادرات التجارة الإلكترونية وتنفيذها تتم من خلال عمليات محددة لإدارة المشاريع.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يوجد لدينا عمليات محددة يتم من خلالها التحكم فيما يعرض من بيانات وقوائم منتجاتنا على الإنترنت.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يتم في مؤسستنا تحديد عمليات دقيقة لمساعدة عملائنا وإدارة تعاملاتهم على الإنترنت.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لدى مؤسستنا إجراءات عمل قياسية تغطي كافة طرق الطلبات عبر الإنترنت.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لدى مؤسستنا إجراءات عمل قياسية تغطي كافة أنظمة المشتريات عبر الإنترنت.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يشارك الموردون مؤسستنا في تحديد وتقدير الاحتياجات المستقبلية من خلال عمليات وإجراءات محددة.				
2 فيما يتعلق بإدارة ومراقبة المبادرات الإلكترونية وتطبيقها :				
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
المهام والمسؤوليات والرقابة (المساءلة) محددة بدقة لكل مبادرة من مبادرات التجارة الإلكترونية لدينا.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
تم بدقة تشكيل هيئة تنفيذية داخل مؤسستنا لاتخاذ كافة القرارات المتعلقة بالتجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
تقوم مؤسستنا بتحليل تام لجميع التغيرات المحتملة داخل المؤسسة أو مع الموردين والعملاء والتي قد يسببها تطبيق التجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يتم اتباع خطوات منظمة لإدارة التغيرات التي قد تطرأ بسبب تطبيق التجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يتم تحديد حالة عمل لكل مبادرة من مبادرات التجارة الإلكترونية أو تنفيذها.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يوجد لدينا مقاييس محددة بدقة لتقييم الأثر المترتب على مبادرات التجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
مبادرات التجارة الإلكترونية لدينا مدعومة من قبل موظفينا على كافة مستوياتهم الإدارية.				
3 فيما يتعلق بخطة واستراتيجيات المؤسسة :				
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لدى مؤسستنا رؤية واضحة للتجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
بناء وتفعيل التجارة الإلكترونية يتم من خلال سياسات المؤسسة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
جميع مبادرات التجارة الإلكترونية لدينا لها من يبنائها ويدعمها.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
إدارتنا العليا تتبنى وتدعم مبادرات التجارة الإلكترونية وتنفيذها.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
رؤيتنا لنشاطات التجارة الإلكترونية معروفة ومتداولة على كافة المستويات الإدارية.				
4 من الدوافع الأساسية لتطبيق التجارة الإلكترونية في تعاملات مؤسستنا :				
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
تقليل التكاليف.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
توسيع نطاق المؤسسة التجاري للمنتجات أو الخدمات الحالية.				

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	دخول المؤسسة إلى أسواق أو نشاطات جديدة.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	تحسين وتطوير التواصل مع العملاء و الموردين.
5 في مؤسستنا ، يتوافق تطبيق التجارة الإلكترونية ويتلاءم مع :					
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	<input type="checkbox"/>	قيم و ثقافة المؤسسة.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	قنوات التوزيع الحالية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	طرق البيع التي نتبعها.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	نظم المشتريات لدينا.
6 فيما يتعلق بالضغط التجاري والمنافسة الإلكترونية :					
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	<input type="checkbox"/>	نسبة عملائنا القادرين على التعامل إلكترونياً تعتبر عالية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	نسبة موردينا القادرين على التعامل إلكترونياً تعتبر عالية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	نسبة منافسينا الذين يطبقون التجارة الإلكترونية تعتبر عالية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	استفادة منافسينا من تطبيقهم للتجارة الإلكترونية تعتبر محدودة جداً.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	هناك أفضلية لمنافسينا الذين يطبقون التجارة الإلكترونية من قبل الآخرين (مثل العملاء أو الموردين).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	تشارك مؤسستنا مع جهات أخرى في نشر الوعي حول التجارة الإلكترونية والتحفيز لها.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	تواجه مؤسستنا ضغطاً من "الموردين" للتعامل معهم إلكترونياً.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	تواجه مؤسستنا ضغطاً من "العملاء" للتعامل معهم إلكترونياً.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	تواجه مؤسستنا ضغطاً من "الحكومة" للتعامل معها إلكترونياً.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	تواجه مؤسستنا ضغطاً من "الشركة الأم أو الشركات المهيمنة" للتعامل معها إلكترونياً.
7 فيما يتعلق بجاهزية البلد للتجارة الإلكترونية ، نعتقد أن لدينا في المملكة :					
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	<input type="checkbox"/>	بيئة قانونية تساعد على تفعيل التعاملات التجارية عبر الإنترنت.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	قوانين فعالة لردع الجرائم الإلكترونية على الإنترنت.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	قوانين فعالة لفض النزاعات الناتجة عن خلافات تجارية على الإنترنت.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	قوانين فعالة لحماية خصوصية المستهلكين على الإنترنت.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	أنظمة و متطلبات حكومية قد تعيق تطبيق بعض التعاملات التجارية على الإنترنت.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	خدمات حكومية إلكترونية فعالة وميسرة تدفع بدورها المؤسسات لاستخدام الإنترنت في الأعمال التجارية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	توجهات جادة للدولة لدعم التجارة الإلكترونية في المملكة.
8 فيما يتعلق بجاهزية المؤسسات الداعمة محلياً ، نعتقد أن :					
أوافق بشدة	أوافق	محايد	لا أوافق بشدة	<input type="checkbox"/>	البنية التحتية للبنوك والمؤسسات المالية المحلية قادرة على دعم تعاملات التجارة الإلكترونية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	البنوك والمؤسسات المالية لديها الرغبة في توفير الدعم اللازم لنا للدخول في التجارة الإلكترونية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	لدينا في المملكة عدداً كافياً من شركات تقنية المعلومات قادرة على تزويدنا بالتجهيزات والبرامج اللازمة للدخول في التجارة الإلكترونية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	شركات تقنية المعلومات المتاحة في المملكة تقدم خدمات مناسبة من حيث الجودة والتكلفة لدعم توجهنا للدخول في عالم الإنترنت.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	لدينا في المملكة عدداً كافياً من مراكز التدريب المتخصصة والمناسبة من حيث الجودة والتكلفة لتقديم التدريب اللازم لتطبيق التجارة الإلكترونية.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	في المملكة خدمات بريدية وأنظمة عناوين فعالة تساهم في دعم توجهنا للتجارة الإلكترونية.

لدينا في المملكة عدداً كافياً من شركات النقل والتوصيل والمناسبة من حيث الجودة والتكلفة مما يساهم في تيسير دخولنا في عالم الإنترنت.

أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 فيما يتعلق بجاهزية البنية التحتية للاتصالات وتقنية المعلومات ، نعتقد أن :				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
البنية التحتية للاتصالات وتقنية المعلومات فعالة من حيث الجودة والتكلفة لدعم تطبيق التجارة الإلكترونية محلياً.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"نسبة الأعطال المصاحبة لخطوط الاتصال بالإنترنت" تعتبر ضئيلة جداً.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
عند استخدام الإنترنت المحلية ، احتمالية "صعوبة الدخول لموقع المؤسسة على الإنترنت" تعتبر عالية ولها تأثير سلبي على التعاملات التجارية الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
الأساليب الأمنية المتاحة لتأمين التعاملات التجارية إلكترونياً يمكن الحصول عليها بسهولة وبتكاليف ميسرة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"شركات الإنترنت المحلية" تسعى لتوفير خدمات الإنترنت الآمنة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
هيئة الاتصالات في المملكة توفر نطاقات الإنترنت والاستضافة محلياً بتكاليف مناسبة مما يساهم في دخولنا في عالم الإنترنت.				

أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 فيما يتعلق بالموارد الداخلية للمؤسسة :				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لدى مؤسستنا كوادر فنية مؤهلة للتعامل مع تقنية المعلومات.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يُدرَّب موظفونا على تقنيات المعلومات مباشرة عند الحاجة لذلك.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يتم تعيين مستشارين خارجيين للمساعدة في تطوير أنظمة تقنية المعلومات في المؤسسة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لدينا طاقم إداري لديه المعرفة والخبرة اللازمة لإدارة بيئة التجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لدى مؤسستنا إنترنت عالي السرعة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
عملياتنا التجارية تدار أو تدعم بواسطة أنظمة وتطبيقات الحاسب الآلي.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
أنظمة المعلومات وتطبيقات الحاسب الآلي لدينا تم تطويرها بواسطة تقنيات الويب.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
أنظمة المعلومات وتطبيقات الحاسب الآلي في شركتنا مترابطة ومتكاملة.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
تعتبر مؤسستنا مجهزة تجهيزاً جيداً بشبكات داخلية وخارجية لربط الأقسام والفروع.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
تعتبر تكاليف تطبيقنا لتقنيات التجارة الإلكترونية عالية بالنسبة لمؤسستنا.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
التكاليف المالية والزمينية لتدريب موظفينا لاستخدام تقنيات التجارة الإلكترونية تعتبر عالية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
تكلفة الصيانة والتشغيل المصاحبة لتطبيق التجارة الإلكترونية عالية بالنسبة لمؤسستنا.				

أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 فيما يتعلق بجاهزية المستهلكين ، نعتقد أن المستهلك السعودي :				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لديه التقنيات اللازمة لبدء مزولة نشاطات الإنترنت.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
لديه وعي كافٍ ومعرفة لبدء التسوق عبر الإنترنت.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يقبل التعاملات الإلكترونية البنكية ويستخدمها في حياته اليومية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
يستخدم بطاقات الائتمان في المشتريات اليومية ولديه اتجاهات إيجابية نحوها.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
عنده القابلية لاستخدام عمليات الدفع الإلكترونية عبر الإنترنت.				

أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 فيما يتعلق بالثقة في التقنية و الشركاء التجاريين ، لدينا الثقة التامة فيما يتعلق ب :				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
معرفة عملائنا وموردنا بالتجارة الإلكترونية والمهارات التقنية المتعلقة بها.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
الكفاءة التامة لهؤلاء العملاء والموردين لتطبيق وممارسة التجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
الاعتمادية والموثوقية التامة لعملائنا وموردنا لتطبيق وممارسة التجارة الإلكترونية.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
سمعة هؤلاء الموردين والعملاء في تطبيق وممارسة التجارة الإلكترونية بالشكل المطلوب.				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
أمن التحصيل والمدفوعات الإلكترونية التي يقوم بها هؤلاء العملاء والموردون.				

<input type="checkbox"/>	حيادية عملاننا ومورديننا وعدم التحيز مع منافسينا أثناء التعاملات الإلكترونية.				
<input type="checkbox"/>	القدرة على الحد من مخاطر القرصنة الإلكترونية (الهكرز) على الإنترنت.				
<input type="checkbox"/>	القدرة على المحافظة على أمن بياناتنا وتعاملاتنا وسريتها على الإنترنت.				
<input type="checkbox"/>	لدى زبائننا الثقة التامة حول سرية بياناتهم المرسله وخصوصيتها عبر الإنترنت.				

13 معلومات عامة عن المؤسسة والمشارك :

تنتمي مؤسستنا إلى قطاع :				
[] الصناعة	[] التوزيع (الجملة والمفرق)	[] الخدمات المالية	[] أخرى، حدد
عمر المؤسسة منذ نشأتها :				
[] أقل من ٥ سنوات	[] من ٥ إلى ٩ سنوات	[] من ١٠ إلى ١٤ سنة	[] من ١٥ إلى ١٩ سنة	[] ٢٠ سنة أو أكثر
عدد الموظفين في مؤسستنا :				
[] أقل من ١٠	[] من ١٠ إلى ٤٩	[] من ٥٠ إلى ٢٤٩	[] من ٢٥٠ إلى ٩٩٩	[] ١٠٠٠ أو أكثر
المقر الرئيسي للمؤسسة :				
[] مدينة الرياض	[] مدينة جدة	[] مدينة الدمام	[] أخرى، حدد
النطاق الجغرافي للمؤسسة تجارياً :				
[] مدينة محلية	[] المملكة	[] دول الخليج العربي	[] دول الشرق الأوسط	[] دول العالم
المستوى الإداري الحالي لكم :				
[] مدير عام	[] مدير تنفيذي	[] مدير تقنية معلومات	[] أخرى، حدد
سنوات الخبرة في تخصصكم الحالي :				
[] أقل من ٥ سنوات	[] من ٥ إلى ٩ سنوات	[] من ١٠ إلى ١٤ سنة	[] من ١٥ إلى ١٩ سنة	[] ٢٠ سنة أو أكثر
العمر الحالي لكم :				
[] أقل من ٢٥ سنة	[] من ٢٥ إلى ٣٤ سنة	[] من ٣٥ إلى ٤٤ سنة	[] من ٤٥ إلى ٥٤ سنة	[] ٥٥ سنة أو أكثر

ختاماً، نشكر لكم تفضلكم بالمشاركة بهذه الدراسة. كما نقدر أي ملاحظات أو اقتراحات حول موضوع الدراسة ، و في حين رغبتم بالتزود بنتائج هذه الدراسة نرجو تزويدنا بوسائل الاتصال المناسبة من خلال الإيميل التالي (aldwsry@gmail.com).

APPENDIX (D): Correlation Matrix

	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
PR1	1.0000									
PR2	0.6512	1.0000								
PR3	0.5649	0.6820	1.0000							
PR4	0.5140	0.5744	0.6941	1.0000						
PR5	0.5096	0.4796	0.5724	0.4962	1.0000					
PR6	0.5390	0.4740	0.4957	0.4458	0.4822	1.0000				
PR7	0.5778	0.6252	0.5935	0.6005	0.4865	0.6780	1.0000			
PR8	0.5528	0.6110	0.5866	0.5210	0.4371	0.5752	0.6823	1.0000		
PR9	0.4429	0.5806	0.4950	0.4597	0.3565	0.3999	0.5405	0.6926	1.0000	
PR10	0.4204	0.4584	0.4396	0.5204	0.4008	0.3783	0.5476	0.5419	0.6118	1.0000
GV1	0.5424	0.5537	0.5485	0.5890	0.4662	0.5377	0.5660	0.5747	0.5008	0.4934
GV2	0.5273	0.5573	0.5471	0.4647	0.4156	0.4909	0.5381	0.5482	0.4921	0.5473
GV3	0.5538	0.5982	0.5953	0.5781	0.4703	0.5639	0.6142	0.6357	0.5811	0.5255
GV4	0.5239	0.5892	0.6106	0.5078	0.4126	0.5071	0.5644	0.5458	0.5017	0.4699
GV5	0.5125	0.5751	0.4809	0.4837	0.4153	0.4855	0.4936	0.5877	0.4990	0.5221
GV6	0.4842	0.5641	0.5345	0.5128	0.4312	0.5240	0.5478	0.5418	0.5351	0.4612
GV7	0.4837	0.4838	0.4436	0.4606	0.4292	0.5613	0.5350	0.5641	0.4455	0.4041
CM1	0.4762	0.4676	0.4224	0.4154	0.4424	0.5098	0.4961	0.5425	0.4535	0.3966
CM2	0.4680	0.4404	0.3872	0.4127	0.4302	0.5274	0.5009	0.4249	0.4268	0.4123
CM3	0.4176	0.4294	0.4147	0.3437	0.4388	0.5167	0.4803	0.4454	0.3751	0.3552
CM4	0.4557	0.4122	0.4089	0.3920	0.3959	0.5618	0.5248	0.4911	0.4298	0.3794
CM5	0.4724	0.4653	0.4176	0.4216	0.4633	0.4906	0.4928	0.5107	0.4062	0.3994
TR1	0.2077	0.2733	0.2328	0.2485	0.2349	0.2645	0.3168	0.3118	0.2663	0.3330
TR2	0.2632	0.3129	0.2534	0.2941	0.2466	0.3935	0.3814	0.3782	0.2914	0.3361
TR3	0.3964	0.4096	0.3622	0.3174	0.2954	0.4489	0.4599	0.4881	0.3208	0.3566
TR4	0.3272	0.3643	0.3527	0.3288	0.3198	0.3934	0.4069	0.4171	0.2922	0.3448
TR5	0.3305	0.3527	0.3578	0.2753	0.2335	0.3444	0.3902	0.3608	0.3285	0.3236
HR1	0.3983	0.3659	0.3716	0.3137	0.3539	0.4349	0.4362	0.4258	0.2666	0.2535
HR2	0.2557	0.2877	0.3093	0.2496	0.2732	0.2271	0.2694	0.2622	0.2315	0.2582
HR3	0.0966	0.1264	0.2434	0.1411	0.1261	0.1719	0.1887	0.1536	0.0354	0.0511
HR4	0.3498	0.4048	0.4032	0.3361	0.2791	0.4395	0.4079	0.4567	0.2994	0.2850
PC1	-0.0782	0.0785	0.1010	0.1002	0.0374	-0.0563	0.0808	0.0648	0.0510	0.0146
PC2	-0.0198	-0.0092	0.0570	0.0524	0.0441	0.0146	0.0536	0.0480	-0.0648	-0.0047
PC3	-0.0075	0.0675	0.0950	0.0679	0.0499	-0.0475	0.0533	0.1221	0.0158	0.0499
PB1	0.2246	0.1615	0.1288	0.1831	0.1800	0.2249	0.2620	0.1769	0.2493	0.2929
PB2	0.2893	0.2056	0.1930	0.2455	0.2702	0.3690	0.3042	0.2638	0.2294	0.2623
PB3	0.2712	0.1810	0.1854	0.2768	0.2563	0.3333	0.3424	0.2600	0.1974	0.2251
PB4	0.2528	0.2333	0.1605	0.2065	0.2295	0.3818	0.3529	0.2748	0.2145	0.2867
CT1	0.3713	0.3667	0.2881	0.3338	0.3235	0.4047	0.4077	0.4017	0.3102	0.3075
CT2	0.4012	0.4086	0.4289	0.3799	0.3761	0.4783	0.4492	0.4925	0.3115	0.2960
CT3	0.3629	0.3535	0.3102	0.2811	0.3296	0.4695	0.4380	0.4201	0.3201	0.3181
CT4	0.2909	0.3391	0.2772	0.2236	0.3137	0.3694	0.3768	0.3706	0.4356	0.3300
SC1	0.1627	0.2318	0.2769	0.2360	0.1291	0.2215	0.2183	0.2523	0.2808	0.1649
SC2	0.2167	0.2190	0.2764	0.2960	0.2202	0.2661	0.2697	0.2921	0.2683	0.3113
SC3	0.2471	0.2226	0.2876	0.2719	0.2027	0.3137	0.2480	0.2813	0.2263	0.2207
NP1	0.2649	0.2502	0.2761	0.2772	0.2335	0.3438	0.3037	0.3835	0.2915	0.2416
NP2	0.2076	0.2059	0.2774	0.2159	0.2577	0.2169	0.2966	0.2978	0.3572	0.2321
NP3	0.3142	0.3592	0.2999	0.2923	0.3094	0.3631	0.3809	0.3989	0.3290	0.3247
MP1	0.2154	0.2559	0.3231	0.1912	0.2479	0.2911	0.3237	0.3242	0.2985	0.2620
MP2	0.2399	0.2733	0.3057	0.1144	0.2329	0.1805	0.2259	0.2104	0.2210	0.1720
MP3	0.2506	0.2415	0.2923	0.2947	0.2353	0.2986	0.3134	0.3314	0.3748	0.3273
CP1	0.0400	0.1020	0.1943	0.1443	0.1676	0.0063	0.1167	0.0989	0.1899	0.1355
CP2	0.1049	0.1187	0.2131	0.1527	0.2036	0.1771	0.2238	0.1866	0.0646	0.1623
CP3	0.0905	0.0756	0.1295	0.0494	0.1305	0.0373	0.0769	0.0832	0.1097	0.0686
CP4	0.1845	0.1982	0.3254	0.2090	0.2961	0.0936	0.1587	0.1712	0.2411	0.1480
GR1	0.0759	0.1225	0.1619	0.1513	0.2225	0.0559	0.0989	0.0839	0.2416	0.1611
GR2	0.0184	0.1125	0.1573	0.1283	0.2094	0.0395	0.0822	0.0696	0.2112	0.1625
GR3	0.0332	0.0823	0.1478	0.1347	0.1685	0.0638	0.0806	0.0738	0.1868	0.1486
GR4	0.0646	0.0910	0.1387	0.1712	0.2303	0.0911	0.0917	0.0752	0.2095	0.1649
GR5	-0.0062	-0.0464	0.0016	-0.0486	0.0651	-0.0138	-0.0254	0.0389	-0.0062	0.0225
GR6	0.1186	0.1607	0.1338	0.1315	0.2291	0.1377	0.1180	0.0944	0.2237	0.1797
GR7	0.0969	0.1837	0.2295	0.1673	0.1607	0.1500	0.1855	0.1636	0.2588	0.1279
SR1	0.0790	0.1749	0.1224	0.0586	0.1653	0.1940	0.2499	0.2123	0.1125	0.1229
SR2	0.0806	0.1024	0.1290	0.0578	0.1516	0.2040	0.1826	0.1081	0.1537	0.0524
SR3	0.1626	0.1375	0.1867	0.0820	0.1159	0.1088	0.1175	0.1195	0.1674	0.1964
SR4	0.1321	0.1000	0.1364	0.1056	0.1941	0.0655	0.0607	0.0659	0.0829	0.1399
SR5	0.2376	0.1367	0.1696	0.1336	0.2033	0.2379	0.1431	0.1995	0.1209	0.1082
SR6	0.0588	0.0317	0.0475	0.0899	0.1569	0.0964	0.0254	0.0665	0.1256	0.1502
SR7	0.0974	0.0652	0.1081	0.0386	0.1487	0.1249	0.0423	0.0415	0.0617	0.0929
TC1	0.1334	0.1551	0.1004	0.0269	0.1181	0.0976	0.0499	0.1142	0.1507	0.0779
TC2	0.1702	0.1711	0.1620	0.0771	0.1476	0.1114	0.1045	0.1519	0.1863	0.1300
TC3	0.0580	0.0725	0.0041	-0.1219	0.0131	0.0985	-0.0354	-0.0290	-0.0065	-0.0281
TC4	0.1347	0.1075	0.2105	0.1375	0.1933	0.1192	0.1590	0.1694	0.1181	0.1692
TC5	0.1406	0.1388	0.2134	0.1065	0.1933	0.1573	0.1017	0.1306	0.1831	0.1505
TC6	0.1338	0.1078	0.1235	0.0504	0.1199	0.1337	0.0665	0.0521	0.1640	0.0822
CR1	0.0900	0.0006	0.0725	-0.0584	-0.0374	0.0567	0.0493	0.0997	0.0459	0.0818
CR2	0.0356	0.0366	-0.0032	-0.0013	-0.0236	-0.0116	0.0120	0.0153	0.0337	-0.0113

