ELECTRONIC COMMERCE ADOPTION: A STUDY OF BUSINESS-TO-BUSINESS

PRACTICES IN SAUDI ARABIA

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بسم الله الرحمن الرحيم

IN THE NAME OF ALLAH, MOST GRACIOUS, MOST MERCIFUL

Aston University

Electronic commerce adoption: A study of Business-to-Business practices in Saudi Arabia

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Thesis Summary

Electronic commerce (e-commerce) has become an increasingly important initiative among organisations. The factors affecting adoption decisions have been well-documented, but there is a paucity of empirical studies that examine the adoption of e-commerce in developing economies in the Arab world. The aim of this study is to provide insights into the salient e-commerce adoption issues by focusing on Saudi Arabian businesses. Based on the Technology-Organisational-Environmental framework, an integrated research model was developed that explains the relative influence of 19 known determinants.

A measurement scale was developed from prior empirical studies and revised based on feedback from the pilot study. Non-interactive adoption, interactive adoption and stabilisation of e-commerce adoption were empirically investigated using survey data collected from Saudi manufacturing and service companies.

Multiple discriminant function analysis (MDFA) was used to analyse the data and research hypotheses. The analysis demonstrates that (1) regarding the non-interactive adoption of e-commerce, IT readiness, management team support, learning orientation, strategic orientation, pressure from business partner, regulatory and legal environment, technology consultants' participation and economic downturn are the most important factors, (2) when e-commerce interactive adoption is investigated, IT readiness, management team support, regulatory environment and technology consultants' participation emerge as the strongest drivers, (3) pressure from customers may not have much effect on the non-interactive adoption of e-commerce by companies, but does significantly influence the stabilisation of e-commerce use by firms, and (4) Saudi Arabia has a strong ICT infrastructure for supporting e-commerce practices.

Taken together, these findings on the multi-dimensionality of e-commerce adoption show that non-interactive adoption, interactive adoption and stabilisation of e-commerce are not only different measures of e-commerce adoption, but also have different determinants. Findings from this study may be valuable for both policy and practice as it can offer a substantial understanding of the factors that enhance the widespread use of B2B e-commerce. Also, the integrated model provides a more comprehensive explanation of e-commerce adoption in organisations and could serve as a foundation for future research on information systems.

Keywords: e-commerce adoption, Saudi Arabia, developing Arab nations, Technology-Organisational-Environmental framework, innovation adoption.

Dedication

By the grace and mercy of God, I dedicate my dissertation to the memory of the departed soul of my father, to my caring mother, to my sisters and my brothers who have been my biggest supporters and for their love and sincere prayers. They all gave me unconditional love and encouragement .They provided me with strength, courage, and determination to move through my PhD study. My dream came true due to their love and sacrifices. I also dedicate this dissertation to my many friends who have supported me through the process. I will always appreciate their continuous support. Finally, I dedicate this work to each and every one, who had a hand in my education, and helped in any way light a candle for me along the road to accomplishing my objective

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Related Publications

Some of the material contained in this dissertation has been presented in the following publications.

Refereed Journals

- Al-Somali, S.A, Gholami, R. and Clegg, B. (2011). An Investigation into the Adoption of Electronic Commerce among Saudi Arabian SMEs. Journal of Electronic Commerce in Organizations, 9(2), pp.41-65, April-June**.**

Refereed Journal Papers: Under Review

- Al-Somali, S.A, Gholami, R. and Clegg, B. (2011). Determinants of B2B e-commerce adoption in Saudi Arabian firms. Under review for the International Journal for Digital Society (IJDS).

Refereed Book Chapters

- Al-Somali S., Clegg, B.T. and Gholami R. (2010). An Investigation into the Adoption and Implementation of Electronic Commerce in Saudi Arabian Small and Medium Enterprises. In Alkhalifa, E.M., (Ed.), E-Strategies for Resource Management Systems: Planning and Implementation. Advances in Information Resources Management (AIRM) Book Series, IGI Global. ISBN13: 9781616920166. EISBN13: 9781616920173.

- Al-Somali S., Clegg, B.T and Gholami R. (2010). E-Business Adoption and its Impact on Performance. In Lee, I., (Ed.), Encyclopedia of E-Business Development and Management in the Global Economy. IGI Global. ISBN13: 9781615206117.

- Al-Somali, S., Gholami, R. and Clegg, B.T. (2009). Theories and Factors Affecting Electronic Commerce Adoption in Small and Medium Enterprises (SMEs): A Review. In Xu, J. and Quaddus, M. (Eds.), E-business in 21st Century: Realities, Challenges and Outlook. World Scientific Publishing: Mountain View, CA, USA.

Refereed Conference Papers

- Al-Somali, S., Gholami, R. and Clegg, B. (2011, April). Business-to-business e-commerce adoption in Saudi Arabia: the moderating effect of technology consultants' orientation. The 20th International Conference on Management of Technology, Miami Beach, Florida, USA.

- Al-Somali, S., Gholami, R. and Clegg, B. (2010, June). E-business Adoption in Saudi Arabian Private Sector. The international conference on information socie*y* (i-Society)*,* London, UK

- Al-Somali, S., Gholami, R. and Clegg, B. (2010, March). An investigation into the adoption of electronic business in Saudi Arabia using the technology-organisation-environment framework. UKAIS Conference. Oriel College, University of Oxford, UK.

- Al-Somali, S., Clegg, B.and Gholami, R. (2009). Exploring the Adoption of Electronic Commerce in Saudi Arabia: The Case of Small and Medium Enterprises. The International Conference on Technology and Business Management. March 29-April 1, 2009, Dubai (UAE).

PhD Consortium Paper

- Al-Somali, S., Gholami, R. and Clegg, B. (2010, June). Contextual antecedents of electronic commerce adoption among organisation in developing Arab high-income economies: Evidence from the private sector in Saudi Arabian. The West Midlands Regional Doctoral Colloquium. Aston University, Birmingham.

- Al-Somali, S., Gholami, R. and Clegg, B.(2008, June). E-commerce Adoption in Small and Medium Enterprises (SMEs) in Saudi Arabia. The West Midlands Regional Doctoral Colloquium (Aston, Birmingham and Warwick Business Schools). Aston University, Birmingham.

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List of abbreviations

B2B	Business-to-Business e-commerce
B2C	Business-to-Business e-commerce
ECRM	Electronic Customer Relationship Management
DOI	Theory on Diffusion of innovation
EDI	Electronic Data Interchange
E-business	Electronic business
E-commerce	Electronic commerce
EFT	Electronic Fund Transfer
E-procurement	Electronic procurement
GCC	Gulf Cooperation Council
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
IS	Information Systems
IT	Information Technology
LDCs	Least Developed Countries
OPEC	Petroleum exporting countries
RBV	Resource Based View
SMES	Small and medium-sized enterprises
TAM	Technology acceptance model
TOE	Technology-organisation-environment

| **Figure 1.1** | Overview of chapter one |

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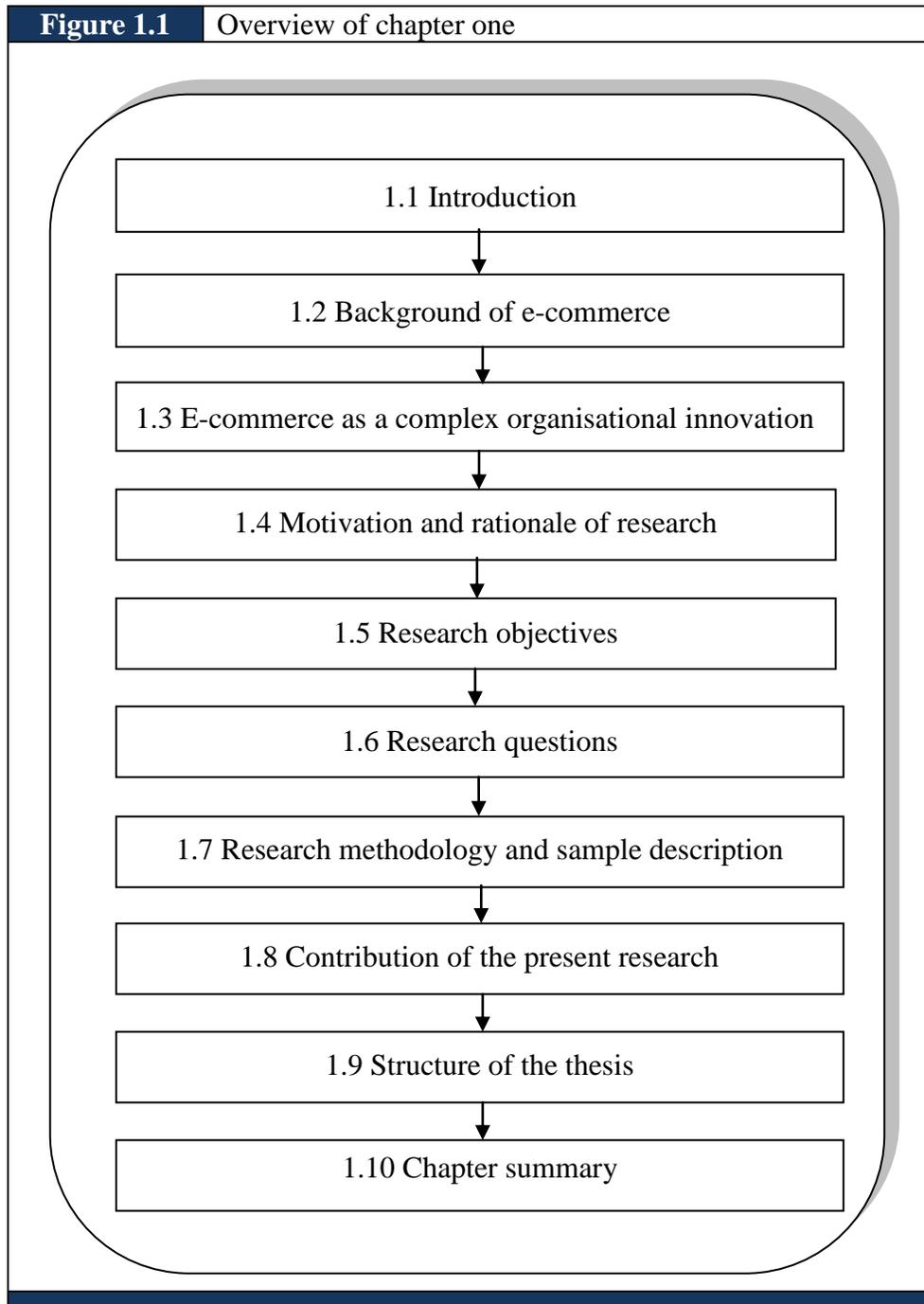
1.1 Introduction

Structured in ten sections, the purpose of this first chapter is to introduce the reader to the proposed research. Section 1.2 provides a background to electronic commerce (hereafter, e-commerce) and discusses the emergence of e-commerce technology as an opportunity for business organisations; the definition, benefits and challenges of e-commerce technology are discussed. The next section, Section 1.3, discusses the nature of e-commerce as a complex organisational innovation. Following this, Section 1.4 outlines the rationale for the research. Section 1.5 then highlights the research objectives, Section 1.6 outlines the research questions and Section 1.7 describes the research approach. The contributions of this study are then discussed in Section 1.8. The main structure of the thesis is provided in Section 1.9 and, finally, Section 1.10 provides a summary of this chapter. Figure 1.1 (previous page) portrays the organisation of the chapter.

1.2 Background of e-commerce

1.2.1 Definition and concepts of e-commerce

Technological innovations such as the Internet and the World Wide Web (WWW) have enabled many organisations to undertake transactions, share information, and collaborate across geographical boundaries and across computing platforms and networks (Berners-Lee et al., 1994). Indeed, the Internet and its associated technologies are the key to the survival and growth of businesses in today's competitive environment. If the Internet and its applications were suddenly removed from the face of earth, the impact on advanced economies - particularly the United States, Canada, the European Union, and Japan - would be disastrous: the economies of these regions would go into a tailspin; countless people would feel totally frustrated because they would be unable to obtain essential information or conduct necessary transactions; millions of information workers would lose their jobs (Dholakia et al., 2002).

The Internet has opened up a new set of applications like e-commerce that offer a wide spectrum of potential commercial activities and information exchange and that allow organisations to

cooperate and collaborate with their business partners and customers (Thatcher et al., 2006; Moodley, 2003).

E-commerce is growing in significance and is having a direct impact upon ways of doing business. It is defined as the sharing of business information, the maintaining of business relationships, and the conducting of business transactions between stakeholders using a telecommunication network and electronic information technology (Eastin, 2002; Zwass, 1996). Moreover, Moodley (2003) defines e-commerce as any form of commercial or administrative transaction or information exchange that takes place via an ICT-based, computer-mediated network. These definitions imply that electronic commerce is not solely restricted to the actual buying and selling of products, but also covers the conduct of other business activities via the Web using internet technologies, such as e-mail and websites (Schneider, 2002). These activities include pre-sale and post-sale activities across the supply chain and maintaining business relationships (Alonso-Mendo et al., 2009; Fillis et al., 2004; Turban et al., 2002).

E-commerce has revolutionised traditional commerce and boosted sales and exchanges of merchandise and information (Mohd and Osman, 2005). Moreover, e-commerce has been used worldwide as an integral part of firms' marketing strategies (Rapp et al., 2008; Sagi and Thomas, 2004). Figure 1.2 illustrates the traditional view of e-commerce and its use to support the external relationships of business with the two major stakeholder groups: suppliers and customers .

| **Figure 1.2** | Forms of e-commerce |

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Source**:** Beynon-Davies, 2007, p.15

E-commerce applications are now commonplace in business-to-consumer (B2C) and business-to-business (B2B) interactions. B2C e-commerce is sometimes called sell-side e-commerce and concerns the commerce between companies and consumers (Turban et al., 2000). Customers or consumers will typically be individuals and sometimes other organisations (Beynon-Davies, 2007). B2B e-commerce is sometimes called buy-side e-commerce and takes place between organisational actors (i.e. public and/or private sector organisations) (Beynon-Davies, 2007). B2B encompasses a wide range of technologies to support the entire value chain, from suppliers through to the firm and on to customers (Thatcher et al., 2006; Pinkston, 2001). It should be noted that this study focuses exclusively on business-to-business (B2B) e-commerce, which is becoming an increasingly important topic and is seen as a promising area for both researchers and practitioners (Al-Qirim, 2007; Hong and Zhu, 2006; Montealegre, 1998; Zhu et al, 2003).

According to Andam (2003), three primary processes are enhanced in e-commerce:

1. Production processes, which include procurement, ordering of stocks, processing of payments and the relationship and links with suppliers;

2. Customer-focused processes, which include promotional and marketing efforts, selling over the Internet, processing of customers' orders and payments, and customer support;

3. Internal management processes, which include employee services, training, internal information-sharing, video-conferencing, and recruiting.

A variety of benefits are provided by e-commerce: better profits, improved communications, an evolving understanding of information requirements, brand awareness, and cost reductions. The information provided by new, advanced technology has characteristics that are important to national leaders and managers. It supports decision making by identifying areas that require attention, providing answers to questions, and giving knowledge about related areas. It provides relevant, timely information. In addition, IT has improved communications in several ways. It is used to facilitate networking and the sharing of information with customers and suppliers at the micro level and among firms and various governmental entities at the macro level (Shalhoub and Al Qasimi, 2006; Chang et al., 2003; Moodley, 200; D'Cruz and Hussain, 2001).

Conversely, D'Cruz and Hussain (2001) note that there are some limitations to e-commerce that can be summarised as follows:

- It often requires a high capital outlay, and has a slow return on investment.
- Perceived security risks regarding sensitive data have to be overcome, such as credit card fraud.
- Compatibility within the technological architecture can be a limitation.
- The company may experience high costs (e.g. staff training and purchasing the technological architecture and software required).

Consistent with Wolfe (1994), e-commerce is viewed in this study as an outcome of various antecedents or determinants. Moreover, the specific domain of innovation is an important factor in understanding the organisation's adoption behaviour and in identifying the determinants of innovation in organisations (Lee and Kim, 1998; Daft, 1978; Donovan, 1994; Downs and Mohr, 1979; Swanson, 1994). Thus, this study uses the growing research literature on innovation adoption in organisations as its theoretical base, and this will be discussed in more detail in Chapter 3.

1.2.2 The relationship between e-commerce and e-business

The use of the term 'electronic commerce' has been supplemented by the term 'electronic business'. Electronic business or e-business refers to the entire Internet integration of an enterprise. According to IBM Corporation, e-business is defined as the transformation of key business processes through the use of internet technologies (IBM, 2002). Some may refer to this as e-enabling the enterprise or e-enterprise (Cassidy, 2002). Cassidy (2002) notes that e-business is the integration of people, processes, and technology to conduct business. On the other hand, Chaffey (2004: 9) argues that "e-business is just a new label and there is no distinction between the role of e-business and traditional information systems management".