	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
CR3	0.0961	0.0127	0.0348	-0.0054	-0.0083	0.1716	0.1254	0.0494	-0.0905	0.0060
CR4	0.0223	-0.0316	-0.0409	-0.0709	0.0224	0.0611	-0.0191	-0.0387	-0.0933	-0.0267
CR5	0.0053	-0.0184	0.0267	-0.0440	-0.0030	0.1244	0.0916	0.0748	-0.0345	-0.0355
TT1	0.2012	0.2249	0.2607	0.2192	0.2640	0.2523	0.2765	0.2299	0.2137	0.2748
TT2	0.1594	0.2126	0.2701	0.2258	0.1775	0.1979	0.2386	0.2718	0.2093	0.2962
TT3	0.2179	0.2175	0.2606	0.1961	0.1946	0.2055	0.2209	0.2893	0.2267	0.2897
TT4	0.1756	0.1406	0.2264	0.2254	0.1438	0.2281	0.2429	0.2343	0.2616	0.2580
TT5	0.2250	0.2068	0.3082	0.2720	0.2435	0.3372	0.3604	0.3138	0.1845	0.2210
TT6	0.1273	0.1909	0.1999	0.1897	0.0624	0.1835	0.2451	0.2521	0.2592	0.2511
	GV1	GV2	GV3	GV4	GV5	GV6	GV7	CM1	CM2	CM3
GV1	1.0000									
GV2	0.6321	1.0000								
GV3	0.6355	0.6886	1.0000							
GV4	0.6209	0.6523	0.7310	1.0000						
GV5	0.6293	0.6191	0.6394	0.6550	1.0000					
GV6	0.6113	0.6054	0.6392	0.6878	0.7115	1.0000				
GV7	0.5183	0.5174	0.5877	0.5617	0.6200	0.6247	1.0000			
CM1	0.5687	0.5354	0.6064	0.5448	0.5352	0.5573	0.6053	1.0000		
CM2	0.5505	0.5242	0.5570	0.5875	0.5857	0.6022	0.5213	0.7453	1.0000	
CM3	0.4927	0.5447	0.5279	0.5167	0.5500	0.5494	0.4787	0.6988	0.7015	1.0000
CM4	0.4992	0.4766	0.5246	0.5161	0.5704	0.5702	0.5602	0.6772	0.7326	0.7564
CM5	0.5425	0.4940	0.5043	0.4996	0.5580	0.5155	0.5801	0.6454	0.6151	0.6527
TR1	0.2371	0.2855	0.2756	0.2260	0.3332	0.2539	0.2298	0.2877	0.2954	0.3156
TR2	0.3162	0.3886	0.3817	0.3469	0.3701	0.3128	0.3063	0.3525	0.3446	0.4071
TR3	0.3950	0.4160	0.3983	0.3775	0.3668	0.4114	0.3375	0.3820	0.3742	0.4452
TR4	0.3453	0.3645	0.4193	0.3678	0.3818	0.3574	0.3718	0.4377	0.3844	0.4654
TR5	0.3230	0.3346	0.3653	0.3782	0.4068	0.3542	0.3199	0.3481	0.3455	0.4237
HR1	0.3592	0.3751	0.4173	0.3510	0.3471	0.3330	0.3880	0.4038	0.3669	0.4097
HR2	0.3178	0.3272	0.3358	0.3657	0.3106	0.3048	0.2983	0.2901	0.3141	0.2891
HR3	0.1313	0.1445	0.1225	0.2082	0.0881	0.0803	0.1329	0.1457	0.1589	0.1387
HR4	0.3746	0.4021	0.4375	0.4417	0.4455	0.4370	0.4411	0.4171	0.3658	0.4087
PC1	0.0322	0.0047	0.0635	0.0577	0.0210	0.0339	0.0482	-0.0274	0.0291	0.0091
PC2	0.0202	0.0266	0.0509	0.0114	-0.0613	-0.0663	0.0392	0.0258	-0.0422	0.0254
PC3	0.0135	0.0546	0.0759	0.0266	-0.0002	-0.0586	0.0470	0.0467	-0.0201	-0.0038
PB1	0.2210	0.2388	0.2435	0.2510	0.2758	0.2180	0.2668	0.1863	0.2459	0.1777
PB2	0.3317	0.3149	0.3456	0.3410	0.3476	0.3604	0.3334	0.3404	0.4122	0.3505
PB3	0.3227	0.2706	0.2947	0.3104	0.3111	0.3048	0.3323	0.3774	0.3880	0.3237
PB4	0.2415	0.2255	0.2190	0.2531	0.3312	0.3157	0.2972	0.2982	0.3850	0.3829
CT1	0.4303	0.3549	0.3993	0.4516	0.4397	0.4358	0.4364	0.5021	0.5030	0.5094
CT2	0.4577	0.4247	0.4913	0.4667	0.4473	0.4872	0.4592	0.4873	0.4304	0.4576
CT3	0.3710	0.3533	0.4091	0.4396	0.4293	0.4784	0.4475	0.5198	0.4975	0.4702
CT4	0.2831	0.3127	0.4087	0.4020	0.3719	0.4114	0.4126	0.4318	0.4153	0.3648
SC1	0.3497	0.2510	0.3405	0.3309	0.2675	0.2879	0.2797	0.3428	0.2342	0.2209
SC2	0.3846	0.2828	0.3742	0.3568	0.4123	0.3692	0.3398	0.3721	0.3324	0.3329
SC3	0.3398	0.2843	0.2978	0.2777	0.3713	0.3033	0.2867	0.3784	0.3321	0.4144
NP1	0.3203	0.3211	0.3575	0.2393	0.2983	0.2868	0.3493	0.3567	0.2800	0.3434
NP2	0.1886	0.2541	0.3429	0.2738	0.2687	0.2727	0.2406	0.3045	0.3201	0.3680
NP3	0.3587	0.3751	0.4010	0.3840	0.3845	0.3575	0.3960	0.3944	0.3586	0.3688
MP1	0.2927	0.3040	0.3752	0.3593	0.3290	0.3266	0.2346	0.2533	0.2445	0.2946
MP2	0.1476	0.1986	0.2423	0.2768	0.1894	0.2263	0.1301	0.2608	0.2314	0.2652
MP3	0.3171	0.2999	0.3251	0.3473	0.3372	0.3270	0.2719	0.2644	0.3040	0.2577
CP1	0.0838	0.0652	0.1823	0.1673	-0.0064	0.0876	0.0414	0.1153	0.0922	0.0791
CP2	0.0953	0.1510	0.1876	0.1344	0.1031	0.0499	0.1047	0.0855	0.0994	0.1380
CP3	0.0267	0.1491	0.0710	0.0872	0.0722	0.0229	0.0980	0.0423	-0.0039	0.0380
CP4	0.1783	0.1884	0.2452	0.2461	0.1472	0.1679	0.1563	0.2142	0.1810	0.1695
GR1	0.2547	0.1415	0.1573	0.1512	0.1685	0.2310	0.1907	0.1905	0.1452	0.0974
GR2	0.1381	0.1174	0.2017	0.1492	0.1048	0.1694	0.1395	0.2532	0.1157	0.1056
GR3	0.1733	0.0950	0.1872	0.1465	0.1214	0.1393	0.1289	0.1726	0.0784	0.0896
GR4	0.1719	0.0899	0.2458	0.1605	0.1129	0.1487	0.1564	0.2731	0.1529	0.1175
GR5	0.0560	0.0138	0.0455	0.0632	-0.0235	0.0356	0.0287	0.0315	0.0252	0.0129
GR6	0.2427	0.1975	0.1824	0.1723	0.1647	0.2246	0.1594	0.2030	0.1640	0.1572
GR7	0.2172	0.1502	0.2085	0.1586	0.2108	0.2061	0.2122	0.2753	0.1885	0.1707
SR1	0.2049	0.1120	0.1251	0.1341	0.1682	0.1532	0.1141	0.2507	0.2022	0.2377
SR2	0.2065	0.1317	0.1296	0.1303	0.1847	0.1904	0.1497	0.1724	0.2023	0.2642
SR3	0.1086	0.1849	0.1050	0.1794	0.1682	0.2005	0.1116	0.1771	0.0924	0.2074
SR4	0.1039	0.1764	0.1558	0.1277	0.1410	0.1263	0.1128	0.1476	0.0419	0.1725
SR5	0.1687	0.1882	0.2078	0.1530	0.2246	0.2060	0.1971	0.1788	0.1626	0.1705
SR6	0.0901	0.0787	0.1013	0.1223	0.1742	0.1327	0.1718	0.1804	0.1827	0.1610
SR7	0.1078	0.0631	0.0650	0.1626	0.0988	0.1334	0.1507	0.1378	0.1679	0.1104
TC1	0.0768	0.1271	0.1044	0.1008	0.1972	0.1679	0.2090	0.1747	0.1341	0.1255
TC2	0.1800	0.1776	0.1994	0.2103	0.2146	0.1858	0.1769	0.1132	0.1317	0.1234
TC3	-0.0117	-0.0111	-0.0148	0.0504	0.0319	0.0189	-0.0002	0.0646	0.0816	0.0869
TC4	0.1779	0.2110	0.2046	0.2301	0.1962	0.2459	0.1791	0.2014	0.1527	0.2357
TC5	0.2240	0.1327	0.2411	0.2720	0.1817	0.2312	0.1639	0.2593	0.2239	0.2284
TC6	0.1599	0.0688	0.1060	0.1939	0.1069	0.1533	0.0894	0.1840	0.1630	0.0992
CR1	0.0933	0.0648	0.0235	0.0470	0.1185	0.0677	0.0955	0.0537	0.0088	0.0321
CR2	0.1422	0.0424	0.0337	-0.0106	0.0814	0.0427	0.1097	0.0851	-0.0363	0.0444

	GV1	GV2	GV3	GV4	GV5	GV6	GV7	CM1	CM2	CM3
CR3	0.0439	0.0970	0.0730	0.0506	0.0643	0.0443	0.0419	0.0510	0.0670	0.1278
CR4	0.0561	0.0659	0.0463	0.0420	0.0914	0.0045	0.0486	0.0557	0.0336	0.0879
CR5	0.0699	0.0542	0.0574	0.0746	0.1042	0.0271	0.0717	0.0745	0.0350	0.0890
TT1	0.2683	0.1812	0.3175	0.2429	0.1753	0.2026	0.2063	0.2486	0.1721	0.2854
TT2	0.2380	0.2521	0.3136	0.2710	0.2966	0.2146	0.3003	0.2314	0.1246	0.2225
TT3	0.2477	0.2523	0.2812	0.2654	0.2634	0.2554	0.2526	0.2675	0.1720	0.2565
TT4	0.2813	0.2503	0.3402	0.3505	0.2603	0.2688	0.2201	0.3246	0.2718	0.3470
TT5	0.3454	0.2478	0.3187	0.3215	0.3483	0.2899	0.2884	0.3079	0.2822	0.3853
TT6	0.2437	0.2122	0.2747	0.2597	0.3217	0.2438	0.1973	0.1466	0.2130	0.2753
	CM4	CM5	TR1	TR2	TR3	TR4	TR5	HR1	HR2	HR3
CM4	1.0000									
CM5	0.6842	1.0000								
TR1	0.3069	0.3919	1.0000							
TR2	0.3774	0.3665	0.5252	1.0000						
TR3	0.4708	0.3923	0.4923	0.5631	1.0000					
TR4	0.4343	0.4830	0.5199	0.6107	0.6372	1.0000				
TR5	0.4477	0.4002	0.5081	0.4759	0.5271	0.6373	1.0000			
HR1	0.3533	0.4019	0.3837	0.4710	0.4816	0.5371	0.4046	1.0000		
HR2	0.2532	0.3438	0.3420	0.3974	0.3227	0.4170	0.3389	0.5817	1.0000	
HR3	0.1088	0.2029	0.2586	0.1747	0.2551	0.2450	0.2772	0.3626	0.4567	1.0000
HR4	0.4537	0.4957	0.4025	0.3641	0.4856	0.4728	0.4072	0.5904	0.5431	0.3724
PC1	-0.0119	0.0200	0.0531	0.0562	0.0423	0.0409	0.1049	0.0230	0.1826	0.2380
PC2	-0.0386	0.0123	-0.0866	0.0045	0.0190	0.0553	-0.0000	0.0567	0.0334	0.2676
PC3	-0.0477	0.0671	-0.0148	0.0247	0.0166	0.0549	0.0351	0.0571	0.0810	0.2243
PB1	0.2611	0.2740	0.2090	0.1916	0.1119	0.1798	0.1565	0.1783	0.2584	0.2119
PB2	0.4520	0.4296	0.3095	0.3039	0.2161	0.2831	0.2143	0.3015	0.2419	-0.0102
PB3	0.4349	0.4309	0.2880	0.2622	0.1873	0.2510	0.1746	0.2707	0.1981	0.0159
PB4	0.4517	0.4121	0.2749	0.3361	0.2852	0.2601	0.2602	0.2803	0.1916	0.0275
CT1	0.5555	0.5142	0.2497	0.3476	0.4219	0.3790	0.3267	0.3428	0.3440	0.1341
CT2	0.4580	0.4991	0.2397	0.3321	0.4021	0.3340	0.3218	0.3602	0.2880	0.1394
CT3	0.5409	0.5184	0.2105	0.3331	0.3341	0.3334	0.2615	0.2919	0.2807	0.0412
CT4	0.4423	0.4440	0.0882	0.2965	0.2172	0.3174	0.2017	0.2629	0.2668	0.0217
SC1	0.2615	0.2662	0.1209	0.1855	0.1548	0.2325	0.1794	0.2213	0.1641	0.0447
SC2	0.3619	0.4069	0.2362	0.2786	0.2597	0.3389	0.2390	0.3227	0.2792	0.0053
SC3	0.4043	0.4242	0.2872	0.3150	0.3232	0.3967	0.3069	0.4184	0.2940	0.0652
NP1	0.3521	0.3604	0.1599	0.3027	0.2860	0.2671	0.2049	0.4040	0.2527	0.0886
NP2	0.3154	0.2835	0.1313	0.2456	0.1879	0.2088	0.2112	0.2873	0.1990	0.0706
NP3	0.3728	0.5033	0.2418	0.2598	0.2915	0.3941	0.2816	0.4002	0.3206	0.1854
MP1	0.2802	0.2496	0.1045	0.1896	0.2029	0.1821	0.1630	0.2376	0.1405	0.1472
MP2	0.2869	0.2582	0.1443	0.1684	0.2279	0.1922	0.2379	0.2505	0.1547	0.1419
MP3	0.3150	0.2858	0.1931	0.2119	0.2137	0.1828	0.2162	0.2799	0.2099	-0.0062
CP1	0.0656	0.0769	0.0533	0.0358	0.0832	0.0522	0.0538	0.1076	0.1070	0.1164
CP2	0.1294	0.1489	0.0637	0.0990	0.0933	0.1190	0.1108	0.1798	0.0796	0.2061
CP3	0.0563	0.1079	0.0446	0.0024	0.0302	0.0581	0.1005	0.1242	0.1446	0.2102
CP4	0.1208	0.1756	0.0648	0.0404	0.0796	0.0455	0.1380	0.1578	0.1604	0.1464
GR1	0.0963	0.2171	0.0666	-0.0387	0.0177	0.0692	0.0291	0.0440	0.1588	-0.1032
GR2	0.0677	0.1653	0.1019	0.0165	0.0160	0.0812	0.0126	0.0833	0.1029	-0.0387
GR3	0.0581	0.1341	0.0436	-0.0354	-0.0018	0.0899	-0.0314	0.1209	0.1191	-0.0321
GR4	0.0978	0.1446	0.0798	0.0262	0.0086	0.1325	0.0303	0.1377	0.0983	-0.0475
GR5	-0.0161	-0.0210	-0.0950	-0.0234	-0.0212	-0.0230	-0.0471	-0.0223	-0.1024	-0.1550
GR6	0.2209	0.3048	0.1352	0.1462	0.1857	0.1705	0.1366	0.0781	0.1038	-0.0952
GR7	0.2730	0.2837	0.2395	0.1832	0.2541	0.1969	0.2123	0.1490	0.1491	0.0409
SR1	0.1987	0.2556	0.1451	0.1759	0.1986	0.1984	0.1952	0.1808	0.1352	0.0940
SR2	0.2335	0.2379	0.0915	0.1470	0.1276	0.1585	0.1914	0.2311	0.2059	0.0936
SR3	0.1557	0.1835	0.2119	0.2304	0.1425	0.2131	0.1023	0.2648	0.1992	0.0144
SR4	0.0782	0.1694	0.1537	0.1684	0.1181	0.2292	0.0489	0.3125	0.2387	0.0202
SR5	0.2014	0.2576	0.1697	0.2252	0.1601	0.2611	0.0758	0.3363	0.2640	0.0728
SR6	0.1205	0.1678	0.0708	0.0844	0.0696	0.1395	-0.0446	0.1669	0.1054	-0.1183
SR7	0.1398	0.1170	0.0605	0.1353	0.0964	0.1228	0.0460	0.2154	0.2386	0.0913
TC1	0.1362	0.1750	0.2595	0.1720	0.1393	0.1591	0.1387	0.2662	0.2450	0.0370
TC2	0.1148	0.1593	0.2435	0.1379	0.1917	0.1196	0.0973	0.2470	0.2233	0.0614
TC3	0.1244	0.0861	0.0689	0.0848	0.0324	0.0098	0.1434	0.0553	0.0207	0.0230
TC4	0.1524	0.2027	0.1944	0.1822	0.1151	0.1742	0.0248	0.1750	0.1788	0.0707
TC5	0.1567	0.1120	0.1528	0.1603	0.1725	0.2001	0.0627	0.0987	0.1891	-0.0273
TC6	0.1043	0.1286	0.1604	0.1364	0.1170	0.1032	0.1131	0.1848	0.2741	0.0947
CR1	0.0815	0.1126	0.1524	0.0326	0.1385	0.0294	0.0893	0.0187	0.1088	0.0919
CR2	0.0118	0.0954	0.1257	0.0557	0.1198	0.0816	0.0383	0.0718	0.0979	0.0991
CR3	0.1548	0.1457	0.1073	0.1461	0.2010	0.2323	0.1281	0.2012	0.0704	0.1290
CR4	0.0414	0.1170	0.0015	0.0180	-0.0129	0.1193	-0.0306	0.0995	0.0351	0.0296
CR5	0.1145	0.1450	0.0977	0.0771	0.0254	0.1876	0.1085	0.2005	0.1530	0.1901
TT1	0.1609	0.3230	0.1557	0.2035	0.2082	0.2270	0.1200	0.2546	0.1864	0.1792
TT2	0.1841	0.3306	0.1902	0.2505	0.1332	0.2831	0.1512	0.2393	0.1799	0.1240
TT3	0.1905	0.3579	0.2784	0.2642	0.2181	0.3178	0.2315	0.2741	0.1860	0.1296
TT4	0.2779	0.3392	0.2767	0.3082	0.2418	0.3161	0.2465	0.2280	0.2060	0.1180
TT5	0.3234	0.4187	0.2465	0.3093	0.2929	0.3686	0.3029	0.3538	0.2176	0.1010
TT6	0.2343	0.3044	0.2341	0.2457	0.2343	0.2792	0.2228	0.2473	0.1800	0.1244