Figure 1.3 presents some viewpoints of the relationship between e-business and e-commerce. In figure 1.3(a) there is a relatively small overlap between e-commerce and e-business. This is unlikely scenario since the overlap between buy-side and sell-side e-commerce is significant.

Figure 1.3(b) considers e-business and e-commerce to be synonymous. Finally, figure 1.3(c) shows that e-comerce can be conceived of as a subset of e-business. It is believed that figure 1.3(b) seems to be more realistic, and many scholrs seem to consider e-business as a newer term that is often used synonymously with e-commerce (Chaffey, 2004; ESCWA, 2003; 2001). In fact, what is important within any given company is that managers involved with the implementation of e-commerce/e-business are agreed on the scope of what they are trying to achieve (Chaffey, 2004). So e-comerce is broadly equivalent to e-business and this is the perspective that will be used in this thesis.

Figure 1.3	The relationship between e-commerce and e-business

(a)   **EC**   **EB**   Electronic commerce (EC) has some degree of overlap with electronic business (EB).

(b)   **EC = EB**   Electronic commerce is broadly equivalent to electronic business.

(c)   **EB** / **EC**   Electronic commerce is a subset of electronic business.
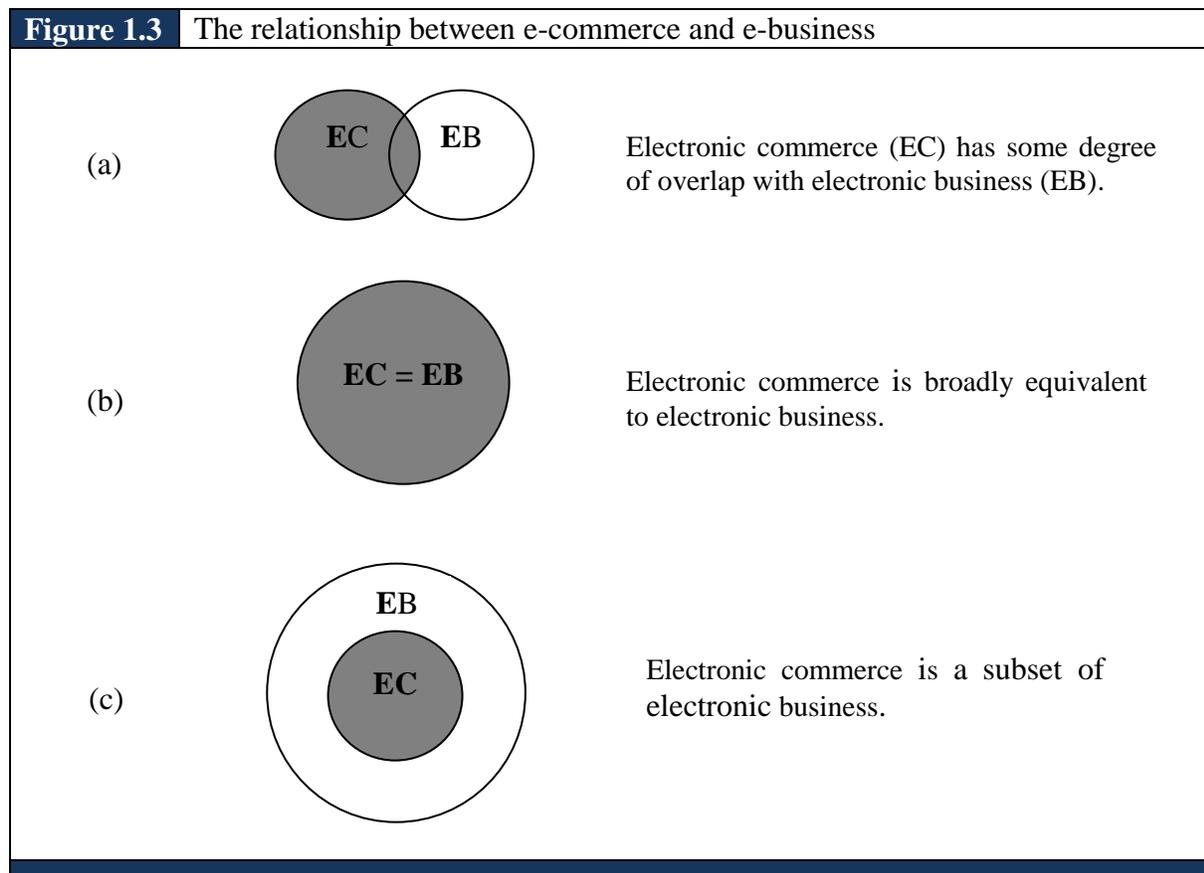
Source: Adapted from Chaffey, 2004

1.2.3 E-commerce and the new economy

As the infrastructure of countries around the world advances, location and distance will be less relevant, and e-commerce activities – on both the seller and the buyer side – will become increasingly global (Dholakia et al., 2002). E-commerce is rapidly expanding and has become a

driving force for the globalization of the world economy; indeed, countries that do not engage in e-commerce may put the competitiveness of their economies at risk. Global electronic activities have existed for a long time and the emergence of the Internet and telecommunications, such as extranets, have resulted in flexible infrastructure that can greatly facilitate global trade (Turban et al., 2006).

Globalization propels technological progress with the competition and incentives of the global marketplace. A global electronic marketplace means access to larger markets, mobility (e.g. in order to minimize taxes), and flexbility to employ workers anywhere. Developing countries that can develop the requisite infrastructure can participate in new global business models of intermediation, business process outsourcing and value chain integration (Shalhoub and Al Qasimi, 2006). However, going global is a complex decision due to many challenges. These include legal issues (jurisdiction, export/import regulation, intellectual property, encryption and data security, contracts, authentication procedures, content control and consumer protection), and financial issues (buyer and seller identification, trust, software security, cultural diversity, international agreements, language and translation, currency exchanges and role of local government) (Turban et al., 2000).

Estimates of global e-commerce have projected that the total value of such commerce would be about US $618 billion by 2011, up 14 percent from 2010 revenue (JPMorgan, 2009). Figure 1.4 presents e-commerce revenue by region between 2004 and 2011 in billions of US$. E-commerce sales in the USA for 2011 only are estimated at $207, 505 billion. On the other hand, Europe is found to fall closely behind the USA in terms of revenue in billions of dollars (see Figure 1.4). In 2009, European retail e-commerce revenue reached $140, 740 billion, a slight decrease from 2008. However, this number rose again in 2010 to $170, 942 billion. Moreover, by the end of 2011, it is estimated that e-commerce revenues in Europe will peak at $198, 200 billion. It should be noted that these broad estimates could change substantially because of new technologies or rapid social and cultural change. Also, within the broad sweep of these estimates, a wide variety of e-commerce patterns across the world are likely to be seen.

| **Figure 1.4** | E-commerce revenues worldwide (Billions US$) by region, 2004-2011 |

Source: JP Morgan, 2009

Generally speaking, the overall size and growth of the global e-commerce sector in various countries as discussed above would depend on a number of factors such as the data communication infrastructure, the availability of e-commerce options, and the willingness and ability of people to transact online (Dholakia et al., 2002). Moreover, PC skills, accessibility and utilization may play major roles in global e-commerce. Indeed, developed countries seem to have comparatively more advanced technological and organisational infrastructures for enabling the development of e-commerce. Conversely, less-developed countries have poorer infrastructure, inherently less productive human capital (in part due to lower levels of education) and business

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models that have yet to transition from the industrial to the information age (Dewan and Kraemer, 2000).

1.3 E-commerce as a complex organisational innovation

Innovation can be new technology or practice that is perceived as new by an individual or an organisation or institution (Damanpour, 1991). Organisational innovation is very different from adoption of innovations by individuals and is more complex than individual innovation. Complexity of an innovation reflects the extent to which an innovation is perceived to be difficult to use or understand (Rogers, 2003: 257). In an organisational innovation context, complexity also refers to the degree and broadness with which employees, business activities, and processes are exposed to changes to fit the adopted innovation. In fact, innovation adoption in organisations requires the active and coordinated use of multiple organisational members to benefit the organisation. Therefore, the innovation literature on individual behaviour falls short in providing insight about organisations as adopters (Pennings, 1987).

This study regards the nature of e-commerce as a complex and multi-faceted innovation implying changes in technology, organisation, and strategy. This consideration is essential because although e-commerce is heavily supported by the development of the Internet or general IT, it is less appropriate to simplify e-commerce as IT innovation and neglect its business side. Rather, e-commerce has the capability of making radical differences to the organisational structure, practices, business processes and relationships with customers and partners (March, 1999). Moreover, e-commerce today is increasingly widening the concept of business from a simple transactional approach (goods or services that should be selected, bought and delivered) to a more complex and wider concept of inter-firm co-operation that includes process monitoring, inter-company co-operation and collaborative design. To completely understand the possible impact of e-commerce, a deep investigation of e-commerce is required with a view of the nature of e-commerce as a complex innovation.

First, e-commerce represents a manifestation of technological innovation offering a borderless global market space, and it is reflected by the development and application of internet

technologies. Previous research proposed that Internet technologies such as e-commerce can be considered as a technological innovation (Jackson and Harris, 2003; Patterson et al., 2003; Daniel et al., 2002; Kendall et al., 2001b; Prescott and conger; 1995), which offers firm's opportunities to establish interactive relationships with business stakeholders (i.e. business partners and suppliers, logistics providers and customers), improve operating efficiency and expand their market reach. In fact, e-commerce consists of several technologies working in concert with one another. The most obvious one is the Internet, which transforms the way commerce is performed and serves as a technical basis for e-commerce development. In addition e-commerce consists of interconnected networks, software and hardware components, middleware, user-interface technologies, server-side facilities and more importantly the World Wide Web. Figure 1.5 illustrates the different components of e-commerce technology. In general, driven by increasingly intense business competition and dynamics, innovative technology and applications emerge to solve problems and satisfy requirements raised in current and future business. In the context of e-commerce, technologies and business applications mutually reinforce and co-evolve with each other in a coherent style (Wang and Shi, 2009).

Figure 1.5	E-commerce system component
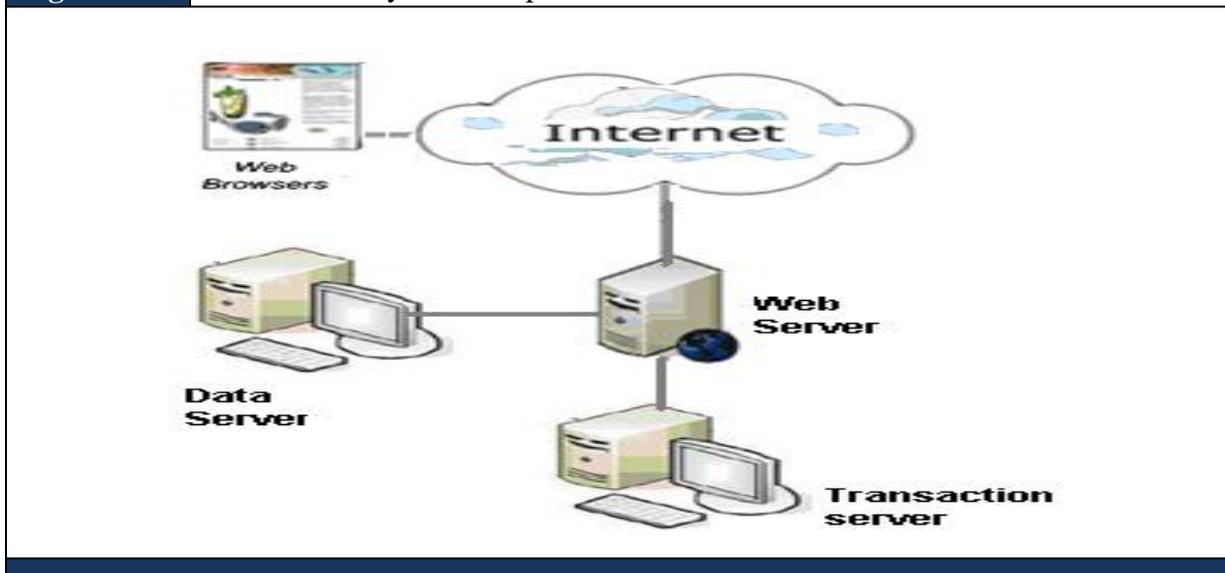
Source: adapted from Oracle (2005)

Second, e-commerce usually implies transformation in every aspect of a firm, including organisational structure, business process, working style, administration, and relationships with customers and suppliers (Li, 2006). With growing use of automated information processing applications and rapid proliferation of ubiquitous computing, many business tasks which were initially conducted manually have become automatic, greatly improving work efficiency. Timmers (2000) presents case examples where the use of electronic commerce has flattened the organisational structure and changed decision-making policies. Because the decision-making information can be shared better through organisation, responsibilities are clearer and decision-making power can be transformed closest to the decision. In engaging in e-commerce, companies are required to redesign business processes and structure to deploy new business models. In fact, the implementation of e-commerce initiatives usually involves the sharing of information and collaboration across different functional units within a firm, and among firms and various governmental entities at the macro (country) level.

E-commerce also implies reconstructing firm relationships with external customers and partners. Companies increasingly adopt customer-oriented applications to increase velocity of operations throughout the value chain, cooperate with business partners at lower transaction costs and strengthen communication and interaction with customers. On the other hand, with the penetration of the Internet and the emerging online presence of companies, customers can easily access information about products and attain more power in doing transactions with companies. In fact, the Internet empowers customers with greater knowledge and expanded choices, limiting much of the power that companies traditionally had in the selling process. In the context of e-commerce, companies have to get closer to their customers and reconsider the nature of responsive relationships with customers or partners and figure out how to leverage these changes to be a player in this economy (Shalhoub and Al Qasimi, 2006). E-commerce even triggers changes in organisational culture by incorporating new policies, working style, and interpersonal relationships into business processes and management.

Third, e-commerce is basically strategic innovation which opens opportunities for developing strategies and business models (Amit and Zott, 2001; Eikebrokk and Olsen, 2007). In a changing environment, companies need to frequently adjust their decisions and activities based on

environmental requirements to achieve their business goals. Business on the Internet is booming and many organisations around the world are actually changing habits in the way they do business by introducing new methods, creating and delivering new opportunities through the market space and providing innovative and customised solutions in a cost-effective fashion. Such consideration of e-commerce as a strategic innovation is consistent with the argument that e-commerce essentially belongs to Type III innovation in Swanson's (1994) IS innovation taxonomy because it introduces a new way of doing business and it is often embedded in the firm's core business processes or is extending basic business products and services (Hong and Zhu, 2006; Wu et al., 2003; Chatterjee et al., 2002). According to the typology of Swanson, IS innovations can be classified into three categories:

- Type I innovations: it is described as process innovations within the IS function, where information technologies are assimilated[1] to enhance the efficiency or effectiveness of the IS function. For example, firms have invested in relational database, and object-oriented technologies to enhance the effectiveness of the IS function in systems delivery.

- Type II innovations: refer to the use of IS products and services for enhancing the administrative work processes of firms. The assimilation of office productivity, groupware, or decision support tools in specific organisational tasks is an instance of Type II innovations.

- Type III innovations: it is described as information technologies that have strategic relevance for firms because their integration into the core business processes or strategies could directly impact financial performance. For example, the introduction of airline reservation systems, and computer integrated manufacturing solutions are examples of such Type III innovations.

In conclusion, e-commerce adoption by organisations remains a complex, elusive, yet extremely vital phenomenon. Indeed, there is no doubt that e-commerce and the Internet represent the opportunities for developing nations to leap forward to more economic development and growth,

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[1] Innovation assimilation is defined as the extent to which an innovation is diffused and routinized in organisational activities and processes (Curtis and Sambamurthy, 1999; Fichman and Kemerer, 1997, 1999; Meyer and Goes, 1988).

where the creation of added value will be driven by information, knowledge, and the adoption of ICT technologies.

1.4 Motivation and rationale of research

Previous studies that explore the factors that influence the adoption and diffusion of e-commerce in organisations were restricted to data from firms in industrialized countries in the West. These studies were conducted in the United States (e.g. Grandon and Pearson, 2004), the United Kingdom (e.g. Matlay and Addis, 2003), Canada (e.g. Sparling et al., 2007) and Italy (e.g. Scupola,2003). Consequently, it is important to add an international dimension to the investigation of e-commerce adoption, extending beyond the US and Europe to encompass the experience of less developed countries. Moreover, it is widely acknowledged that theories and management practices developed in the context of industrialized and developed countries in the West need to be re-examined in the context of developing countries to fit the cultural context of the recipient nation (Austin, 1990; Hofstede, 1980). This is because issues which might seem trivial for developed countries may play an important role for e-commerce adoption in developing countries. For instance, the major issues in developing regions are slow internet speeds, the high prices of internet service providers (ISPs), an insufficient regulatory environment, and poor infrastructure; whereas, in developed countries, the main issues are privacy and taxes (Molla and Licker, 2005a). In addition, Ein-Dor et al. (2004) conducted a four-country study that included Finland, Israel, New Zealand, and Singapore. Their study indicates that differences in culture, attitudes toward information and communication technology (ICT), and socioeconomic status impact the adoption of e-commerce.