	HR4	PC1	PC2	PC3	PB1	PB2	PB3	PB4	CT1	CT2
HR4	1.0000									
PC1	0.0628	1.0000								
PC2	0.0174	0.6239	1.0000							
PC3	0.0399	0.6590	0.7607	1.0000						
PB1	0.1410	0.1567	0.0725	0.0467	1.0000					
PB2	0.2557	-0.0393	-0.0909	-0.0941	0.4454	1.0000				
PB3	0.3174	-0.0312	-0.0760	-0.0656	0.3364	0.7043	1.0000			
PB4	0.2809	-0.0055	-0.0525	-0.0407	0.3488	0.6182	0.5991	1.0000		
CT1	0.4090	0.0581	0.0015	0.0518	0.2488	0.4146	0.4200	0.4827	1.0000	
CT2	0.4174	0.0530	-0.0024	0.0158	0.2492	0.3241	0.3680	0.3174	0.5772	1.0000
CT3	0.3776	-0.0718	-0.0662	-0.0475	0.1684	0.3658	0.3580	0.4026	0.5920	0.6389
CT4	0.3340	-0.0531	-0.0556	-0.0523	0.1915	0.2740	0.2934	0.3452	0.5025	0.5216
SC1	0.2080	0.0743	-0.0467	-0.0203	0.1794	0.1945	0.1967	0.0465	0.1763	0.3102
SC2	0.3132	0.0126	-0.0729	-0.0947	0.1784	0.2850	0.3074	0.2229	0.2362	0.3131
SC3	0.3376	-0.0369	-0.0769	-0.0957	0.0610	0.2513	0.2823	0.2356	0.2620	0.3356
NP1	0.3029	-0.0339	-0.0237	0.0160	0.1721	0.1617	0.1632	0.2249	0.2867	0.3538
NP2	0.1955	0.0614	0.1282	0.0735	0.0169	0.1047	0.1722	0.2141	0.2091	0.2016
NP3	0.4675	0.0766	0.0417	0.0600	0.3104	0.3163	0.3478	0.3220	0.3542	0.3256
MP1	0.2368	0.0272	-0.0126	0.0215	0.1258	0.1373	0.1590	0.1342	0.1701	0.2860
MP2	0.2177	-0.0186	-0.0807	-0.0649	0.0356	0.0483	0.0673	0.0405	0.1473	0.3288
MP3	0.2902	-0.0183	-0.1251	-0.0984	0.1329	0.3122	0.3446	0.2960	0.2908	0.3270
CP1	0.1095	0.1265	0.1583	0.0674	-0.0143	0.0181	0.1202	0.0363	0.1417	0.1147
CP2	0.1298	0.1752	0.1573	0.1435	0.2002	0.1529	0.1837	0.1159	0.0367	0.1317
CP3	0.1545	0.1789	0.1124	0.2064	0.2040	0.0422	0.1031	0.0624	0.0915	0.0414
CP4	0.1846	0.0875	0.1308	0.1134	0.0281	0.0452	0.1708	0.0358	0.1498	0.1410
GR1	0.1400	0.0107	-0.0840	-0.0616	0.0750	0.1443	0.1695	-0.0114	0.0981	0.1605
GR2	0.0395	-0.0293	-0.0554	-0.0364	0.0798	0.0841	0.1339	-0.0821	0.0249	0.1579
GR3	0.1223	0.0205	-0.0365	-0.0475	0.1020	0.0584	0.0721	-0.1144	0.0036	0.1402
GR4	0.1000	0.0018	-0.0063	-0.0154	0.0468	0.0433	0.1120	-0.0813	0.0542	0.1600
GR5	-0.0996	-0.1332	-0.0341	-0.1517	-0.1937	-0.0601	-0.0134	-0.1624	-0.0428	-0.0156
GR6	0.1455	-0.0825	-0.1154	-0.0925	0.0681	0.1501	0.1839	0.1597	0.2271	0.2242
GR7	0.2223	0.0169	-0.0234	-0.0282	0.0397	0.0471	0.1119	0.0796	0.2047	0.1857
SR1	0.1512	0.0409	0.0764	0.0947	0.0203	0.0323	0.0897	0.1457	0.2263	0.1767
SR2	0.1957	0.1558	0.0302	0.0422	0.1982	0.2308	0.2479	0.2743	0.2173	0.1707
SR3	0.1777	-0.0348	-0.0616	-0.0285	0.1262	0.2083	0.1367	0.1674	0.1091	0.1224
SR4	0.2069	-0.0702	-0.0478	-0.0278	0.1174	0.1356	0.1831	0.0521	0.0722	0.1815
SR5	0.3027	-0.0120	-0.0152	0.0307	0.1760	0.1709	0.1796	0.0996	0.1665	0.2411
SR6	0.1409	0.0310	-0.0157	-0.0022	0.0567	0.1065	0.0945	0.0466	0.1559	0.1311
SR7	0.1678	-0.0319	-0.0705	-0.1121	0.1275	0.1023	0.1172	0.0720	0.0945	0.1525
TC1	0.2541	0.0284	-0.0804	0.0065	0.1196	0.1150	0.1539	0.0691	0.2328	0.2539
TC2	0.2340	0.0731	-0.0342	0.0271	0.1030	0.0372	0.0940	0.0206	0.1351	0.2039
TC3	0.0685	-0.0795	-0.1135	-0.0861	-0.0286	-0.0934	-0.0969	-0.0144	0.0727	0.0430
TC4	0.1759	-0.0082	-0.0531	0.0158	0.1215	0.1375	0.1492	0.0045	0.1516	0.1713
TC5	0.1387	-0.0770	-0.0581	-0.0224	0.0137	0.0798	0.0959	-0.0093	0.1037	0.1319
TC6	0.2024	-0.0547	-0.1460	-0.0434	0.0245	0.0367	0.0535	-0.0049	0.1035	0.0660
CR1	0.1548	0.0038	-0.1038	-0.0287	0.0750	0.0521	0.0304	0.0493	0.1004	0.0490
CR2	0.1326	0.0248	-0.0188	-0.0108	0.0677	0.0381	0.0084	-0.0205	0.0244	0.0162
CR3	0.2155	-0.0246	0.0690	0.0574	0.1376	0.1066	0.0643	0.1414	0.1087	0.0555
CR4	0.0711	-0.0196	0.0989	0.0139	0.1025	0.1817	0.1159	0.0840	0.0619	0.0486
CR5	0.2334	0.1094	0.0816	0.1159	0.2098	0.1406	0.1522	0.1357	0.0917	0.0727
TT1	0.2515	-0.0104	0.0685	0.0527	0.1696	0.1977	0.1590	0.1294	0.1962	0.2817
TT2	0.2656	-0.0018	-0.0433	0.0345	0.2578	0.2384	0.2113	0.1055	0.1804	0.2743
TT3	0.2854	0.0137	-0.0126	0.0056	0.2517	0.2315	0.2080	0.1467	0.2153	0.2784
TT4	0.2407	-0.0245	-0.0568	-0.0797	0.1258	0.2325	0.1984	0.1405	0.2264	0.2705
TT5	0.3576	-0.0133	-0.0411	-0.0710	0.0548	0.3091	0.3308	0.2884	0.2807	0.2807
TT6	0.2222	0.0711	-0.0523	0.0047	0.2020	0.2386	0.1814	0.1916	0.2446	0.2605

	CT3	CT4	SC1	SC2	SC3	NP1	NP2	NP3	MP1	MP2
CT3	1.0000									
CT4	0.7023	1.0000								
SC1	0.2098	0.2357	1.0000							
SC2	0.2875	0.2841	0.7385	1.0000						
SC3	0.2548	0.2299	0.5441	0.7177	1.0000					
NP1	0.2732	0.2105	0.2489	0.3227	0.4044	1.0000				
NP2	0.1913	0.2424	0.0857	0.2429	0.2911	0.4833	1.0000			
NP3	0.2987	0.2707	0.1871	0.3108	0.2789	0.3323	0.2356	1.0000		
MP1	0.2097	0.1885	0.1907	0.3228	0.2662	0.4311	0.3888	0.2447	1.0000	
MP2	0.2567	0.1624	0.2195	0.2141	0.2361	0.2875	0.2742	0.1602	0.5081	1.0000
MP3	0.3232	0.3354	0.1841	0.3420	0.2994	0.3232	0.3227	0.3522	0.4896	0.2982
CP1	0.1044	0.1306	0.0198	0.0980	0.1096	0.1361	0.3968	0.2363	0.2358	0.1430
CP2	0.0688	-0.0074	0.0910	0.1375	0.1949	0.2161	0.1161	0.2707	0.4186	0.2313
CP3	-0.0042	0.0507	0.0465	0.0485	0.1385	0.1090	-0.0050	0.2974	0.2194	0.0612
CP4	0.0992	0.1612	0.0534	0.0995	0.1331	0.1513	0.2716	0.2667	0.2141	0.1869
GR1	0.1088	0.1885	0.2227	0.2395	0.2278	0.1943	0.1231	0.2480	0.1435	0.0865
GR2	0.0762	0.1660	0.2816	0.2773	0.2207	0.2495	0.1544	0.2040	0.1662	0.1340
GR3	0.0428	0.1429	0.3312	0.3089	0.2402	0.1961	0.0669	0.2420	0.1934	0.0882
GR4	0.0895	0.1712	0.3254	0.3107	0.2862	0.2135	0.1402	0.2376	0.2427	0.1749
GR5	-0.0227	-0.0392	0.0014	-0.0455	0.0021	-0.0382	-0.0332	-0.0874	-0.0470	0.0673
GR6	0.1713	0.2882	0.2205	0.2929	0.2836	0.2123	0.1637	0.2559	0.1265	0.0263

	CT3	CT4	SC1	SC2	SC3	NP1	NP2	NP3	MP1	MP2
GR7	0.1450	0.2051	0.2029	0.2606	0.3105	0.1921	0.2042	0.2627	0.1785	0.0561
SR1	0.1708	0.1480	0.1231	0.2008	0.2032	0.1722	0.2031	0.1641	0.1464	0.1279
SR2	0.1607	0.1300	0.2350	0.2600	0.3012	0.1503	0.2089	0.2346	0.1512	0.0650
SR3	0.1693	0.1384	0.2304	0.3039	0.2451	0.2196	0.1930	0.1750	0.1900	0.1124
SR4	0.1180	0.0898	0.2058	0.3295	0.3395	0.2174	0.1519	0.1881	0.2071	0.1196
SR5	0.1896	0.1870	0.2006	0.2771	0.2798	0.2694	0.1177	0.2557	0.2489	0.0900
SR6	0.1104	0.1739	0.2377	0.2684	0.2373	0.2578	0.1259	0.1941	0.1906	0.0908
SR7	0.1192	0.1792	0.2911	0.3696	0.3597	0.2458	0.1122	0.1858	0.1628	0.1982
TC1	0.2044	0.1754	0.2536	0.2318	0.2062	0.1793	0.0081	0.1941	0.1304	0.1125
TC2	0.1949	0.1217	0.2301	0.1855	0.2011	0.2166	0.0026	0.2021	0.1425	0.1388
TC3	0.0460	0.0372	0.1037	0.0485	0.1738	0.0314	0.0472	-0.0686	-0.0232	0.1753
TC4	0.1487	0.1403	0.1757	0.2755	0.2001	0.1956	0.1338	0.2759	0.2600	0.1974
TC5	0.2215	0.1465	0.2480	0.3000	0.2224	0.1634	0.2061	0.1857	0.1364	0.1533
TC6	0.1190	0.1339	0.1795	0.1635	0.2558	0.2111	0.1463	0.1728	0.1399	0.1314
CR1	0.0500	0.0914	0.1373	0.1491	0.1615	0.1257	0.0477	-0.0237	0.0371	0.0390
CR2	-0.1030	0.0117	0.1547	0.1395	0.1670	0.2060	0.0126	0.1444	0.0699	-0.0197
CR3	0.0584	0.0800	0.1603	0.1712	0.2088	0.1790	0.0055	0.0845	0.1641	0.0813
CR4	-0.0189	0.0727	0.0943	0.1117	0.1693	0.1631	0.0736	0.0584	0.1024	0.0038
CR5	0.0492	0.0705	0.1340	0.0974	0.1583	0.1914	-0.0147	0.2088	0.1568	0.0751
TT1	0.1709	0.2172	0.2855	0.3122	0.3620	0.3038	0.2376	0.2612	0.1861	0.1623
TT2	0.1543	0.2272	0.3777	0.4152	0.3920	0.2889	0.1904	0.3423	0.2445	0.1329
TT3	0.1807	0.1977	0.3783	0.4053	0.3797	0.2953	0.2645	0.3152	0.2032	0.1886
TT4	0.2354	0.2303	0.4061	0.4475	0.4558	0.3178	0.3628	0.2438	0.2704	0.2050
TT5	0.2710	0.2513	0.3595	0.4958	0.5013	0.3310	0.3355	0.3687	0.2751	0.1735
TT6	0.2102	0.2559	0.3222	0.4395	0.4341	0.3088	0.2503	0.2788	0.2624	0.1566
	MP3	CP1	CP2	CP3	CP4	GR1	GR2	GR3	GR4	GR5
MP3	1.0000									
CP1	0.2840	1.0000								
CP2	0.2901	0.4619	1.0000							
CP3	0.2312	0.2495	0.4773	1.0000						
CP4	0.3079	0.6211	0.4072	0.4438	1.0000					
GR1	0.2197	0.2284	0.0256	0.1185	0.2199	1.0000				
GR2	0.1402	0.1452	0.0877	0.1178	0.1473	0.6917	1.0000			
GR3	0.1149	0.1145	0.1320	0.1579	0.1284	0.6587	0.8524	1.0000		
GR4	0.1761	0.1951	0.1352	0.1626	0.2058	0.6225	0.7438	0.7728	1.0000	
GR5	-0.0366	0.0828	-0.1182	-0.1401	0.1489	0.0681	0.0175	-0.0693	-0.0432	1.0000
GR6	0.1902	0.1621	0.0704	0.1977	0.1572	0.5424	0.5387	0.5009	0.5221	-0.0475
GR7	0.1912	0.2223	0.0616	0.1524	0.2458	0.4860	0.4104	0.3857	0.4251	-0.0568
SR1	0.1817	0.1302	0.0758	-0.0635	0.1101	0.1864	0.1267	0.0765	0.1601	-0.0416
SR2	0.1723	0.0555	0.1726	0.1522	0.0252	0.1941	0.1726	0.2146	0.1877	-0.1843
SR3	0.2411	0.1049	0.1252	0.0880	0.0374	0.2441	0.2215	0.2201	0.2481	-0.0383
SR4	0.1175	0.0947	0.1849	0.1372	0.0875	0.3442	0.3541	0.3576	0.3690	-0.0044
SR5	0.1739	0.0572	0.2251	0.1761	0.0331	0.2750	0.2710	0.3210	0.3224	-0.1356
SR6	0.1355	0.0477	0.0621	0.0526	0.0282	0.4787	0.4583	0.5005	0.4778	-0.0067
SR7	0.1938	0.1176	0.1664	0.1282	0.1762	0.3303	0.3911	0.4239	0.3837	0.0428
TC1	0.1449	-0.0629	-0.0362	0.1142	0.0041	0.3069	0.3006	0.3205	0.2895	-0.0111
TC2	0.1485	-0.0145	0.0379	0.1065	0.0694	0.2891	0.2410	0.2292	0.2723	0.0961
TC3	-0.0891	-0.1805	-0.1373	-0.0532	-0.0940	-0.0544	-0.0505	-0.0766	-0.0025	0.1009
TC4	0.1478	0.0888	0.1215	0.1088	0.0797	0.2875	0.2866	0.2836	0.3305	0.0586
TC5	0.1234	0.1818	0.0460	-0.0618	0.1254	0.3160	0.2608	0.2455	0.2900	0.0826
TC6	0.1410	0.0180	-0.0443	-0.0162	0.0438	0.3806	0.3265	0.2989	0.3288	0.0653
CR1	0.0835	-0.0047	-0.0609	-0.0399	0.0693	0.2080	0.0381	0.0291	0.0434	0.0586
CR2	0.0781	0.0114	0.0096	0.0363	-0.0016	0.1991	0.1394	0.1340	0.1227	-0.0489
CR3	0.0772	-0.1168	0.0877	0.0673	-0.1336	0.0347	0.0149	0.0472	0.0274	-0.1150
CR4	-0.0284	-0.0142	0.0182	-0.0255	-0.0603	0.2285	0.1636	0.1979	0.2080	0.0118
CR5	0.0395	-0.1050	0.1275	0.1585	-0.0702	0.1119	0.0800	0.1418	0.1381	-0.1505
TT1	0.1181	0.2549	0.1441	0.0623	0.2271	0.2713	0.3340	0.2875	0.2461	0.1296
TT2	0.2485	0.1945	0.2272	0.1271	0.1290	0.2145	0.2583	0.2533	0.1955	0.0151
TT3	0.1718	0.1742	0.1278	0.0215	0.1323	0.1720	0.2097	0.1651	0.1572	0.0445
TT4	0.2172	0.2583	0.0959	-0.0173	0.1689	0.2056	0.2184	0.1899	0.2379	0.0636
TT5	0.2707	0.2083	0.1772	0.0277	0.1820	0.2014	0.2028	0.2271	0.2185	-0.0077
TT6	0.2612	0.0862	0.1487	0.0996	0.0244	0.1012	0.1474	0.2012	0.1524	-0.1345
	GR6	GR7	SR1	SR2	SR3	SR4	SR5	SR6	SR7	TC1
GR6	1.0000									
GR7	0.6049	1.0000								
SR1	0.1820	0.3115	1.0000							
SR2	0.2924	0.2575	0.4524	1.0000						
SR3	0.2692	0.1995	0.3325	0.4221	1.0000					
SR4	0.2783	0.2324	0.2237	0.3001	0.6260	1.0000				
SR5	0.2804	0.1860	0.2761	0.2724	0.5055	0.6260	1.0000			
SR6	0.3720	0.3315	0.1810	0.2970	0.3585	0.4490	0.5191	1.0000		
SR7	0.3460	0.2404	0.1955	0.3015	0.3037	0.3892	0.4092	0.5510	1.0000	
TC1	0.2241	0.2927	0.2007	0.2907	0.3168	0.4100	0.3530	0.4224	0.3526	1.0000
TC2	0.1419	0.1501	0.0586	0.1997	0.2667	0.3051	0.2456	0.2926	0.2086	0.5226
TC3	0.0288	0.0696	0.1412	0.1163	0.0866	0.0358	0.0323	0.0042	0.1208	0.1837