Indeed, existing cultural conditions always determine whether, when, how, and in what form a new innovation will be adopted (Dunphy and Herbig, 1995). Moreover, studies conducted in Western countries tend to embody the values, attitudes, and beliefs of the West, which are different from those of non-Western cultures. In his comparison of the organisational cultures of 40 independent nations, Hofstede (1980) argues that many of the differences in management styles and organisational practices of companies throughout the world can be related to differences in the collective mental programming of people in different national cultures.

Yet, it seems that there is a paucity of writing in the context of developing economies in the Arab world and the patterns of organisational adoption of e-commerce remain a largely unexplored area (Yasin and Yavas, 2007). Particularly, few studies have explored e-commerce growth in the high-income economies of the Arabian Gulf region (Alrawi and Sabry, 2009). This paucity of research on e-commerce adoption, exploring the factors that influence e-commerce adoption in developing Arab countries, leaves a significant gap. Generally, it is believed that the Arab world has not yet received enough attention from social scientists and organisational analysts (Al-Yahya, 2009).Thus, the present study attempts to bridge the knowledge gap in the extant literature about e-commerce and shed some light on the adoption of e-commerce by organisations in the private sector in the context of developing Arab countries in the gulf region, extending beyond the Western context which might represent different stages of e-commerce transformation (UNCTAD, 2002).

This study focuses upon Saudi Arabia. In fact, Saudi Arabia forms an interesting context and domain for the study. This is because economic liberalisation programmes initiated in Saudi Arabia in the 1980s have resulted in attempts at overall transformation of technology usage among Saudi industries. Despite this, prior research in Saudi Arabia has indicated that, although ICT is rapidly growing in Saudi Arabia (both PC sales and internet growth are high), it is generally believed that e-commerce practices are not progressing at the same speed (Al-Otaibi and Al-Zahrani, 2003). Moreover, familiarity with and confidence in ICT among organisations has remained limited compared to other Arab countries, such as the United Arab Emirates (UAE), who share similar characteristics in terms of socioeconomic, commercial, and infrastructural development.

1.5 Research objectives

Motivated by the issues identified above in Section 1.4, the main purpose of this study is to determine the factors that influence and inhibit B2B e-commerce adoption by Saudi Arabian firms in the private sector.

The central objectives of this study can be summarised as follows:

1. To develop a conceptual model that can be used to study organisations' adoption of e-commerce technology.

2. To operationalise the dependent and independent variables included in the conceptual model by developing a research instrument and demonstrating their reliability and validity.

3. To empirically validate the conceptual model that is proposed to examine e-commerce adoption among Saudi Arabian businesses.

4. To provide valuable guidelines to policy makers, technology vendors and practitioners in implementing and accelerating e-commerce development and utilisation among firms in the private sector.

Accomplishing these four research objectives would result in significant contributions for both research and practice.

1.6 Research questions

To achieve the research objectives stated in Section 1.5, the following research questions are formulated:

1. In searching for an integrated framework, what theoretical perspectives can be used to study organisations' adoption of e-commerce technology?

2. What factors can be included within this theoretical framework?

3. How can organisational e-commerce adoption be conceptualized and operationalized?

4. What is the current level of e-commerce technology use in organisations in Saudi Arabia?

5. What are the impacts of e-commerce technology characteristics, organisational determinants and environmental factors on organisations' adoption of e-commerce technology?

1.7 Research methodology and sample description

The main data collection method is based on a self-administrated questionnaire. It was used to understand the B2B e-commerce phenomenon in Saudi Arabia and detect the effects of the independent variables and their hypothesised relationships on firms' e-commerce adoption in order to provide general statements about the study. However, the study commenced with an initial qualitative research design which led to the exploration of seven firms to develop a preliminary understanding and to discover the most critical factors that should be included within the conceptual framework before running the questionnaire survey.

The questionnaire survey was hand delivered to the most senior manager of the firm, such as the managing director, general manager or senior manager. The sampling method for the survey was based on systematic random sampling and the population for this study comes from Saudi Arabian manufacturing and service companies from the private sector who were drawn from the Saudi Chamber of Commerce and Industry directory for private organisations. The final usable sample contained 202 responses giving a response rate of 44.9%.

It is noteworthy that, the study's response rate compares favourably with other studies and is even better in some cases than previous studies (e.g. Grandon and Pearson, 2004; Thong et al., 1996; Premkumar and Potter, 1995). In fact, a high response rate is viewed as an important criterion by which the quality of a survey is judged (Hox and DeLeeuw, 1994) because a higher response rate implies less potential non-response bias (Shih and Fan, 2008). Non-response rate is affected by question content, question construction and questionnaire length. Sensitive, irrelevant or repetitive questions, as well as those that are poorly worded, difficult to understand, difficult to answer or have insufficient response categories can frustrate respondents and produce a non-response rate. Therefore, the researcher spent time composing, designing, checking and revising the questionnaire during the questionnaire planning phase.

This research study utilized the closed question style in which respondents were encouraged to select the answer which best fits their opinion. This type of question was selected because closed-end questions are quick to answer, produce answers that are much easier to code, computerise, analyse and they do not discriminate against the less talkative and less articulate

respondents. All of the measures were shown to be internally consistent, unidimensional, and to demonstrate sufficient levels of validity, which means that the collected data and findings that were obtained from this instrument are reliable. It is noteworthy that validity was assessed through content, convergent and discriminant validity.

The characteristics of the sample indicate that an over-whelming majority (65%) of the respondents were managing directors, CEOs or IS managers, were generally well educated with over 62% having a University degree - 43% gained their degree from Saudi Arabia - and 65% belonged to the 30 to 49 year old age group. In general, the profile of the respondents indicates that these respondents are likely to be involved with the strategic decisions of the companies, have information about the organisational traits that are of interest to this study, are capable of answering the questions, and are credible sources of information about the companies. The majority of respondents were from construction, banking, finance and insurance entities, representing 15% of the sample. Finally, the majority of the firms sampled (70.8%) had been established for more than 10 years, while a mere 16.8% had only been established for less than 5 years.

1.8 Contribution of this study

This research makes a contribution to theory, practice and policy. The theoretical contribution of this study to innovation adoption literature is its extending of innovation adoption and information systems (IS) literature to the context of e-commerce in order to enrich knowledge and understanding of the organisational technology adoption process. The study also contributes towards theory by evaluating the applicability of different theories of organisational innovation adoption which were developed for Western developed countries in order to understand issues in the context of developing Arab countries. Moreover, this study contributes to the theory by proposing a comprehensive conceptual framework by integrating factors from different theoretical perspectives in order to provide a holistic view of the facilitators and inhibitors of e-commerce technology across the different stages in the adoption process from an organisation's perspective.

Given the importance of widespread adoption for the success of e-commerce and the slower than expected growth of e-commerce among Saudi Arabian firms (KACST, 2006), there is a great need for understanding the important factors that influence e-commerce adoption in organisations. Policy makers are currently investigating how to influence firms to use new technologies in order to enhance firms' capabilities, and so information on strategies and incentives that facilitate the widespread use and acceptance of the technology among organisations will be useful. Moreover, technology consultants and software vendors are trying to identify the profile of organisations that are more likely to adopt e-commerce technologies in order to increase their marketing activities and target those organisations that are likely to become e-commerce adopters. Therefore, for both policy and practice, this research is viewed as being relevant as it can offer a substantial understanding of the factors that enhance the widespread use of B2B e-commerce. In fact, studies that have so far been conducted in the context of Saudi Arabia have focused on B2C e-commerce rather than B2B e-commerce or organisational level adoption (Ahmed et al., 2006; Aleid et al., 2009; Al-Somali et al., 2009).

1.9 Structure of the thesis

To accomplish the research objectives outlined in Section 1.5, the thesis is divided into eight chapters, including the present one.

Chapter two provides a background to Saudi Arabia in terms of its location, demographic profile, economy, business organisations and ICT development. Moreover, it provides the reader with a review and assessment of e-commerce phenomenon in developing economies in general, and in developing Arab world and Gulf countries in particular. Finally, the chapter ends with an overview of the e-commerce situation in Saudi Arabia.

Chapter three reviews the body of research literature circumscribing the field of interest for this thesis. Here, research in organisational innovation adoption, theoretical models and e-commerce adoption in developing countries are discussed. Chapter four presents the conceptual model and illustrates the various hypotheses regarding the proposed relationship of the research constructs.

Chapter five discusses the methodological framework and research approach. The content and description of the instrument used in the collection of data are described. Furthermore, operationalizations for all variables under investigation are provided, and the development of a measuring instrument for the constructs is described. Finally, sampling procedure and data collection process are outlined and discussed.

Chapter six presents an interpretation of the research findings and discusses the main statistical methods used. Subsequently, the hypotheses test results are reported.

Chapter seven summarises the key findings outlined in the previous chapter regarding the significant facilitators and inhibitors to the successful adoption of e-commerce in the private sector of Saudi Arabia. Chapter eight is the final chapter and it discusses in detail the implications of the research for managers, government bodies and policy makers. Finally, the limitations of the study are acknowledged and outlined and, following from this, a number of suggestions and recommendations for future research are presented. Figure 1.6 provides a map of the thesis.

Figure1.6 **Structure of the thesis**

Chapter 1

Introduction
- Background
- Research objectives
- Research questions
- Thesis structure

Chapter 2

The e-commerce phenomenon and the digital divide
- Country profile
- Digital divide
- Technology transfer
- E-commerce in developing economies

Chapter 3

Theoretical background
- Prior research
- Innovation adoption
- Theories and models

Chapter 4

Conceptual framework and development of hypotheses
- Development of the conceptual model
- Research hypotheses

Chapter 5

Methodology and Data Collection
- Research design
- Instrument and measures

Chapter 6

Inferential statistical analysis
- Data analysis
- Hypothesis testing

Chapter 7

Discussion of the survey findings
- Discussion of results in relation to objectives and hypotheses

Chapter 8

Conclusion
- Contribution
- Implication
- Limitation
- Future research

Introduction ⟶ *Literature Review* ⟶ *Gap identification & data collection* ⟶ *Analysis* ⟶ *Conclusion*

1.10 Chapter summary

This chapter laid the foundations for and served as a general introduction to the thesis. The research problem domain was discussed and the research questions that laid the foundations of this research study were explained. The research justifications and this study's contribution to the body of knowledge in the area investigated were briefly discussed. Finally, the overall structure of the thesis was outlined.

| Figure 2.1 | Overview of chapter two |

2.1 Introduction

⬇

2.2 Country profile

⬇

2.3 The digital divide and technology transfer

⬇

2.4 The e-commerce phenomenon in developing economies: General overview

⬇

2.5 E-commerce in the Arab world and the Arab Gulf countries

⬇

2.6 The e-commerce situation in Saudi Arabia

⬇

2.7 Chapter summary
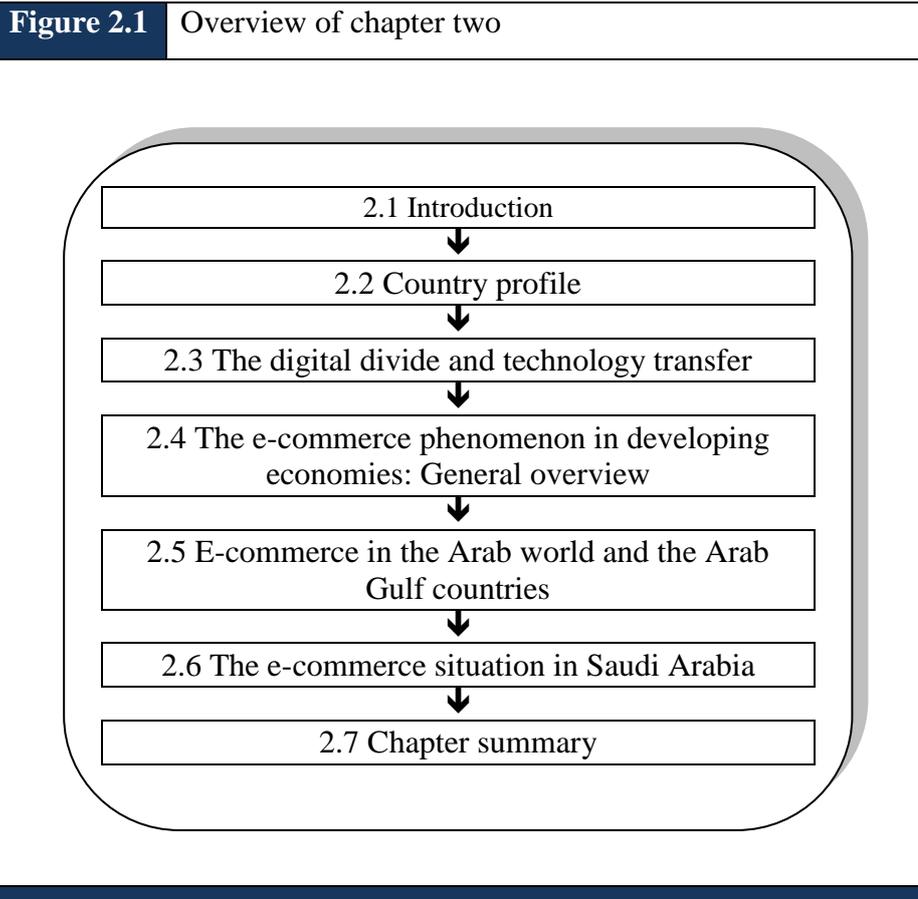
2.1 Introduction

This chapter attempts to provide a background to Saudi Arabia in terms of its location, demographic profile, economy, business organisations and ICT development. Moreover, this chapter discusses issues related to the digital divide, technology transfer and e-commerce development. Finally, e-commerce and the Internet in Saudi Arabia and other developing economies are discussed, including its situation, infrastructure readiness and barriers to e-commerce adoption, as these allow an understanding of variation across the world and, more importantly, form the significance of this study. Figure 2.1 (previous page) portrays the organisation of the chapter.

2.2 Country profile

Saudi Arabia is a relatively young country and like many developing countries, it has undergone rapid economic, social and demographic changes. The aim of this section is to provide general facts about Saudi Arabia in terms of location, population and demographic profile, economy, and telecommunications.

2.2.1 Location

Located in the southwest corner of Asia, the Kingdom is at the crossroads of Europe, Asia and Africa. It is surrounded by the Red Sea in the West, by Yemen and Oman in the South, the Arabian Gulf and the United Arab Emirates and Qatar in the East, and Jordan, Iraq and Kuwait in the North. Occupying four-fifths of the Arabian Peninsula, Saudi Arabia is the largest country on the peninsula and is the largest and most populated of the six Gulf Cooperation Council (GCC)[2] states in the Middle East (see Figure 2.2).

Desert covers more than half the total area of Saudi Arabia and the mountains in the West are very rich in minerals. The eastern region has the richest reservoirs of oil in the world. Moreover, Saudi Arabia holds a unique position in the Islamic world, as Islam's two holiest sites, Makkah (Mecca) and Madena (Medina) are located in the country.

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[2] The Gulf Cooperation Council (GCC) formed by Bahrain, Kuwait, Oman, Qatar, the United Arab Emirates and the Saudis. The Kingdom of Saudi Arabia contributes with 49% of the total GDP of the economic block and 67% of the total population (Chauvin, 2010).

Figure 2.2	Saudi Arabia and its neighbours

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Source: Saudi Aramco, 2007

2.2.2 Population and demography

In July 2010, Saudi Arabia had a total estimated population of approximately 25 million (Table 2.1). Regarding the age structure, 38 percent were aged between 0-14 years (male 5,557,453/female 5,340,614), 59.5 percent were aged between 15-64 years (male 9,608,032/female 7,473,543), and 2.5 per cent were aged at 65 years and over (male 363,241/female 343,750). The median age in total was 24.9 years (male: 26 years; female: 23.4 years). The population growth rate in 2010 was 1.548 percent, and it is expected that the

total population will increase to around 43.6 million by 2050 (Index Mundi, 2010). The literacy rate among youths has been improving; they are also becoming more Internet savvy and prefer to own sophisticated electronic gadgets like mobile phones and laptops (Rao, 2006).

Table 2.1	Population and demography of Saudi Arabia[3]

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Source: Index Mundi, 2010

2.2.3 Economy

Saudi Arabia has a stable economy and has a conducive environment for commerce and business. In fact, Saudi Arabia is the largest oil-exporting country in the world and one of the twenty largest economies in the world. Moreover, Saudi Arabia is a member of the Organisation of Petroleum Exporting Countries (OPEC). The money from trading in oil has increased government revenues, ownership of foreign assets and has provided the Kingdom with the financial capital to invest in industrial plants and information and communication technology (ICT) infrastructure and attract skilled people to help develop a modern infrastructure (Shirazi et al., 2009; Jasimuddin, 2001). Figure 2.3 presents the oil prices from 1996 to 2009.

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[3] July 2010 estimated

Figure 2.3 Oil prices from 1996 to 2009

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Source: OPEC, 2009

The World Bank has classified Saudi Arabia and the Gulf Cooperation Council (GCC) countries as high-income economies. Moreover, Saudi Arabia is today the only Middle East Country, the only Arab country and the only OPEC member among the constituents of the G20, indicating the rising importance of Saudi Arabia both in the Middle East and North Africa (MENA) region and in the global economy (Chauvin, 2010). An additional strength is that the Saudi banks were not greatly affected by the recent global economic crisis because they are not widely integrated into the international financial system.

GDP (real growth rate) in 2009 was 0.1% and the industrial annual production growth rate was 2.8% in 2009. Moreover, unemployment was around 10.5% in 2009 (Central Intelligence Agency, 2009). Table 2.2 provides a summary of the Saudi Arabian economy.

Table 2.2	Saudi Economy at a glance [4]

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Source: Central Intelligence Agency, 2009

2.2.4 Culture

Saudi society has a highly homogeneous culture like most Middle Eastern nations, due mainly to the profound effects of Islamic teachings on the society. Generally speaking, Islam influences all decisions for Arabs, including business decisions (Idris, 2007). Moreover, Saudi Arabia has not been colonized by Western countries and Arabic is the main language spoken in the country.

Hofstede (1980) identified four dimensions of cultural variability which provide broad explanatory concepts for differences between cultures. Hofstede (1980) found that the Middle Eastern countries exhibited cultural characteristics of a considerably high power distance, high collectivism orientations, femininity or masculinity characteristics and high uncertainty avoidance. A high power distance index indicates a high level of inequalities of power and wealth in Saudi society (Al-Gahtani et al., 2007). Bjerke and Al-Meer (1993) note that the high power distance orientation could be attributed to the Moslem belief about authority in Islamic societies.

Cultures that exhibit high collectivism often have very clear norms for proper behavior in social situations and avoid new situations with no clear norms (Hofstede, 1980). Furthermore, a high uncertainty avoidance deals with tolerance for uncertainty and, as a result of this characteristic, the society does not readily accept change and is very risk adverse. Definitions

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[4] 2009 estimated

for Hofstede's four dimensions of cultural values and scores for Saudi Arabia are illustrated in Table 2.3.

| **Table 2.3** | Scores for Saudi Arabia for Hofstede's four dimensions of cultural values |

Source: Hofstede (1980)

2.2.5 ICT and Internet in Saudi Arabia

Information and communication technology (ICT), specifically the World Wide Web, is being used by businesses worldwide to manage day-to-day transactions as an integral part of their marketing strategy (Sagi and Thomas, 2004). Universally, the extent to which a nation is able to adopt a new technology is heavily dependent on the state of its existing information technology (IT) infrastructure.

In fact, the ICT sector in Saudi Arabia is a fast growing one and the government has taken various measures to diversify the economy for sustainable development of the country and one of the major steps is to transform Saudi Arabia into a digital society. Moreover, Saudi Arabia has placed great emphasis on the acquisition of new technology to enhance firms'

capabilities in setting forth a new age of manufacturing products for local and export markets, with quality matching that of developed nations (Al-Thawwad, 2008).

The Saudi Arabian Internet service was launched (as per ministerial decree No. 163) in March 1998, and the Internet in Saudi Arabia is supervised by King Abdulaziz City for Science and Technology (KACST). The number of Internet users grew from around 1 million in 2001 to 9.8 million at the end of 2010 (InternetWorldStats, 2010). This rapid growth is attributable to increased public awareness, growth in broadband availability, decreasing costs of personal computers and Internet access, and enhanced usefulness of the Internet brought about by increased availability of local content, of Arabic language sites, and of e-services such as online banking, e-commerce, and e-government applications (Communications and Information Technology Commission, 2010).

It is to be noted that although the potential importance of PCs in the social and economic development of Saudi Arabia is recognized by Saudi authorities, the need to uphold the tenets of Islam was probably responsible for the delay (until January 1999) in allowing public access through the PC to the enormous potential of the Internet within Saudi Arabia (Al-Khaldi and Wallace, 1999). Moreover, previous research shows that familiarity with, and confidence in, IT among organisations remained limited compared to other Arab countries who share similar characteristics in terms of cultural and economical development, such as the United Arab Emirates (UAE). Jasimuddin (2001) notes that one important factor that makes Saudi companies less competitive in the world market is the complacency of businesses and their slow response to innovation and the changing environment. Moreover, Saudi Arabia suffers from an acute shortage of skilled Saudi workers and expertise in certain areas like electronics, computing, software and telecommunications, which has led to a lack of advanced technology use among businesses (Idris, 2007).

2.2.6 Saudi Arabian business organisations in the private sector

According to the Eighth Development Plan (2005-2009), the concept of the private sector is normally based on the criteria of private ownership of establishments that engage in various industrial, agricultural and commercial activities with the aim of realising profits. Furthermore, the scope of the Saudi private sector can be extended to include some companies of mixed public and private ownership which operate as joint stock companies

according to the disciplines of the market. The Saudi private sector can be divided into three categories: a) commercial, industrial, and service establishments registered in the Commercial Register; b) retail outlets and small service facilities and workshops licensed by the municipalities; c) agricultural holding and related production units (Eighth Development Plan, 2005-2009).

The economic problems which the Kingdom experienced in the mid 1980's due to the unfavourable oil prices, caused the Saudi government to move beyond being an economy almost wholly dependent on the export of oil to one which was focused on expanding the role of the private sector. This was in order to achieve a more diverse and competitive economy and greater job opportunities for citizens (Al-Dosary and Rahman, 2009; Jasimuddin, 2001). In addition, the government started to initiate a shift from public sector control of the economy to private sector leadership. Since 2002, many government-owned companies have been going through the process of privatization. The first sectors to witness privatization transactions have been the telecommunication sector and postal services. In fact, telecommunication liberalization is viewed as having brought many opportunities for industrial expansion into these services, as well as increased efficiency of information flow among industries (Jasimuddin, 2001).

It should be understood that Saudi antitrust legislation and the generally low barriers to entry have led to productive competition in various industries and to Saudi Arabia becoming one of the largest producers of precious and industrial metals in the world (Jasimuddin, 2001). Moreover, Saudi industrial strengths in gas, chemicals, machinery and banking are important contributing factors to the nation's success. Due to such success, Saudi Arabia became the 149th Member of the World Trade Organisation (WTO) in 2005. The membership of WTO means that Saudi Arabia is required to open up its economy to the institutions and companies of other WTO members. Therefore, it should be far easier for foreign companies to sell online to Saudis.

2.3 The digital divide and technology transfer

New innovations as a result of ICT are continuing to emerge. However, ICT has diffused rapidly in developed industrialised countries but slowly in developing countries and has led to a digital divide (Hinson and Sorensen, 2006; Johnston and Acquaah-Gaisie, 2001; Licker and Motts, 2000). The term 'digital divide' is associated with marked gaps or imbalances in access to physical infrastructure, such as computers and the Internet, or even conventional communication infrastructure, such as fixed telephone lines and mobile cellular telephones (Campbell, 2001). Digital divides can exist between developed and developing countries (also known as a global divide), or within a country (known as an internal country divide).

Developing countries have not yet reached the stage of growth of industrialisation. They are usually characterised by a broad range of attributes including low standards of living, high birth rates, high rates of illiteracy, low standards of democratic governments and insufficient access to goods and services. The World Bank classifies countries into three groups based on the Gross National Product (GNP) per capita, namely, low-, middle-, and high-income countries, with the middle-income countries subdivided into a lower-middle and upper-middle income group (World Bank, 2009). Moreover, the World Bank classified Saudi Arabia and the GCC countries as high-income economies. However, as noted by Hafez (2006), although Kuwait, Saudi Arabia and the United Arab Emirates are classified as a high-income group, they are far less advanced than the USA, Canada and Australia, who belong to the same income group. Therefore, the classification of countries by income does not accurately reflect the level of ICT diffusion within a country (Hafez, 2006). An important point to note here is that this research project focuses on studying the adoption of e-commerce in developing Arab economies, particularly high-income economies.

The World Bank has noted grave disparities in the technology infrastructures between and among developed and less developed nations, evidenced by numbers of Internet users and Web servers, and telecommunication costs (World Bank, 2009). These disparities are evident in Table 2.4. Basically, in developed countries the percentage of Internet users remains much higher than in the developing world, where four out of five people are still excluded from the benefits of being online (ITU, 2010).

Table 2.4	Digital divide between developed and developing countries								
	Developing Countries					**Developed countries**			
	Bangladesh	Egypt	India	Saudi Arabia		Australia	Canada	UK	USA
Income group category [a]	Low income	Lower middle income	Lower middle income	High income		High income	High income	High income	High income
Population (millions)[b]	158,065	80,471	1,173,108	25,73		21,262	33,759	62,348	310,232
Internet users (% population) [b]	0.4	21.2	6.9	38.7		80.1	77.7	82.5	77.3
Secure Internet servers [c]	0.09	1.05	1.28	8.28		993.22	906.60	904.96	1,173.7
Personal computers per 100 population [c]	2.25	3.92	3.18	68.25		n/a	94.40	80.23	78.67
Fixed broadband tariffs (monthly fee $) [c]	155.05	24.39	16.40	57.73		20.98	16.50	22.51	14.95
Main telephone lines per 100 population [d]	0.94	14.64	3.09	16.27		42.36	54.36	54.24	49.62
Mobile cellular subscriptions per 100 population [d]	31.07	66.69	43.83	174.43		113.75	68.75	130.55	94.83

The digital Divide

[a] World Bank (2009); [b] InternetWorldStats (2010); [c] World Economic Forum (2010); [d] UN databases (2009)

As can be seen from Table 2.4, people in developed countries have better access to the Internet. The UK, Australia and Canada, for example, have internet penetration of about 83, 80 and 78 percent, respectively, whilst Bangladesh[5] has internet penetration of 0.4 percent (InternetWorldStats, 2010). It is particularly notable that internet penetration in developed countries reached 64 percent at the end of 2009, while in developing countries it reached only 18 percent (ITU, 2010).

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[5] Bangladesh is one of the world's 48 least developed countries (LDCs). LDCs are defined as low-income countries suffering from long-term constraints against growth (Austin, 1990). In particular, these growth constraints include low levels of human resource development and severe structural, economical, social and political weakness. Currently there are 48 LDCs as defined by the United Nations. Of the 48 LCDs, 33 are in Africa (Constituting more than 60% of the world's LDCs), 13 in Asia and the Pacific, 1 in the Americas (Haiti) and 1 in the Arab states (Yemen).

In addition, the low rate of Internet use can be attributable in part to the relatively high costs of fixed broadband[6]. For example, according to the most recent figures (see Table 2.4), the fixed broadband tariff in Bangladesh is 155 US$/month. Many researchers have reported that the slow adoption and diffusion of the Internet and its technologies in developing countries is due to the high cost of Internet access and network connectivity (Molla, 2006; Molla and Licker, 2005b; Xu et al., 2004). Moreover, Raven et al. (2007) conclude that lack of competition in international telephone traffic, which increases the cost of a network, is found to inhibit Internet and e-commerce adoption in developing countries.

Another important challenge in bringing more people online is the limited availability of fixed broadband access, which is primarily confined to Internet users in developed countries and some developing countries. Figure 2.4 shows the continuing broadband divide between developed and developing countries. Penetration levels in developing countries remain low: 4.4 subscriptions per 100 inhabitants compared to 24.6 in developed countries by the end of 2010. It is to be noted that, consumers with broadband have been more active in e-commerce than those who do not have high-speed access. In the United States, for example, Internet users having a broadband connection were almost 20% more likely to purchase online than those not having broadband access (i.e. narrowband users) (OECD, 2008, p. 85).

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[6] Broadband network connection is considered to be any dedicated connection to the Internet at speeds equal to, or greater than, 256 kilobits per second in one or both directions (World Economic Forum, 2010).

| Figure 2.4 | Fixed broadband subscriptions in developing and developed nations |

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Source: ITU, 2010

In developed countries, telecommunication infrastructure is advanced and the subscription to telephone lines is taking the lead. On the other hand, in developing countries, the number of telephone lines is insufficient and rates of subscription are low. For example, in India there are 3 telephone lines per 100 people and almost 1 line per 100 people in Bangladesh (see Table 2.4). Nevertheless, cellular phones in some developing countries have experienced strong growth rates and relatively high penetration, similar to those in industrial countries. In Saudi Arabia, for example, there are 174.43 mobile cellular subscriptions per 100 people (see Table 2.4). In fact, in 2010, Saudi Arabia was seen as having the most valuable mobile market in the Middle East with more than $11 billion in revenues (Cherrayil, 2010). Surprisingly, with 68.75 subscriptions per 100 people, Canada's mobile telephony penetration rate remains by far the lowest among all advanced economies listed in Table 2.4. On average, however, cellular phone penetration in developing countries remains well below industrial-country levels.

Differences in the number of secure Internet servers [7] per 1 million people are stark in which developing countries have less secure servers than developed countries. While the USA had about 1,173.7 secure servers per 1 million people in December 2008, Bangladesh and India had about 0.4 and 7 secure servers per 1 million people, respectively (Table 2.4). In general, according to the World Bank the United States is leading the world in the number of secure Internet servers per 1 million people (World Bank, 2009).

Overall, a substantial amount of variation exists in rates of technology use between developed and developing countries and even across the set of developing countries (i.e. the poor and the rich countries). Generally speaking, it is believed that the disparities between industrialized and developing countries in the availability of ICT products and access to the Internet are already wide or are growing wider (Campbell, 2001).

Technology transfer is an aspect of the digital divide and it continues to be a key energizer for industrialization and economic expansion in developing countries (Mohamed et al., 2010). However, technology transfer is not an easy task, and seems to be particularly daunting for developing countries. Technology transfer is defined as the process of transferring some form of knowledge, material, new idea or equipment from one foreign party, such as a person or organisation, to another local party (person or organisation) that has arranged to receive it (Mohamed et al., 2010; Campbell, 2001). Developing countries differ from industrialized nations in aspects such as availability of skills, managerial styles, and information distribution channels. Cohen (2004) suggests that technological transfer can enhance the technological and technical abilities of developing countries.

In industrialized countries, the innovation process is free from outside force. On the other hand, technology transfer to developing nations is driven by internal factors (i.e. inside the country) as well as external factors[8]. Figure 2.5 illustrates the technology transfer process in developing and developed nations. As can be seen in Figure 2.57, three groups of factors are involved in these interlinked internal and external relationships. The first group consists of

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[7] Secure Internet servers are servers using encryption technology for Internet transactions. The number of secure servers indicates how many companies are conducting encrypted transactions over the Internet. A secure, reliable business-enabling environment is a key element of successful e-commerce (World Bank, 2009).

[8] It is, of course, possible that the technological capability existing within a country might be able to dominate the effects of external elements, providing a smooth context for technology transfer. This could accelerate technological adaptation and improvement so as to facilitate the emergence of appropriate conditions for technology generation, similar to those of innovation in the developed country context (Cohen, 2004).

the developing countries (constituting the demand side of the transfer process), while the second and third groups comprise the industrialized countries and international agencies (the supply side), respectively. Existing weaknesses, advantages and constraints within a given developing country, along with the benefits, recommendations and restrictions arising from the supply side, as well as the characteristics of the candidate technology, define the context in which a technology is transferred (Cohen, 2004).

Figure 2.5	Technology transfer context: Internal and external elements

Source: Cohen, 2004

As most technology is designed and produced in developed countries, it is culturally-biased in favour of those developed countries' social and cultural systems. This bias creates cultural and social obstacles for developing countries to transfer technology into practice (Hill et al., 1998). Indeed, cultural and social factors are a powerful explanation for why westerners, who attempt to implement technology transfer, are often challenged in terms of their own ideas, beliefs, and values about how technology "should" be utilized in developing countries as the initiatives result in failure (Hill et al., 1998). Moreover, Mohamed et al. (2010) note that, in order to achieve a successful technology transfer process, the cultural differences must be considered because culture may have an undesirable effect on the technology transfer process. Struab et al. (2001) conclude that the transfer of ICT applications into a non-Western culture is usually seen as posing obstacles and as a source of resistance (Struab et al., 2001).

2.4 The e-commerce phenomenon in developing economies: General overview

The adoption of the Internet and e-commerce around the world is widespread. Most countries, especially the developing nations, are making substantial investment in modernizing and boosting IT infrastructure, building a strong telecommunications infrastructure, and promoting Internet and e-commerce adoption in businesses, government,

and various communities. This wide use of ICT has accelerated the growth of e-commerce in many parts of the world, transforming businesses, increasing economic prosperity, and facilitating communication within a country and among countries (Shalhoub and Al Qasimi, 2006). The world is rapidly moving toward Internet-based economic structures and knowledge societies, which comprise networks of individuals, firms, and countries linked electronically in independent and interactive relationships (Meso and Duncan, 2000). In addition, electronic commerce promises to be the drive behind a new surge of economic growth and development (Shalhoub and Al Qasimi, 2006). E-commerce arguably has the potential to add a higher value to businesses and consumers in developing countries than in developed countries. Yet, most developing country-based enterprises have failed to reap the benefits offered by modern information and communication technologies (ICTs) (Kshetri, 2007).