	GR6	GR7	SR1	SR2	SR3	SR4	SR5	SR6	SR7	TC1
TC4	0.2368	0.1532	0.1332	0.1527	0.3657	0.4224	0.3663	0.3055	0.3119	0.2923
TC5	0.2652	0.2409	0.1484	0.1372	0.2946	0.4123	0.2326	0.2415	0.2892	0.2965
TC6	0.3660	0.3460	0.1606	0.1925	0.2613	0.2239	0.2512	0.3503	0.2966	0.3973
CR1	0.1580	0.1882	0.1634	0.0592	0.1606	0.1160	0.1563	0.1236	0.1851	0.1623
CR2	0.1864	0.1385	0.1350	0.1277	0.1901	0.2186	0.2907	0.2217	0.2002	0.1303
CR3	0.1504	0.0939	0.1605	0.1942	0.1761	0.2282	0.3465	0.1668	0.2328	0.2080
CR4	0.2177	0.0753	0.0862	0.1391	0.2025	0.3193	0.3455	0.2854	0.2417	0.1626
CR5	0.0749	0.0363	0.0866	0.2429	0.1309	0.2060	0.2699	0.1428	0.1952	0.2109
TT1	0.2604	0.1866	0.2553	0.1771	0.1765	0.2437	0.2173	0.2113	0.3008	0.1365
TT2	0.1820	0.0916	0.1588	0.1344	0.2919	0.3309	0.3131	0.2393	0.2879	0.1958
TT3	0.1402	0.0682	0.1183	0.1461	0.2387	0.2673	0.2095	0.1967	0.2298	0.1831
TT4	0.2018	0.1582	0.1815	0.1660	0.2353	0.2684	0.2143	0.1775	0.2594	0.0693
TT5	0.2272	0.2116	0.2757	0.3559	0.2638	0.2808	0.2246	0.2326	0.2815	0.1488
TT6	0.1769	0.0937	0.1348	0.1919	0.2412	0.2239	0.2345	0.2212	0.2107	0.1434

	TC2	TC3	TC4	TC5	TC6	CR1	CR2	CR3	CR4	CR5
TC2	1.0000									
TC3	0.1873	1.0000								
TC4	0.3603	0.1433	1.0000							
TC5	0.3325	0.1891	0.4849	1.0000						
TC6	0.3874	0.2232	0.3402	0.5019	1.0000					
CR1	0.1970	0.1296	0.1626	0.1810	0.3046	1.0000				
CR2	0.2433	0.0187	0.2420	0.2632	0.1952	0.5278	1.0000			
CR3	0.1479	0.0755	0.1370	0.1258	0.1227	0.3694	0.4207	1.0000		
CR4	0.1253	-0.0176	0.1954	0.2231	0.1224	0.2962	0.4472	0.5289	1.0000	
CR5	0.2480	0.0372	0.1766	0.1390	0.1516	0.3321	0.4006	0.4956	0.6065	1.0000
TT1	0.1173	0.1026	0.2045	0.2532	0.1790	0.2733	0.2684	0.2288	0.2290	0.1260
TT2	0.1331	0.0069	0.3362	0.2532	0.1377	0.2074	0.2868	0.1976	0.1845	0.1657
TT3	0.1201	0.0066	0.2655	0.2184	0.1336	0.2003	0.2220	0.1390	0.1749	0.1660
TT4	0.0608	0.0323	0.2515	0.2744	0.1678	0.2339	0.2080	0.1433	0.2262	0.0935
TT5	0.1350	0.0275	0.2429	0.2849	0.1626	0.1803	0.2165	0.2586	0.2461	0.2832
TT6	0.0920	0.0356	0.2806	0.1510	0.1186	0.0922	0.1990	0.1514	0.1979	0.1726

	TT1	TT2	TT3	TT4	TT5	TT6
TT1	1.0000					
TT2	0.6561	1.0000				
TT3	0.5580	0.7225	1.0000			
TT4	0.5323	0.5737	0.7003	1.0000		
TT5	0.4850	0.4860	0.5785	0.6047	1.0000	
TT6	0.3342	0.4886	0.5127	0.5253	0.5222	1.0000

APPENDIX (E): Construct Reliability

I. Initial Reliability

Item	Obs	Sign	item-test correlation	item-rest correlation	Average inter-item covariance	Alpha if-deleted/Alpha
PR1	283	+	0.755	0.695	0.713	0.911
PR2	283	+	0.795	0.738	0.692	0.908
PR3	283	+	0.801	0.747	0.693	0.908
PR4	283	+	0.761	0.695	0.698	0.911
PR5	283	+	0.678	0.601	0.729	0.916
PR6	283	+	0.720	0.647	0.713	0.913
PR7	283	+	0.834	0.785	0.677	0.905
PR8	283	+	0.819	0.764	0.675	0.906
PR9	283	+	0.734	0.661	0.704	0.913
PR10	283	+	0.703	0.623	0.715	0.915
Test scale					0.701	0.919
GV1	286	+	0.805	0.730	0.762	0.911
GV2	286	+	0.805	0.727	0.755	0.911
GV3	286	+	0.855	0.795	0.735	0.904
GV4	286	+	0.846	0.785	0.745	0.905
GV5	286	+	0.846	0.784	0.743	0.905
GV6	286	+	0.844	0.782	0.747	0.906
GV7	286	+	0.761	0.670	0.777	0.917
Test scale					0.752	0.921
CM1	384	+	0.864	0.784	0.894	0.901
CM2	384	+	0.867	0.791	0.898	0.900
CM3	384	+	0.884	0.813	0.868	0.895
CM4	384	+	0.887	0.816	0.861	0.895
CM5	384	+	0.840	0.745	0.906	0.909
Test scale					0.885	0.918
TR1	384	+	0.714	0.560	0.632	0.845
TR2	384	+	0.779	0.661	0.600	0.822
TR3	384	+	0.821	0.703	0.544	0.809
TR4	384	+	0.849	0.739	0.515	0.799
TR5	384	+	0.793	0.653	0.557	0.823
Test scale					0.569	0.851
HR1	384	+	0.785	0.612	0.561	0.740
HR2	384	+	0.817	0.667	0.529	0.715
HR3	384	+	0.738	0.510	0.603	0.793
HR4	384	+	0.814	0.642	0.512	0.724
Test scale					0.551	0.795
PC1	384	+	0.859	0.670	0.813	0.858
PC2	384	+	0.885	0.741	0.754	0.787
PC3	384	+	0.903	0.781	0.706	0.750
Test scale					0.758	0.856
PB1	384	+	0.739	0.502	0.495	0.822
PB2	384	+	0.865	0.750	0.400	0.698
PB3	384	+	0.823	0.653	0.415	0.742
PB4	384	+	0.773	0.617	0.492	0.762
Test scale					0.450	0.806