E-commerce barriers in developing countries can be divided into four categories: (1) economical, (2) cultural, (3) legal, and (4) cognitive. While economic, cultural and legal factors focus mainly on the environmental characteristics, the cognitive component reflects organisational and individual behaviours (Kshetri, 2007; Kshetri, 2001; Noda and Collis, 2001). Kshetri (2007) argues that because of these factors very few firms are willing to adopt e-commerce, making it impossible for a developing country-based company to break all e-commerce related barriers. However, Kshetri (2007) suggests that the only way to overcome some of the barriers is to locate some e-commerce functions, such as credit card processing, in the industrialized countries and, in order to maintain geographical proximity with customers, organisations in developing countries can outsource some e-commerce functions to industrialized countries and so overcome e-commerce barriers (Kshetri, 2007). Figure 2.6 illustrates the barriers that inhibit e-commerce diffusion in developing countries.

| Figure 2.6 | Factors impacting the diffusion of e-commerce in developing countries |

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Source: Adapted from Kshetri, 2007

Economical and technological barriers

Recent research has found that the low rate in ICT usage in some parts of Asia has been caused by economic conditions, government control of the Internet, low affordability and lack of telecommunication infrastructure (Zia et al., 2009). Generally speaking, technologies typically improve as more people adopt them and gain experience with them. This link is a positive feedback loop: the more people adopt a particular technology, the more it improves, and the more incentive there is for further adoption (Arthur, 1990). Further, research found that the slow Internet diffusion in developing countries has led to a low IT business value measured by performance and productivity (Dewan and Kraemer, 2000; Tam, 1998). Definitions of good business performance include: continuing to stay in business (Reid, 1991), achieving the desirable level of sales and financial returns (Zhu et al., 2004),

introducing a new product and service lines, increasing the quality of product and service offerings (Venkatraman and Ramanujam, 1986), and increasing the levels of customer satisfaction, coordination and collaboration (Paul and McDaniel; 2004; Zhu et al., 2004; Chang and Wang, 2008).

A study by Karanasios and Burgess (2008) indicated that the deployment of the Internet in the least developed countries is associated with issues such as inadequate IT professionals in the local market. Karanasios and Burgess (2008) also highlight that enterprises in developing countries do not make use of the Internet technologies because of behavioural factors related to customers who tend not to use the Internet for online transactions and also because of the unwillingness of top management to learn or use the technology.

Online payment using credit cards is also a major hurdle and is a missing component of the developing countries' business environment (Mercer, 2006; Kenny, 2003; Miller, 2001; Biederman, 2000). In countries like China, Brazil, and India, the availability of credit cards is low, making it difficult to set up payment systems for those willing to buy online (Dholakia et al., 2002). In addition, companies are required to provide alternative payment methods, such as cash on delivery and wire transfers (Hawk, 2004; Hilbert, 2001). In Asia, 35–40% of B2C transactions are mainly conducted on a cash-basis (compared to 3% in the USA) and thus are not readily convertible to electronic methods (RITIM, 2001). Other features of the financial systems are also underdeveloped (Kenny, 2003). In the Caribbean, local banks do not process on-line credit card transactions (Fraser and Wresch, 2005) or other forms of electronic payment systems (Wresch and Fraser, 2006).

Rapid growth of e-commerce in the USA can be attributed to infrastructure already being in place and the easy availability of a physical delivery system. Such systems are rarer in developing countries (Hawk, 2004). For example, in the Caribbean region, lack of delivery mechanisms and logistical and technological infrastructures is hampering the growth of B2B e-commerce (Wresch and Fraser, 2006). Moreover, insufficient transport networks to handle express documents and packages are found to be a serious obstacle to China's B2B e-commerce diffusion, as they make it difficult for companies to realize the potential gains of increased efficiency in their supply chains (Cheung, 2001). In the Arab region, the postal network is small, with each office serving an average of 20,323 inhabitants (compared with a worldwide average of 10,131 inhabitants per office). In addition, nearly 4% of the Arab

population was still without a postal service in 2007, and just over half of Arab countries offered online postal services in 2007, which is lower than the world average of 62.4% (UPU, 2009). Indeed, payment and delivery mechanisms are found to facilitate e-commerce.

The underdeveloped state of Internet Service Providers and the poor internet connectivity are found to inhibit the completion of e-commerce transactions in developing countries (Kshetri, 2007; Kapurubandara and Lawson, 2006). Indeed, a slow connectivity means that a longer time is needed to transfer data; hence, this results in a lower relative advantage of the Internet (Kshetri, 2007). Importantly, high Internet access costs, including connection service fees, communication fees, and hosting charges for websites are found to hinder e-commerce in developing countries (Andam, 2003).

Cultural and social barriers

The context of developed countries is different from the developing context, both from the point of view of economic development and of cultural orientation. In fact, the cultural barrier is a major factor that impacts e-commerce diffusion in developing countries. Personal relationships are important in Asian *businesses* and anonymous online relationships threaten established interpersonal networks (Gibbs et al., 2003). Favouring personal face-to-face communications over e-mails and a preference for established business relationships over the Internet's inter-personal efficiency also work against e-commerce diffusion (McKinsey, 2001). For instance, a study of e-commerce cultural issues in China found that the socializing effects of commerce, transactional and institutional trust, and attitude toward debt were major impediments to e-commerce in China (Efendioglu and Yip, 2004).

Legal and political barriers

The lack of a legal framework and well-designed policies to address problems of the validity of electronic transactions is seen as a significant barrier that hinders the growth of e-commerce in many developing countries (Andam, 2003). Moreover, security, privacy and trust are sensitive issues when discussing e-commerce. Commonly, privacy and security concerns about the transmission of personal or financial information over the Internet are major issues for both consumers and firms, and may explain why they may be reluctant to use the Internet to make transactions (World Bank, 2009). For example, in China, a lack of 'transactional and institutional trust' related to the weak rule of laws was a major impediment

to e-commerce (Gibbs et al., 2003; Efendioglu and Yip, 2004). Moreover, a survey conducted among Brazilian consumers indicated that the low e-commerce adoption rate was related to government regulations such as concern about privacy and security, lack of business laws for e-commerce, inadequate legal protection for Internet purchases and concern over Internet taxation (Tigre and Dedrick, 2004). The United Nations (2004) noted that, in Asia, only four countries – Singapore (Singapore Electronic Transactions Act), Malaysia (Cyberlaws), Philippines (E-commerce Act), and Thailand (Thailand Electronic Transactions Act) – have a legal framework for e-commerce. These frameworks provide for the legal recognition of electronic documents and signatures and penalize common crimes committed in cyberspace (United Nations, 2004).

Cognitive barriers

Finally, cognitive factors are related to the mental maps of individuals and organisational decision makers (Huff, 1990). Previous research found that enterprises in developing countries do not make use of the Internet technologies because of behavioural factors related to customers who tend not to use the Internet for online transactions and also because of the unwillingness of top management to learn or use the technology (Karanasios and Burgess, 2008). It is broadly believed that direct users of new ICT usually require computer literacy and, often, knowledge of the English language because most software, human-computer interfaces and content on the Web are in English. A lack of proficiency in the English language has thus been a major problem among non-English-speaking customers, especially the older generation (Kshetri, 2007; Levinson, 2004; Gibbs et al., 2003; Nunberg, 2000). Many researchers note that in developing countries there is a lack of awareness and understanding of potential opportunities as well as risk aversion and inertia among business organisations and organisations' employees, leading to a negative cognitive assessment of e-commerce (Kshetri , 2007; Molla and Licker, 2005b; Moodley and Morris, 2004).

In summary, many practitioners and theorists are in agreement that the majority of developing countries in the new millennium will continue moving their industrial based societies into the information/knowledge era. In addition, many advocate the use of IT and e-commerce as an effective way of coping with the changing environment, locally, regionally, and globally. Shalhoub and Al Qasimi (2006) go one step further by stating that the adoption of electronic commerce at the national level plays a critical role for countries in their bid to survive in a hostile, complex, and turbulent global environment. The following sections will

discuss e-commerce development and trends in the Arab world and the Arab Gulf countries in order to understand e-commerce variation across these economies. Essentially, the success of e-commerce across national borders is a function of several variables, including national economy, national literacy, telecommunications availability, and technology penetration and acceptance (Sagi and Thomas, 2004).

2.5 E-commerce in the Arab world and the Arab Gulf countries

The Arabian region covers a vast geographic area spanning two continents, Asia and Africa. Commonly, Arab countries have a long-standing cultural tradition and are similar in many ways, such as in their religion, customs and values, history, and language (Hu et al., 2010). However, the Arab world differs mainly in terms of wealth and size. Wealth-wise, most Arab countries, with the exception of the Arab Gulf countries or the Gulf Cooperation Council countries (GCC)[9], do not have access to sufficient wealth and resources. In fact, the average GDP per capita of Arab Gulf countries exceeds that of the world average and some advanced countries (Aladwani, 2003).

In terms of area size, the Arab North-African sub-region covers a larger geographic area and is populated by more people than any other sub-region in the Arab world, while the Gulf sub-region (excluding Saudi Arabia) covers the smallest area and is inhabited by the least number of people. Wealth and size limitations impose some serious development challenges upon some Arab countries. For example, the economies of Arab-African countries and Yemen (with less money to spend and a larger area to develop) have a tendency to invest less in nation-wide projects requiring high government spending, such as building an advanced telecommunication infrastructure (Aladwani, 2003).

The Arabian region is playing a growing role in the global economy and has progressively realized technology-enabled modernization. Moreover, technology has become an integral feature in the Arabian business landscape and its modernization efforts (Hu et al., 2010). However, it is believed that this region has received surprisingly scant attention and, as noted by Aladwani (2003), there is very little empirical evidence on e-commerce and aspects of the

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[9] The Gulf Cooperation Council (GCC) was established in accordance with an agreement concluded in 1981 in Riyadh, Saudi Arabia between: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE). These countries declared that the GCC is established in view of the special relations between them, their similar political systems based on Islamic beliefs, joint destiny and common objectives (Shalhoub, 2006).

Internet in the developing Arab nations. This fact suggests bad news for those CEOs who are eager to exploit the Internet to enter into the Arabian market (Aladwani, 2003).

To measure Arab countries' e-commerce development requires a weighted combination of many indicators and parameters, such as: secure hosting, e-payment infrastructure, infrastructure access and affordability, Internet penetration and availability, computerization, user awareness, a legal and regulatory framework and secure on-line banking and payment. The United Arab Emirates (UAE) and Bahrain are the most advanced countries in the region measured by country e-commerce parameters, followed by other Gulf countries, and countries like Lebanon, Jordan and Egypt on selected indicators. The regional e-commerce readiness statistics among selected Arab states are indicated in Table 2.5 as well as their characteristics in terms of income category and population.

Table 2.5	Benchmarking of selected Arab countries e-commerce indicators								
Country	Region	Income category	Population (millions) (2009)[a]	Internet users (% population) (2010) [b]	Secure Internet servers per million population (2009) [c]	Personal computers (PC) per 100 population (2008) [c]	Telephone lines per 100 people (2008) [c]	Internet hosts per 1000 population (2010) [d]	Price basket for Internet - US$/month (2009) [a]
Algeria	Middle East and North Africa	Upper-middle-income	34,895,470	3.6 %	0.52	1.07	9.64	572	117.22
Bahrain	**Arabian Gulf**	**High-income**	**791,473**	**88%**	**78.23**	**74.6**	**28.42**	**53,944**	**112.09**
Egypt	Middle East and North Africa	Lower-middle-income	82,999,393	21.2 %	1.05	3.92	14.64	187,197	155.61
Iraq	Middle East and North Africa	Lower-middle-income	31,494,287	1.1 %	0	1	3.52	9	n/a
Jordan	Middle East and North Africa	Lower-middle-income	5,951,000	27.2 %	8.8	7.48	8.79	42,412	127.82
Kuwait	**Arabian Gulf**	**High-income**	**2,794,706**	**39.4 %**	**64.88**	**22.22**	**19.83**	**2,485**	**124.99**
Lebanon	Middle East and North Africa	Upper-middle-income	4,223,553	24.2 %	15	10.18	17.88	51,451	103.41
Libya	Middle East and North Africa	Upper-middle-income	6,419,925	5.5%	0.48	2.19	16.41	12,432	121.90
Mauritania	Sub-Saharan Africa	Low-income	3,290,630	2.3 %	1.56	4.54	2.37	23	125.04
Morocco	Middle East and North Africa	Lower-middle-income	31,992,592	33.0 %	1.41	5.70	9.46	277,793	110.39
Oman	**Arabian Gulf**	**High-income**	**2,845,415**	**41.7%**	**12.06**	**16.88**	**9.84**	**9,114**	**127.40**
Qatar	**Arabian Gulf**	**High-income**	**833,285**	**51.8%**	**76.37**	**15.69**	**20.56**	**822**	**139.25**
Saudi Arabia	**Arabian Gulf**	**High-income**	**25,391,100**	**38.7%**	**8.28**	**69.8**	**16.64**	**488,598**	**122.90**
Syria	Middle East and North Africa	Lower-middle-income	21,092,262	17.7 %	0.15	8.78	17.12	8,114	136.19
Tunisia	Middle East and North Africa	Lower-middle-income	10,432,500	34.0 %	10.65	9.66	12	490	117.43
United Arab Emirates	**Arabian Gulf**	**High-income**	**4,598,600**	**75.9%**	**125.77**	**33.08**	**33.63**	**379,309**	**n/a**
Yemen	Middle East and North Africa	Lower-middle-income	23,580,220	1.8 %	0	2.77	4.87	255	147.53
[a] World Bank (2009); [b] InternetWorldStats (2010); [c] World Economic Forum (2010); [d] CIA-World Fact book (2010).									

Note: Arab Gulf region statistics are represented in boldface letters and numbers

Table 2.5 shows that the six Arab Gulf countries dominate the top connectivity rankings in the region as reflected by the number of Internet users and personal computers per 100 measures. On average, about 56 percent of the population of these six countries have Internet access compared to an average of only 16 percent of the population of the remaining countries. Iraq and Yemen, however, dominate the bottom of the same list of rankings with 1 and 2 percent, respectively, of the population of this sub-region having access to the Internet. Bahrain has the highest Internet penetration rate in the Arab world with 88 percent of the population having access to the Net. UAE has the second highest penetration rate in the region with 76 percent. Although the Arab region is home to five percent of the world's population, it represents less than four percent of the world's Internet users (InternetWorldStats, 2010). This may be attributed to the high internet costs compared to developed countries.

The figures in Table 2.5 also show that the Arab Gulf sub-region again dominates the top PC ownership rankings in the whole Arab region. The relatively high penetration of PCs in Gulf countries may be because they are seen as luxury goods. On average, about 39 percent of the population of these six countries own a PC compared to an average of 5 percent of the population of the remaining countries. Iraq and Algeria dominate the bottom of the same list of rankings with 1 percent of the population of these countries owning a PC.

In terms of number of hosts per 1,000 people, Table 2.5 shows that the four countries (Saudi Arabia, United Arab Emirates, Morocco and Egypt) dominate the top rankings. On the other hand, Iraq and Mauritania have the least number of hosts among all sub-regions of the Arab world with 0.009 and 0.023 hosts per 1,000 inhabitants, respectively. In terms of the absolute number of Internet hosts, Saudi Arabia comes first with more than 488,000 hosts and Iraq comes last with only 9 Internet hosts. Finally, the figures in Table 2.5 show that four Arab Gulf countries (the United Arab Emirates, Bahrain, Qatar and Kuwait) dominate the top of the rankings for secure servers per 1 million people in the whole Arab region. On the other hand, Egypt, Iraq, Libya, Mauritania, Morocco, Syria and Yemen dominate the bottom of the same list of rankings with less than 2 secure servers per 1 million people.

The Middle East is considered the region to have benefited the most from ICT enhancements. A recent research study shows that the Middle East spent approximately $50 billion in 2009 in IT, up from around $30 billion in 2007, with the Gulf region spending about $12 billion (Ashrafi and Murtaza, 2011). E-commerce growth in Arab countries is noteworthy. Many of the large and leading Arab companies in the fuel, petroleum gas and petrochemical sectors have already introduced advanced e-commerce systems. For instance, Saudi Arabian Aramco has introduced Internet Petroleum Products Sales (IPPS) for Liquified Petroleum Gas (LPG). In fact, most major players in the fuel, petroleum, and gas sector today consider the Internet and Intranet as vital business operation, information and knowledge-sharing tools for enhancing productivity and efficiency, and the economic effect on sales, procurement and contracting are already immense (ESCWA, 2003). Further, in 2005, Arab consumers spent more than US$1 billion on products and services purchased over the Internet and B2B monetary transactions reached more than US$3 billion. It is expected that half of the spending on e-commerce will come from individuals and organisations operating in Arab Gulf countries (Aladwani, 2003).

In the Arab countries, credit cards generally meet the most typical digital payment requirements as they have been established on the Internet for a while. To obtain e-banking and equity investment, companies from Arab countries need to be registered in local, regional and global Internet-based commercial risk databases (ESCWA, 2003). Subsequently, there is still potential for the provision of online postal services in the Arab region. In 2007, the postal network in the Arab countries comprised around 16,000 permanent post offices (2.4% of the world total) (UPU, 2009). Figure 2.7 illustrates access of the world wide population to mail delivery in 2007. The figure shows that, in the Arab region, more than 60% had mail delivered to the door; however, 32% had to collect their mail from a postal establishment (see Figure 2.7). It is to be noted that, in the majority of Gulf countries, mail is delivered via post office boxes (UPU, 2009).

Figure 2.7 | Access of the population to mail delivery by region in 2007

Bar chart data:
- Africa: Population with door-to-door delivery 23, Population having to collect mail from postal establishment 64, Population without postal service 13
- Latin America and Caribbean: 81, 14, 5
- Asia-Pacific: 94, 5
- Europe and CIS: 98
- Arab Countries: 64, 32
- Industrialized countries: 95
- Total: 81, 16

Legend:
- Population with door-to-door delivery
- Population having to collect mail from postal establishment
- Population without postal service

Source: UPU, 2009

People in the Arab world have not fully understood and accepted the use of new Internet technologies due to the fear of threats to their personal privacy and financial security (Al Hosni et al., 2010; Khasawneh, 2009). Unless businesses and consumers are educated about the opportunities and benefits offered by ICT, and unless they are trained to use the Internet, e-commerce will not take off. While access to computers and the Internet is essential, it is not enough; it is equally essential to create a demand for the new technologies and for e-commerce (UPU, 2009). Al Hosni et al. (2010) argue that a consideration of culture, religious beliefs and the adoption of Arabic languages would be more acceptable to the individual in the Middle East. In addition, the preference of Arab people is to use face-to-face dealings with others, establish a family like relationship and build trust and consensus (Hill et al., 1998). Thus, building up a technology that is far removed from such patterns of behaviour and thinking could face some resistance.

The major problems negatively affecting the adoption of ICT in most Arab countries can be attributed to problems related to their government's policies and regulations (Hamade, 2009). For example, Kuwait has no law which is exclusively concerned with the Internet as yet, and the law concerning the Internet and websites is covered by the Press Act of 2006.

2.6 The E-commerce situation in Saudi Arabia

Over the past decade, the Kingdom has taken major steps and implemented initiatives towards strengthening and enabling the environment for effective e-commerce (Mustafa, 2002). The ICT sector in Saudi Arabia is fast growing. The Government of Saudi Arabia has acknowledged the vital role of ICT for socio-economic development and emphasizes ICT development as the centre piece of a national plan to bridge the digital divide by taking a number of steps to liberalize the market and create a positive regulatory framework to encourage investment and promote growth of the ICT market. For example, in 2004, Saudi Arabia launched the home computer project with the aim of increasing the reach of the Kingdom's e-Government systems to Saudi households, and helping to transform Saudi Arabia into a digital society. Participating citizens were asked to pay around $25 a month for two years via their telephone bill for a high specification home computer. Generally speaking, however, the Saudi Arabian government is still at the stage where they are trying to encourage people to go online and register to e-government services.

The Internet in Saudi Arabia is supervised by the government and all Internet connections are routed through government hubs that filter 'unsuitable' content. At the present time, individuals, companies, organisations and government agencies other than universities must subscribe to the Internet through a licensed Internet service provider (ISP) in the Kingdom. Universities are allowed to have their own Internet services (Alfuraih, 2008). Despite its vigilance about content, the Saudi government encourages Internet use because it believes that increased Internet use will aid national development projects. To increase access and use of the Internet, the government has developed the country's communication infrastructure and increased the geographic coverage of Internet services. Saudi Telecommunications Corporation (STC) recently introduced digital subscriber line (DSL) technology to major cities, and has pushed for significant cuts in

connection and phone charges, which started in 2003. The STC's intention was to service 3.3 million regular Internet users by 2005, and it reached 2,540,000 by that target date (Shalhoub, and Al Qasimi, 2006).

Saudi Arabia has a population of over 25 million, but only 9 million, or about 39% of the total population, have Internet access. By contrast, the UAE has a population of about 4 million; about 3 million, or 76% of the total population, have Internet access (see Figure 2.8).

Figure 2.8   The percentage of Internet users in the GCC states

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Source: InternetWorldStats, 2010

The World Economic Forum (2010) classified the UAE, Bahrain and Qatar as advanced countries. These countries have used information and communication technologies (ICTs) as a development enabler, and government policies have helped them reach an impressive level of ICT access. This includes the latest technological initiatives such as the Dubai Internet City and E-Government in the United Arab Emirates (the highest ranked Arab nation in terms of network readiness) (Nathan and Ahmed, 2008; Shalhoub, 2006). Having said all this, however, it must be recognised that while Saudi Arabia may lie behind its smaller neighbours who are making more

progress in terms of rapid Internet-related achievement, a relative view of its size must be maintained when judging its progress towards the goal of universal access to the Internet (Moores, 2002).

Research conducted by King Abdul Aziz City of Science and Technology (KACST)[10] to investigate the use of the Internet among Saudi registered companies found that 67% of the surveyed companies do not have Web access; out of those companies with access, 57% do not use the Internet at all, and, finally, only 10% of the Saudi-based companies have a Web presence (KACST, 2006). The number of Saudi customers who are using the Internet to buy and sell products and services is increasing. Business-to-consumer (B2C) e-commerce is showing growth and, currently, all Saudi commercial banks have Web sites that offer online banking services.

The growth of e-commerce has remained limited compared to other countries in the region, and this has been a result of the country's relatively low usage of credit cards, widespread fears of credit card fraud and a shortage of highly skilled ICT professionals. According to a recent study by Alfuraih (2008), the current use of credit cards as a means of payment is low and the number of credit cards as a ratio to debit (or ATM) cards in the country is currently only 1:10. Moreover, Alfuraih (2008) reports that the use of credit cards as a means of payment is not widely used in Saudi Arabia for three reasons. First, Islam prohibits people to take or give financial interest and most credit cards work on this basis. Second, most consumers use debit cards (ATM cards), removing the need for credit cards (unless there is a need to be able to access cash internationally). Third, disputes in Saudi Arabia involving credit cards usually mean that the customer will have to put forward the cost of the transaction first and only then will the dispute be investigated and hopefully resolved in their favour (Alfuraih, 2008). The prospects for e-commerce may also be constrained by the fact that shopping is a key social activity in the Kingdom and people may be reluctant to abandon this to shop online. Table 2.6 shows the extent to which credit and charge cards were used in different countries in 1998 and 2005 including Saudi Arabia. The Table reveals that credit card penetration varies widely among countries. The

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[10] KACST is the sole institution responsible for Internet provision. It formulates the rules that govern the use of the Internet in Saudi Arabia and governs the Saudi domain. KACST also uses techniques and equipment that filter Internet content, effectively cutting off the websites the government wants to ban from its audience in order to protect Islamic values and culture.

United States, for example, had a penetration of 2.53 cards per capita in 2005 versus only 0.04 cards per capita in Saudi Arabia. Moreover, there is more variation in credit card penetration in Asia than in Latin America or the transitional economies in Eastern Europe (such as the Czech Republic, Hungary, Poland, and Russia). Finally, the number of credit card companies competing in a country varies significantly, from eight in Russia to one in China. There appears to be a rough correlation between the number of companies and credit card penetration (Schmith, 2008).

Although the Ministry of Commerce and Industry established a permanent technical committee in January 2000 to prepare a legal framework for online transactions and trading on the Web, the final version of the legislation has not been adopted or fully achieved and is probably still under consideration (Albur, 2008; Sait et al., 2004). Further, it is believed that laws that govern cyberspace are not given the required attention. According to Albur (2008), in Saudi Arabia there is still no legislation for intellectual property, consumer protection, contract law and dispute resolution, the basis of taxation and Zakah, classification of e-commerce transactions, and compliance and enforcement issues. It is to be noted that, for contract law and dispute resolution, Saudi Arabia has no legislation specifically related to e-commerce contract disputes. Moreover, there have been no publicised disputes to establish a precedent for dispute resolution since Internet access became legal (Economist Intelligence Unit, 2007).

Table 2.6	Market Penetration in Selected Countries (Credit and Charge Cards per Capita)

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Source: Economist Intelligence Unit (2007) and Schmith, S. (2008).

Basically, the Kingdom has passed a number of laws related to computer crime, stemming from its basic principle which states that the Quran, and the Hadith (sayings) and Sunna (tradition) of the Prophet Mohammed, are the constitution of Saudi Arabia. These laws are generally focused on hackers and other individuals who use computer networks for illegal purposes. In 2007, the Saudi government endorsed a new law called the Cyber Crime Act to combat crimes over the Internet such as Internet hacking, fraud and privacy violations. This law aims to protect public interest, morals, public ethics, and the national economy. Moreover, the Cyber Crime law paves

the way for establishment of an IT legal system that safeguards the rights resulting from the legal use of computers and information networks (Albur, 2008).

Universally, it is believed that a country's postal and delivery services are an important part in the e-commerce project. In fact, the Saudi Arabian postal service is understood to be slow and inefficient. Further, mail cannot be delivered directly to homes or offices (and can only be delivered to mail boxes). However, recently, Saudi post established a new service called 'Wasel' to deliver mail in a timely manner direct to houses using latest technology smart P.O. boxes. E-commerce merchants will, as a result of this project, be able to deliver goods directly to houses, increasing levels of trust in the transaction system as a whole and ensuring that the items ordered will go directly to the payee's registered address rather than the P.O. Box number used previously. This service is not free and customers are required to subscribe to the service. Nevertheless, more infrastructure improvements are intended to change this situation in order to facilitate e-commerce applications (Alfuraih, 2008).

E-commerce could enable Saudi Arabia to experience a more open economy and increase its comparative advantage worldwide, hence helping in the nation's economic development, and providing new opportunities for penetrating international trading markets, especially for small and medium size enterprises which lack the resources enabling them to promote themselves globally (Kamel, 2000). This study will try to determine and discover the factors that influence the widespread use of e-commerce among Saudi business organisations in the private sector.

2.8 Chapter summary

The spatial implications of the communication revolution are profound but still uncertain for developing countries, which still have a long way to go before being able to fully realize the benefits of e-commerce. This chapter has provided an overview of technology development, the e-commerce status and the Internet in developing countries, in general, and the Arab World and Saudi Arabia, in particular, as this is critical to the focus of this study. Clearly, there is much to be learned about e-commerce in the developing world.

The following chapter will provide an overview of relevant previous research and salient theories and models, and discuss the potential factors that are found to affect technology adoption by organisations. Some studies have explored these factors for the global mean; this study, however, will focus on Arab countries in the Arabian Gulf region that share similar characteristics such as culture, religion, language and history. In particular, this study will focus on Saudi Arabia.

Figure 3.1	Overview of chapter three

3.1 Introduction

↓

3.2 Innovation Adoption

↓

3.3 Theories and models of technological innovation adoption

↓

3.4 Prior research on technological innovation adoption

↓

3.5 Attributes of the innovation

↓

3.6 Organisational context effects

↓

3.7 Environmental determinants

↓

3.8 Chapter summary
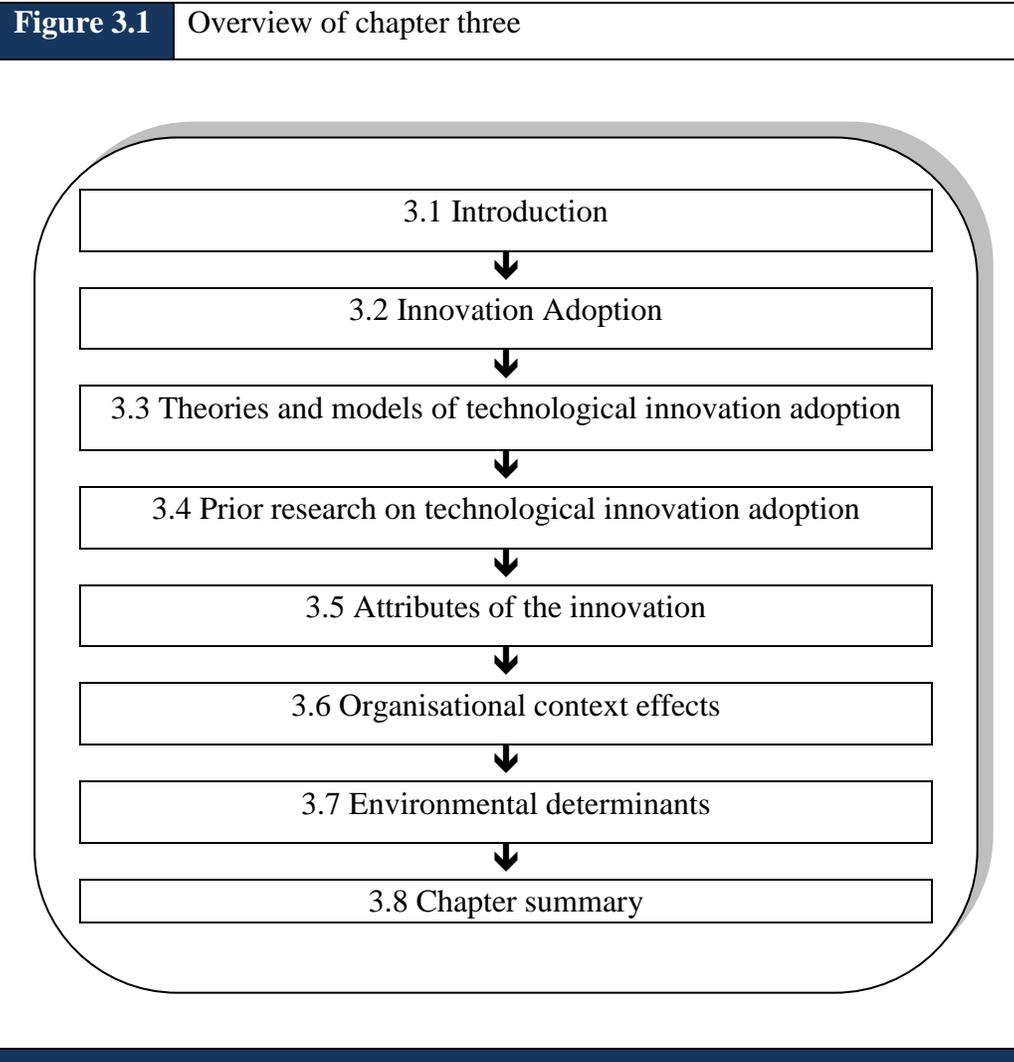
3.1 Introduction

The purpose of this chapter is to review the theoretical literature and empirical studies about innovation adoption, the determinants and moderators that influence organisational innovation adoption. Moreover, this chapter discusses innovation adoption theories and frameworks that are popular in examining the nature of the relationships between adoption of innovations by organisations, organisations' external environments and their internal characteristics. Consequently, this chapter examines studies relating to organisational innovation adoption and identifies the proposed determinants that are found to influence the adoption process. In conclusion, from these aspects, it is possible to develop a series of research propositions that form the focus of this research. An overview of the organisation of this chapter is shown in Figure 3.1 (previous page).

3.2 Innovation Adoption

Researchers report that innovation is a concept central to economic growth and is critical to firm competitiveness and effectiveness (Damanpour and Wischnevsky, 2006; Wolfe, 1994). In fact, a better understanding of innovation can contribute to the practice of management (Leifer et al., 2000; Van de Ven, 1986).

The word innovation is derived from the Latin word *novus*, or new, and it can be alternatively defined in two separate ways: (1) bringing new ideas, products, services or devices, or (2) bringing new technologies or practices into use (Damanpour 1991). The conceptualisation of innovation to be used for this study subscribes to the latter definition. Companies that innovate earlier than others are more likely to acquire real and significant competitive advantages (Salavou et al., 2004).

A number of authors have defined adoption in many ways and have differentiated between adoption, development, implementation and use (Rogers, 1995; Cooper and Zmud, 1990; Kwon and Zmud, 1987; Zmud, 1982; Daft, 1978; Pierce and Delbecq, 1977). In this study, 'adoption' has been conceptualised as the generation, development and implementation of new technology (Damanpour, 1991). Moreover, the diffusion of an innovation refers to the process by which

innovations spread to individuals within an organisation or organisations within a population over time (Rogers, 1983).

Information systems (IS) researchers have proposed that Internet technologies such as e-commerce can be considered as a technological innovation which offers firms opportunities to establish interactive relationships with business stakeholders (i.e. business partners and suppliers, logistics providers and customers), improve operating efficiency and expand their market reach (Jackson and Harris, 2003; Patterson et al., 2003; Daniel et al., 2002; Kendall et al., 2001a; Prescott and Conger, 1995). Furthermore, Ilori and Irefine (1997) assert that successful adoption of any form of technology by a firm may be regarded as an innovation.