Item	Obs	Sign	item-test correlation	item-rest correlation	Average inter-item covariance	Alpha if-deleted/Alpha
CT1	384	+	0.821	0.688	0.648	0.827
CT2	384	+	0.824	0.687	0.636	0.827
CT3	384	+	0.891	0.788	0.538	0.784
CT4	384	+	0.817	0.659	0.627	0.840
Test scale					0.612	0.859
SC1	384	+	0.867	0.706	0.703	0.822
SC2	384	+	0.920	0.812	0.565	0.722
SC3	384	+	0.860	0.678	0.705	0.850
Test scale					0.658	0.857
NP1	384	+	0.832	0.597	0.307	0.384
NP2	384	+	0.781	0.476	0.464	0.549
NP3	384	+	0.700	0.347	0.696	0.716
Test scale					0.489	0.657
MP1	384	+	0.866	0.654	0.374	0.536
MP2	384	+	0.765	0.500	0.636	0.721
MP3	384	+	0.796	0.541	0.560	0.677
Test scale					0.523	0.738
CP1	384	+	0.768	0.572	0.544	0.704
CP2	384	+	0.770	0.577	0.542	0.701
CP3	384	+	0.715	0.487	0.607	0.748
CP4	384	+	0.808	0.620	0.484	0.676
Test scale					0.544	0.764
GR1	384	+	0.789	0.684	0.518	0.800
GR2	384	+	0.846	0.768	0.496	0.786
GR3	384	+	0.852	0.781	0.504	0.785
GR4	384	+	0.832	0.748	0.503	0.789
GR5	384	-	0.191	0.005	0.786	0.892
GR6	384	+	0.738	0.623	0.552	0.810
GR7	384	+	0.688	0.566	0.581	0.819
Test scale					0.563	0.838
SR1	384	+	0.554	0.420	0.492	0.812
SR2	384	+	0.625	0.486	0.461	0.803
SR3	384	+	0.721	0.611	0.432	0.783
SR4	384	+	0.742	0.627	0.416	0.779
SR5	384	+	0.755	0.634	0.403	0.777
SR6	384	+	0.719	0.567	0.405	0.791
SR7	384	+	0.704	0.554	0.415	0.793
Test scale					0.432	0.816
TC1	384	+	0.662	0.481	0.336	0.668
TC2	384	+	0.724	0.533	0.297	0.650
TC3	384	+	0.454	0.217	0.426	0.743
TC4	384	+	0.630	0.441	0.350	0.680
TC5	384	+	0.674	0.510	0.336	0.661
TC6	384	+	0.711	0.530	0.308	0.651
Test scale					0.342	0.716

Item	Obs	Sign	item-test correlation	item-rest correlation	Average inter-item covariance	Alpha if-deleted/Alpha
CR1	384	+	0.655	0.457	0.461	0.781
CR2	384	+	0.759	0.586	0.391	0.740
CR3	384	+	0.744	0.599	0.421	0.738
CR4	384	+	0.769	0.608	0.388	0.732
CR5	384	+	0.749	0.578	0.401	0.742
Test scale					0.412	0.787
TT1	384	+	0.756	0.635	0.422	0.866
TT2	384	+	0.811	0.715	0.408	0.852
TT3	384	+	0.852	0.777	0.397	0.842
TT4	384	+	0.823	0.736	0.409	0.849
TT5	384	+	0.782	0.673	0.416	0.859
TT6	384	+	0.711	0.580	0.445	0.874
Test scale					0.416	0.878

II. Final Reliability

Item	Obs	Sign	item-test correlation	item-rest correlation	Average inter-item covariance	Alpha if-deleted/Alpha
PR1	286	+	0.786	0.706	0.715	0.881
PR2	286	+	0.804	0.722	0.691	0.879
PR3	286	+	0.830	0.758	0.683	0.875
PR4	286	+	0.784	0.692	0.696	0.882
PR5	286	+	0.725	0.623	0.736	0.890
PR6	286	+	0.744	0.642	0.719	0.888
PR7	286	+	0.827	0.750	0.675	0.875
Test scale					0.702	0.897
PR9	289	+	0.800	0.626	0.699	0.786
PR10	289	+	0.827	0.670	0.661	0.766
GV2	289	+	0.807	0.647	0.700	0.777
GV5	289	+	0.799	0.644	0.722	0.779
Test scale					0.695	0.823
CM1	384	+	0.864	0.784	0.894	0.901
CM2	384	+	0.867	0.791	0.898	0.900
CM3	384	+	0.884	0.813	0.868	0.895
CM4	384	+	0.887	0.816	0.861	0.895
CM5	384	+	0.840	0.745	0.906	0.909
Test scale					0.885	0.918
TR1	384	+	0.714	0.560	0.632	0.845
TR2	384	+	0.779	0.661	0.600	0.822
TR3	384	+	0.821	0.703	0.544	0.809
TR4	384	+	0.849	0.739	0.515	0.799
TR5	384	+	0.793	0.653	0.557	0.823
Test scale					0.569	0.851
HR1	384	+	0.785	0.612	0.561	0.740
HR2	384	+	0.817	0.667	0.529	0.715
HR3	384	+	0.738	0.510	0.603	0.793
HR4	384	+	0.814	0.642	0.512	0.724
Test scale					0.551	0.795
PC1	384	+	0.859	0.670	0.813	0.858
PC2	384	+	0.885	0.741	0.754	0.787
PC3	384	+	0.903	0.781	0.706	0.750
Test scale					0.758	0.856
pb2	384	+	0.881	0.727	0.454	0.703
pb3	384	+	0.872	0.672	0.455	0.768
pb4	384	+	0.827	0.644	0.577	0.788
Test scale					0.495	0.822
CT1	384	+	0.821	0.688	0.648	0.827
CT2	384	+	0.824	0.687	0.636	0.827
CT3	384	+	0.891	0.788	0.538	0.784
CT4	384	+	0.817	0.659	0.627	0.840
Test scale					0.612	0.859
SC1	384	+	0.867	0.706	0.703	0.822
SC2	384	+	0.920	0.812	0.565	0.722
SC3	384	+	0.860	0.678	0.705	0.850
Test scale					0.658	0.857

Item	Obs	Sign	item-test correlation	item-rest correlation	Average inter-item covariance	Alpha if-deleted/Alpha
NP1	384	+	-	0.558	0.696	-
NP2	384	+	-	0.558	0.696	-
Test scale					0.696	0.716
MP1	384	+	-	0.532	0.579	-
MP2	384	+	-	0.532	0.579	-
Test scale					0.579	0.692
CP1	384	+	-	0.563	0.703	-
CP4	384	+	-	0.563	0.703	-
Test scale					0.703	0.720
GR1	384	+	0.811	0.713	0.769	0.873
GR2	384	+	0.870	0.801	0.736	0.858
GR3	384	+	0.860	0.790	0.759	0.861
GR4	384	+	0.847	0.768	0.753	0.864
GR6	384	+	0.749	0.635	0.827	0.885
GR7	384	+	0.691	0.567	0.874	0.894
Test scale					0.786	0.892
SR1	384	+	-	0.507	0.428	-
SR2	384	+	-	0.507	0.428	-
Test scale					0.428	0.670
SR3	384	+	0.812	0.608	0.692	0.754
SR4	384	+	0.868	0.690	0.529	0.665
SR5	384	+	0.848	0.624	0.579	0.740
Test scale					0.600	0.795
TC1	384	+	0.681	0.486	0.443	0.706
TC2	384	+	0.733	0.522	0.395	0.694
TC4	384	+	0.667	0.468	0.453	0.713
TC5	384	+	0.697	0.522	0.439	0.695
TC6	384	+	0.736	0.543	0.398	0.684
Test scale					0.426	0.743
CR1	384	+	0.655	0.457	0.461	0.781
CR2	384	+	0.759	0.586	0.391	0.740
CR3	384	+	0.744	0.599	0.421	0.738
CR4	384	+	0.769	0.608	0.388	0.732
CR5	384	+	0.749	0.578	0.401	0.742
Test scale					0.412	0.787
tt1	384	+	0.756	0.635	0.422	0.866
tt2	384	+	0.811	0.715	0.408	0.852
tt3	384	+	0.852	0.777	0.396	0.842
tt4	384	+	0.823	0.736	0.409	0.849
tt5	384	+	0.782	0.673	0.416	0.859
tt6	384	+	0.711	0.580	0.445	0.874
Test scale					0.416	0.878