It is noteworthy that differentiation between innovators and non-innovators occurs when the innovation is put to use within organisations. Some organisations are found to adopt the new innovation right away and these organisations are classified as early adopters Rogers, 1995). Organisations that wait to see how successful an innovation is before making the decision to adopt are known as late adopters (Hubbard and Hayashi, 2003). Moreover, Swanson (1994) notes that first or early adopters of an innovation within an organisational population are viewed as innovators.

Swanson (1994) proposed the following three-category construct to better classify information system (IS) innovations, which may enhance our understanding of the adoption and use of e-business technology:

> Type I: Innovations that mainly used to enhance efficiency or effectiveness within IS function, such as relational database and object-oriented technologies for enhancing the efficiency of system delivery.
> Type II: Innovations that support the administration and operational processes of firms.
> Type III: Innovations that are embedded in the core technology of a business and that are supposed to influence core business processes or strategies.

Researchers argue that e-commerce essentially belongs to Type III innovation because it is often embedded in the firm's core business processes or is extending basic business products and

services, and integrating suppliers and customers in the value chain (Hong and Zhu, 2006; Wu et al., 2003; Chatterjee et al., 2002). Therefore, this study considered e-commerce as a type III technology and examined the adoption of B2B e-commerce from the perspective of information technology innovations. A brief review of both the conceptual and empirical literature provided below discusses some of the most important factors that affect IT and e-commerce adoption decisions. Where relevant, studies that have evaluated IT and e-commerce adoption in Saudi Arabia are reported.

3.3 Theories and models of information system innovation adoption

This section discusses information system (IS) innovations adoption theories and frameworks that are popular in examining the factors that facilitate or inhibit the adoption and diffusion of information technology innovations in organisations. The study of adoption and diffusion of IS innovations has been studied since the early 1940s (for example, see Ryan and Gross, 1943) and has received considerable interest from, industry groups, policy makers and scholars in the social sciences. Moreover, the body of knowledge that exists on IS innovation adoption and diffusion has been based on a set of theoretical frameworks from a variety of disciplines such as sociology, medicine, economics, marketing and psychology (Gatignon and Robertson, 1989). In fact, adopting new innovations is a fundamental concept of economic growth and can be an enabler for achieving sustainable competitiveness for organisations (Barrett and Sexton, 2006; Damanpour and Wischnevsky, 2006).

In recent years, there appears to be significant potential to study organisational adoption of IS innovations such as e-commerce (Tan et al., 2007), e-business (Zhu et al., 2003) and smart-card payment systems (e.g. Plouffe et al., 2001). Research has called for organisations to be more innovative to effectively meet the changing demands of today's environment (Sarros et al., 2008). Table 3.1 summarises theoretical models used for examining organisational/individual level factors affecting information systems (IS) innovations adoption and diffusion. In fact, the explanatory power of these theories was tested empirically by many qualitative and quantitative studies to identify factors that facilitate or hinder IS adoption and diffusion (Shalhoub and Al Qasimi, 2006; Zhu et al., 2006a; Thong, 1999). Moreover, it is believed that there is not a single,

unitary theory, but rather different theories to explain different aspects of innovation (Downs and Mohr, 1976).

Table 3.1	Theoretical models used for examining organisational/individual level factors affecting information systems (IS) innovations adoption and diffusion	
Theory	**Level of analysis**	**Studies**
Technology acceptance model (TAM)	Individual	Grandon and Pearson (2004) Igbaria el al. (1997)
Theory of planned behaviour (TPB)	Individual	Workman, M. (2005) Riemenschneider and McKinney (2001).
Theory on Diffusion of Innovation (DOI)	Organisation	Bradford and Florin (2003) Mustonen-Ollila and Lyytinen (2003) Armstrong and Yokum (2001) Beatty et al.(2001) Agarwal and Prasad (1997)
Resource-based theory (RBT)	Organisation	Zhu and Kraemer(2005) Barney and Arikan (2001) Gregoire et al.(2001) Bharadwaj (2000) Andreu and Ciborra (1996) Clemons and Row (1991) Barney(1991)
Technology-organization-environment (TOE) framework	Organisation	Scupola (2003) Wu et al. (2003)
Institutional theory	Organisation	Gibbs and Kraemer (2004) Chatterjee et al.(2002) Scott (1995) King et al. (1994) Abrahamson and Rosenkopf (1993)
Structuration theory	Organisation	Walsham (2002). Barrett and Walsham (1999) Orlikowski and Robey (1991)

3.3.1 Technology acceptance model (TAM)

Technology Acceptance Model (TAM) was introduced by Davis et. al.(1989) to help explain, as well as predict the factors that affect behavioural intention to use information or computer systems by tracing the impact of external factors on internal beliefs, attitudes, and intentions. It suggests a causal linkage between two key variables —perceived usefulness (PU) and perceived ease of use (PEOU) — and users' attitude, behavioural intention, and actual system adoption and use (Davis, 1989).

Perceived usefulness (PU) captures the user's perception that a specific innovation—such as information technology —will improve his or her work performance. Perceived ease of use (PEOU) captures the user's expectation about the effort required to use information technology innovations (Davis et. al., 1989). Moreover, attitude toward use (AT) is determined by PU and PEOU. Furthermore, behavioral intention to use (BI) is jointly determined by attitude towards use (AT) and perceived usefulness (PU). Finally, the actual system use is determined by behavioural intention (BI) (Gentry and Calantone, 2002).

Because Davis' technology acceptance model (TAM) incorporates findings from the information systems (IS) literature, its use is becoming widespread in the diffusion of innovation literature. TAM has been used for studying individual computer and software applications usage such as email, word processing and spreadsheet software, (e.g. Davis, 1993; Mathieson, 1991; Davis et al., 1989). In recent years, in line with the development of the Internet and Internet-based technologies, there have been a number of attempts to test the applicability of TAM in the areas of organisational contexts (e.g., Venkatsh and Davis, 1996), e-commerce (e.g., Jiang et al., 2000), telemedicine (e.g., Karahanna et al., 1999), and digital library systems (e.g., Davies, 1997).

Gentry and Calantone (2002) find that TAM is superior for explaining variance in behavioral intention within a procurement context and the authors believe that this is at least partially due to TAM's use of two specific beliefs—Perceived Usefulness and Ease of Use—that apply to all attitudes in varying contexts (Gentry and Calantone, 2002). Further, Rose and Straub (1998) extend Davis's (1989) Technology Adoption Model (TAM) to understand how, and why, IT

technology has, or has not, been adopted by less developed countries (LDC). They test the model in five Arab countries (Jordan, Egypt, Saudi Arabia, Lebanon, and UAE) with the objective of being able to predict factors that lead to use. They conclude that TAM transfers successfully and recommend an investigation in future research of cultural factors.

An important point to note is that, although the TAM has been widely used for explaining technology acceptance by users, there has been increasing concern about the appropriateness and comprehensiveness of TAM. Some scholars have criticised the model for its assumption that perceived ease of use and perceived usefulness are always the primary determinants of users' acceptance of technology systems (Park et al., 2008). For example, Davis (1989) argues that research should explore other variables that could affect perceived ease of use, perceived usefulness and could improve the model's predictive power in order to enrich the explanation of the acceptance of technology systems depending on specific technology adoption contexts. Therefore, researchers conclude that the predictive power of TAM is limited, hard to increase and should be extended to include additional constructs to better explain behavioural intention to use information systems (Lopez-Nicolas et. al., 2008; Legris et al, 2003)

3.3.2 Theory of planned behaviour (TPB)

TPB has been successfully applied to the understanding of individual acceptance of many different technologies (Harrison et al., 1997, Taylor and Todd, 1995, Mathieson, 1991). It posits that individual behaviour is driven by behavioural intentions. Behavioural intentions are a function of an individual's attitude toward the behaviour, the subjective norms surrounding the performance of the behaviour, and the individual's perception of the ease with which the behaviour can be performed (behavioural control). Attitude toward the behaviour is defined as the individual's positive or negative feelings about performing a behaviour. Subjective norm is defined as an individual's perception of whether people important to the individual think the behaviour should be performed. Behavioural control refers to people's perception of the ease or difficulty of performing the behavior of interest (Eagly and Chaiken, 1993; Ajzen, 1991).

Theory of planned behaviour has been successfully applied to various situations in predicting the performance of behaviour and intentions, such as intentions to use a new software application (Mathieson, 1991). Harrison et al. (1997) use TPB to explain and predict small business executives' decisions to adopt IS innovations. Their results indicate strong support for a decision process based on attitude (perceived positive and negative consequences for the firm), subjective norm (social expectations), and perceived control (resources to overcome obstacles) regarding IS innovations' adoption. Ramdani (2008) argued that TPB is not specific to IS usage and is less parsimonious than TAM. Also, TPB requires unique operationalisations in every different situation to which it can be applied (Ramdani, 2008; Mathieson et al., 2001).

3.3.3 Theory on Diffusion of Innovation (DOI)

Studies on the adoption of information technology innovations have been well documented in the literature. Rogers' (1983) innovation diffusion theory is useful for the study of the factors that facilitate or hinder technology adoption and diffusion. This theory states that an innovation's adoption rate and ease of implementation depend on five general attributes: relative advantage, compatibility, complexity, observability, and trialability (Rogers, 1983). Table 3.2 briefly defines Rogers' (1983) five innovation attributes and it is believed that innovation attributes play an important role in whether a particular innovation is adopted or rejected by organisations.

Fichman and Kemerer (1993) note that organisations are more likely to be willing and able to adopt innovations that offer clear advantages, that do not drastically interfere with existing practices and that are easier to understand. In fact, the higher the relative advantage and compatibility is for an innovation, the higher is the rate of diffusion. On the other hand, trialability and observability are both related to risk in which adopters look unfavourably on innovations that are difficult to put through a trial period or whose benefits are difficult to see or describe (Fichman and Kemerer, 1993).

Table 3.2	Attributes of innovation

Aston University

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Source: Rogers, 1983

The literature shows that the DOI theory has a solid theoretical foundation and consistent empirical support (Zhu et al., 2006a; Seyal and Rahman, 2003; Moore and Benbasat, 1991). It is believed that the theory on diffusion of innovation provides well developed concepts and a large body of empirical results applicable to the study of information systems' (IS) innovations adoption and implementation, as well as tools, both quantitative and qualitative, for assessing the likely rate of diffusion of a technology, and identifies numerous factors that facilitate or hinder technology adoption and implementation (Fichman, 1992; Moore and Benbasat, 1991). Nevertheless, researchers on complex organisational technology have criticised the deficiencies of the innovation diffusion theory in explaining the adoption behaviour and have concluded that innovation attributes are not sufficient to understand the adoption behaviour of complex organisational technologies (Lee and Cheung, 2004; Chau and Hui, 2001; Prescott and Conger, 1995; Brancheau and Wetherbe, 1990).

Lee and Cheung (2004) argue that Rogers' model excludes the possibility of influence from organisational and environmental factors. Moreover, Pe´rez et al. (2004) assert that "classical diffusion variables by themselves are unlikely to be strong predictors of adoption for complex organisational technology, suggesting that additional factors, either as independent or control variables, should be added" (Pe´rez et al., 2004: 281).

Recent research by Parker and Castleman (2009) notes that DOI has limitations because it does not provide a lens for examining the nature of relationships between organisational and individual decision-making, and the complex social contexts (including change agents) in which firms make decisions. Moreover, they believe that additional theory must be combined with DOI to form an integrated theoretical framework for future research on organisational e-commerce adoption.

3.3.4 Resource-based theory (RBT)

Resource-based theory (RBT) explains how firms can gain a sustainable competitive advantage by exploiting and developing resources (such as competencies, assets, know-how and capabilities) that are unique and, therefore, not imitable by competitors (Rivard et al., 2006; Caldeira and Ward, 2003). Moreover, RBT postulates that the services rendered by a firm's unique bundle of resources and capabilities may lead to value creation (Amit and Zott, 2001).

A firm's resources and capabilities are valuable if, and only if, they reduce costs or increase revenues compared to what would have been the case if the firm did not possess those resources (Barney, 1997). These resources and capabilities can be physical assets, human capital and organisational capital. Physical capital includes tangible resources such as financial resources, technology, and machinery. On the contrary, human capital and organisation capital are intangible resources. Human capital deals with expertise, skills, and relationships, for example, while organisational capital deals with issues such as structure, processes, reputation, processes, managerial attributes, information and knowledge possessed by the firm. These resources can enable a firm to conceive and implement strategies for improving efficiency and effectiveness

(Wernerfelt, 1984). Moreover, the firms can access and exploit external resources from the environment such as trading partners and customers (Parker and Castleman, 2009).

In the IS literature, the RBT has been used to explain how firms create value from IT assets and an organisation's skills to leverage overall IT effectiveness (Clemons and Row, 1991; Jarvenpaa and Leidner, 1998). Parker and Castleman (2009) note that e-commerce technologies are resources because e-commerce adoption is seen to result when firms acquire and use e-business-related resources effectively. Zhao et al. (2008) adopted the RBT to study the process of e-business value creation and they demonstrated the causal relationships among strategy, IT-related resources, and e-business capabilities and their roles in determining organisational transformation and outcome of e-business implementation. Concurrently, Zhu et al. (2004) assesses the business value of e-commerce capability and information technology (IT) infrastructure in the context of electronic business at the firm level. His results were consistent with the resource-based theory and provide empirical evidence for the complementary synergy between front-end e-commerce capability and back-end IT infrastructure.

Although the RBT highlights the capabilities that any firm must have or acquire to adopt e-business, and it recognises intangible as well as tangible resources (Parker and Castleman, 2009), RBT has been criticised on many counts. Priem and Butler (2001) assert that the resource-based view is lacking external measures that determine the value producing capability of the utilised resources. Moreover, Hooley et al. (1998) criticise the resource-based view for its inward focus in which they note that the problem with an inward focus is that risks are often ignored in market demand. Subsequently, Parker and Castleman (2009) note that RBT assumes the resources are typically used to their fullest potential. For example, studies applying RBT found that it was proactive firms who performed better with e-business because they used it to support their strategies and leverage competencies, and because they developed internal e-business capabilities (Parker and Castleman, 2009; Rivard et al., 2006; Caldeira and Ward, 2003). These studies also found that RBT did not explain the adoption decisions of firms because external factors sometimes resulted in adoption even though these firms did not develop internal e-business capabilities or leverage their competencies (Parker and Castleman, 2009; Rivard et al., 2006).

3.3.5 Technology-organization-environment (TOE) framework

Tornatzky and Fleischer (1990) in their book developed a framework called the Technology-Organisation-Environment (TOE) framework. The framework specifies the three contexts that a firm uses to determine how they would take advantage of the new technology. First, technological context, which refers to the nature of the technology adopted and looks into the existing technology that is available in the industry in order to determine the ability of the firm to move on an innovation initiative. Second, organisational context, which includes: 'an organisation's attributes such as its size, centralisation, formalisation, the quality of its human resources, the complexity of the organisation's managerial structure, and the amount of slack resources available internally' (Tornatzky and Fleischer, 1990: 153). Third is the environmental context, which includes the industry an organisation is in, its competitors, its accessibility to the resources supplied by others and dealings with government (Depietro et al., 1990; Tornatzky and Fleischer, 1990).

The TOE framework has been utilised for studying different types of technological innovations. More broadly, it has been tested in the context of information technologies (i.e. Thong, 1999), electronic data interchange (EDI) (i.e. Chau and Tam, 1997; Iacovou et al., 1995; Kuan and Chau, 2001) and e-commerce (i.e. Robertson, 2005). Moreover, many scholars suggest that research in technology and innovation adoption should incorporate the organisational circumstances of a potential adopter and its industry or external environment in addition to Rogers' (2003) innovation characteristics (Chau and Tam, 1997; Lee and Cheung, 2004; Zhu et al., 2006b).

The TOE framework lays the foundation for many models that the literature presents. For example, Tan et al. (2003) introduced a model called "Model of Small Business EMarketplace Adoption" and is firmly grounded in the TOE framework. Moreover, Chau and Tam (1997) applied the TOE framework and suggested that 'one future line of research is to extend the proposed TOE framework to other innovation domains' (Chau and Tam, 1997: 17). Consequently, Zhu et al. (2003) drew upon the TOE framework to identify facilitators and inhibitors for e-business adoption decisions by European firms and demonstrated the solid theoretical bases of the TOE framework for determining facilitators and inhibitors of e-business

adoption. Finally, it is widely acknowledged that the existing literature has demonstrated the usefulness of the TOE framework for understanding the diffusion of information systems (IS) innovation (Scupola, 2003; Wu et al. 2003; Thong, 1999) and, more importantly, it provides a much better explanation which addresses firms' decision-making behaviours (Bouchard, 1993).

3.3.6 Institutional theory

Institutional theory offers seemingly contradictory interpretations of organisational phenomena (Roberts and Greenwood, 1997). It tries to explain the processes by which structures, including schemas, rules, norms, and routines, become established as authoritative guidelines for social behaviour. It inquires into how these elements are created, diffused and adopted over space and time; and how they force one unit in a population to resemble other units that face the same environment fall into decline and disuse (Scott, 1995; King et al., 1994; Abrahamson and Rosenkopf, 1993).

Scott, (1995) posits that institutions consist of three pillars (structures): cognitive, normative and regulative structures. The cognitive pillar presents the rules that constitute the nature of reality and the frames through which meaning is made. For instance, symbols, signs and words have their effect to make sense of the ongoing stream of happenings by shaping the meaning we attribute to objects and activities. The second pillar comprises normative structure by which compliance is obtained through social obligation and it specifies how things should be done through defining goals or objectives (e.g. wining the game or adopting a technology). The third pillar provides the basis of coercive power and it presents institutions constrains and regularizes behaviour. Moreover, regulative processes involve the capacity to establish rules, inspect or overview others 'conformity to them and rewards or punishments in an attempts to influence future behaviour. All these pillars have been identified by one or another social theorist as vital components of institutions (Scott, 1995).

The institutional approach rejects the premise that organisational phenomena are the products of rational choice based on technical considerations. Rather, emphasis is placed either on the taken-for-granted nature of the decisions made or on the pressures to secure legitimacy that operate on organisations, or both (Roberts and Greenwood, 1997). However, institutional theory has captured the attention of a wide range of scholars across the social science to examine the

structure and behavior of organisations (Gibbs and Kraemer, 2004; Chatterjee, et al., 2002; Scott, 1995; King et al., 1994; Abrahamson and Rosenkopf, 1993).

3.3.7 Structuration theory

British sociologist Anthony Giddens developed the theory of structuration and he provided an account of the constitution of social life that departed from and challenged established theoretical positions and traditions (Cohen, 1989). Numerous studies promptly emerged discussing, supporting or criticizing Giddens's ideas (e.g. Giddens and Pierson, 1998; Giddens, 1990; Cohen, 1989; Held and Thompson, 1989).

To examine the dualism between structure and agency, Giddens departed from the conceptualization of structure as some given or external form. Structure is what gives form and shape to social life, but it is not itself the form and shape. Structure exists only in and through the activities of human agents (Wade, 2010). Similarly, he departed from the idea of agency as something just 'contained' within the individual. Agency refers to the flow or pattern of people's actions. Giddens deeply reformulated the notions of structure and agency, emphasizing that 'action, which has strongly routinized aspects, is both conditioned by existing cultural structures and also creates and recreates those structures through the enactment process' (Wade, 2010). He suggested that while structural properties of societies and social systems are real, they have no physical existence. Instead, they depend upon regularities of social reproduction (Giddens and Pierson, 1998). As a consequence, the basic domain of study in the social sciences consists of social practices ordered across space and time (Giddens, 1984: 2).

Structuration theory (ST) is a general theory of the social sciences; in its original formulation, ST pays little attention to technology (Wade, 2010). However, some attempts have been made to extend Giddens's ideas by including an explicit IT dimension in social analysis (Wade, 2010; Walsham, 2002). As a result of such attempts, structurationist analyses have helped to increase our understanding of important IT-based contemporary phenomena. Some recent examples are studies on electronic trading and work (Barrett and Walsham, 1999); globalization issues and IT deployment (Wade, 2010); the dynamics of groupware application (Ngwenyama, 1998); communication and collaboration using IT (Olesen and Myers, 1999); global virtual team

dynamics and effectiveness (Maznevski and Chudoba 2000); and crosscultural software production and use (Walsham, 2002).

3.3.8 Integrating DOI and TOE to study the determinants of e-commerce adoption

After carefully reviewing the literature on IS innovations, the theory on diffusion of innovation (DOI) and the Technology-Organisation-Environment (TOE) framework are viewed as appropriate theoretical foundation for studying e-commerce in organisations. In fact, the TOE framework and the DOI theory provide a reasonable and strong theoretical development for studying technological innovation (Zhu et al., 2006a). Moreover, incorporating TOE contexts help strengthen what has been generally ignored in the DOI theory, such as the organisational circumstances of a potential adopter and its macro arena (Zhu et al., 2006a).

In fact, the adopting organisation not only needs to understand the technological traits and the costs of the technology, but also needs to be able to identify what business activities are likely to benefit from the application of the technology: in other words, how the innovation can be managed. In addition, understanding the adoption processes, its facilitators and inhibitors is crucial because it will help organisations in making decisions in the area of planning, production and distribution of their products and services. Cameron and Quinn (1999) argue that organisational domain is important because plans for any changes adopted without including organisational determinants normally would have unforeseen and usually negative consequences. Also, other outcomes such as efficiency and satisfaction are predicated upon the perceived characteristics of the target system as antecedent to behavioural intent to adopt and, consequently, use the system. Finally, research shows that the environmental dimension is particularly important in predicting technological innovation adoption (Damanpour and Gopalakrishnan, 1998). Zhu et al. (2003) note that e-commerce is enabled by technological development of the Internet, driven by organisational factors such as firm scope and size, and influenced by environmental factors related to customers, business partners, as well as competitors.

3.4 Prior research on technological innovation adoption

There is a growing body of academic research focusing on the determinants of computer technology acceptance and utilization among users (Tornatzky and Klein, 1982; Moore and Benbasat, 1991; and Cooper and Zmud, 1990). Theroies on diffusion of innovation (e.g., Rogers, 1983; Tornatzky and Fleischer, 1990; Davis, 1989) have determined many classes of independent variable as factors to be associated with the dependent variable in which these theories offer rich explanations of how new innovations are adopted, and how adoption decisions are affected by perceptions of the technology itself as well as the character of the adopters (individuals or organisations) and their environment. However, past research on the topic of information technology innovation adoption have examined variables in isolation from one another and have rarely brought them together in a comprehensive model (Brancheau and Wetherbe, 1990; Cooper and Zmud, 1990).

In the field of research and development (R&D), a considerable body of research has been undertaken on the topic of 'technology transfer', which typically focuses on information flow and communication patterns into and within R&D labs (Huff and Munro, 1985), and between, typically, developed and less developed countries. Recently, substantial and diverse empirical innovation research has been conducted by scholars in social sciences to examine the factors that facilitate or inhibit the adoption and diffusion of Information Technology innovations. For example, Teo et al. (2009) looked at electronic procurement (e-procurement); Lin (2007) examined the impact of perceived innovation characteristics and organisational learning capabilities as explanatory and predictive variables for e-business implementation success. Agarwal and Prasad (1997) examined the acceptance behaviour to use the World Wide Web; Gatian et al. (1995) studied the implementation of a strategic information system (SIS); Brancheau and Wetherbe (1990) examined the validity of diffusion theory in the field of end-user computing; Cooper and Zmud (1990) examined the adoption and implementation of material requirement planning (MRP) software, and Zmud (1982) examined the adoption and implementation of modem software practices.

It is noteworthy that the aforementioned studies have found that the effect of different factors may vary depending on the type and stage of innovation adoption in which factors that influence early adopters of a particular innovation may differ significantly from those that impact late adopters (Waarts et al., 2002; Damanpour, 1988). However, as pointed out by Tomatzky and Klein (1982), innovation research which has been conducted lacks a framework and has several problems. These are, namely, (1) the need to focus on the different stages of the innovation adoption process as the dependent variable; (2) the need to avoid generalisations from the individual adoption process to the organisational innovation adoption process. In other words, the organisational unit (not individuals in the organisations) undergoing innovation should be the locus of data gathering: alternatively, as suggested by Hage (1980), the most involved member of the adopting unit would be the most informed respondent; and (3), the need to use reliable measures. This thesis attempts to lessen these concerns.

Table 3.3 contains a summary of the most frequently cited studies on organisational technology adoption and it shows the study object or innovation studied, unit of analysis, methodology used, research variables (dependent and independent variables), and major findings. In fact, lots of research variables and their relationships have been proposed and discussed in which variables or factors that were found to be important by one researcher were not always found to be significant by others because of the dependency of the research findings on the cultural and socioeconomic situations of the target countries (Sameni and Khoshalhan, 2009).

Commonly, it is believed that different cultures have different diffusion rates for the identical innovation. In addition, research shows that a lead and lag relationship of diffusion processes in different countries leads to cross-national variation (Dunphy and Herbig, 1995). Indeed, as noted by Dunphy and Herbig (1995), existing cultural conditions always determine whether, when, how, and in what form a new innovation will be adopted. Finally, Huang and Palvia (2001) note that the use of information technology innovation in developing countries faces challenges and strong resistance that may be related to cultural issues such as the perception that technological innovation degrades personal communications.

The purpose of this study is twofold: first, to investigate particular organisational, technological and environmental variables which could promote or hinder the adoption process in an organisational setting; second, to stimulate research on the subject by providing a conceptual framework which would be the basis for any empirical analysis. The following section reviews the literature regarding technological innovation characteristics which have a potential correlation with the adoption decision and/or the continued use of information technology innovations.

Table 3.3	Key studies examining the determinants of information technology innovation adoption and diffusion				
Source	**Study Object**	**Unit of analysis**	**Methodology used**	**Explanatory Variables**	**Major findings**
Teo et al. (2009)	Electronic procurement (e-procurement)	Organisation	Survey questionnaire	IV: - Perceived direct benefits - Perceived indirect benefits - Perceived costs - Firm size - Top management support - Information sharing culture - Business partner influence DV: - e-procurement adoption	• Firm size, top management support, perceived indirect benefits, and business partner influence are positively and significantly associated with the adoption of e-procurement. • Industry type does not show any relationship with e-procurement adoption.
Lin (2008)	E-business implementation	Organisation	Survey questionnaire	IV: - Perceived relative advantage - Compatibility - Complexity - Organisational learning capabilities DV: e-business implementation success	• Perceived relative advantage, compatibility and organisational learning have a significant effect on e-business implementation success.
Ramdani and Kawalek (2008)	Enterprise Systems (ES)	Organisation	Direct interviews	IV: - Relative advantage - Compatibility - Complexity, - Trialability - Observability - Top Management Support - Organisational Readiness - IS Experience - Size - Industry - Market Scope - Competitive Pressure - External IS Support DV: - Willingness to adopt ES	• Firms with a greater perceived relative advantage, a greater ability to experiment with ES before adoption, a greater top management support, a greater organisational readiness and a larger size are predicted to become adopters of ES.

Note: IV: Independent variables; DV: Dependent variables

Table 3.3 (cont.)					
Source	**Study object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**
Lin and Lee (2005)	E-business adoption	Organisation	Survey questionnaire	<u>IV:</u> - Organisational learning - Knowledge management <u>DV:</u> - E-business systems adoption level.	• Organisational learning and knowledge management processes are closely related to the level of e-business systems adoption. • Firms with greater levels of technical expertise and e-business knowledge attain higher levels of e-business systems adoption.

Pérez et al. (2004)	Tele-working	Organisation	Survey questionnaire	<u>IV:</u> - Human resources
				  - Technological resources
				  - Organisational resources
				
				<u>DV:</u> - Tele-working Adoption
					• Teleworking firms use more ICTs, invest more resources in R & D, have a larger percentage of knowledge workers and salespeople in the workforce, and have a larger geographical market.

					•

Table 3.3 (cont.)					
Source	**Study object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**

Lertwongsatien and Wongpinunwatana (2003)	E-Commerce	Organisation	Survey questionnaire	<u>IV</u>: - Perceived Benefits
				   - Compatibility
				   - Size
				   - Management Support
				   - Existence of IT Department
				   - Competitiveness
				
				<u>DV</u>: - E-commerce Adoption decision
					• Firms that strongly support the use of Information Technology, by formally establishing IT departments, are more likely to adopt e-commerce earlier than firms with less IT support.
					• Firms that have IT assets (i.e. IT knowledge, IT capabilities) are more likely to adopt and implement e-commerce than firms that need to start building technology knowledge and infrastructure required for e-commerce adoption.

Sanchez and Perez (2003)	Electronic data interchange (EDI) adoption	Organisation	Survey questionnaire	<u>IV</u>: - Operational benefits
				   - Strategic benefits
				   - Cost difficulties
				   - Technical difficulties
				   - Organisational difficulties
				   - External pressure
				   - Supply dependence
				   - Mutual understanding
				   - Experience of EDI
				
				<u>DV</u>: - EDI Adoption
				    - Scope of EDI use
					• Organisations that adopt EDI perceive more operational benefits, more external pressure and mutual understanding, and fewer technical and organisational difficulties than non-adopters of EDI.
					• Companies use EDI to become more coordinated with suppliers and customers.

Table 3.3 (cont.)					
Source	**Study Object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**

Scupola (2003)	Internet commerce	Organisation	Qualitative	IV: - Benefits
				  - Barriers
				  - Employ's IS knowledge
				  - Financial resources
				  - Technological resources
				  - size
				  - Government intervention
				  - Public administration
				  - External pressure
				
				DV: Internet commerce adoption & implementation
					• E-commerce benefits, barriers, the quality of access to suppliers of technology-related services, government intervention, pressure from buyers, suppliers and competitors are very important in Internet commerce adoption and implementation

Wu et al. (2003)	Electronic business (e-business)	Organisation	Survey questionnaire	IV: - Management support
				  - Organisational learning
				  - Customer orientation
				  - Competitor orientation
				  - Customer power
				  - Normative pressures
				
				DV: - E-business adoption and performance outcomes
					• Five of the six proposed antecedents had a significant influence on the overall intensity of e-business adoption.
					• The communication and internal administration aspects of e-business positively affect performance outcomes.

Waarts et al. (2002)	Enterprise resource planning (ERP) software	Organisation	Survey questionnaire	IV: - Perceived advantages and disadvantages
				  - Compatibility
				  - Attitude
				  - Company IT resources
				  - IT intensity
				  - IT integration
				  - Parent company
				  - Industry competitiveness
				  - Supply-side competition
				DV: - The likelihood of early adoption of ERP software in 1998
				  - The likelihood of later adoption in 2000
					• Internal strategic force, attitudes of the firm, external factors like competition and supplier activities are important determinants at the early stages of the diffusion process of ERP.
					• Implementation issues such as the scalability of the system, the number of seats and the yearly available budget are important determinants at the late stages of the diffusion process of ERP.

Table 3.3 (cont.)					
Source	**Study Object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**
Chassion and Lavato (2001)	Decision support system	Organisation	Case study	IV: - subjective norms - Adoption stage - Use competence - Implementation process - Organisational factors - Perceived innovation characteristics DV: - IT diffusion	• Users draw upon a wider range of perceived characteristics of innovation during the early stage of adoption and reduce their focus to commutability and relative advantage during later stages.
Chwelos et al. (2001)	EDI	Organisation	Survey questionnaire	IV: - Readiness - Perceived benefits - External pressure DV: - Intent to adopt EDI	• All three determinants were found to be significant predictors of intent to adopt EDI technologies. External pressure and readiness were more important than perceived benefits.
Kuan and Chau (2001)	EDI	Organisation	Survey questionnaire	IV: - Perceived direct benefits - Perceived indirect benefits - Perceived financial cost - Perceived technical competence - Perceived industry pressure - Perceived government pressure DV: - EDI Adoption	• The study finds that direct benefits are perceived to be higher by small firms who adopt EDI than by non-adopter firms. On the other hand, indirect benefits are not perceived differently by either adopter firms or non-adopter firms. • Adopter firms perceive lower financial costs and higher technical competence than non-adopter firms do. • Adopter firms perceive higher government pressure but lower industry pressure than non-adopter firms do.

Table 3.3 (cont.)					
Source	**Study object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**
Mehrtens et al. (2001)	Internet	Organisation	Case studies	<u>IV:</u> - Perceived benefits - Organisational readiness - IT knowledge - External pressure <u>DV:</u> Internet adoption	• Perceived benefits, organisational readiness, and external pressure significantly affect iInternet adoption by small firms. • There are both similarities and differences between internet adoption and EDI adoption in small firms. • High penetration level is important for the success of EDI and government. EDI vendors and IT vendors should consider developing appropriate strategies and plans to promote the adoption of EDI among organisations.
Mirchandani and Motwani (2001)	Electronic commerce (e-commerce)	Organisation	Structured interviews	<u>IV:</u> - Relative advantage - Compatibility - Time required to plan and implement the IS - Dependence on information - Competition - Employees' IS knowledge - Financial cost - CEO's enthusiasm toward IS <u>DV:</u> Adoption of electronic commerce	• Many factors were found to differentiate between adopters and non-adopters of electronic commerce. These included: enthusiasm of the top manager/CEO toward electronic commerce, compatibility of e-commerce with the work of the company, perceived relative advantage, and knowledge of the company's employees about computers.

Table 3.3 (cont.)					
Source	**Study object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**
Petroni and Rizzi(2001)	Materials Requirements Planning (MRP)	Organisation	Survey questionnaire	IV: - Analysis of benefits - Feasibility - Organisational Willingness - Evaluation - Awareness DV: MRP adoption process	• Analysis of benefits, organisational willingness and positive evaluation of the technology are all significant stages of the adoption process. • Awareness of the MRP technology was not significant and therefore does not contribute to the adoption process. Moreover, being aware of the time needed and the technical constraints (feasibility) was also not significant.
Raymond (2001)	E-commerce	Organisation	Survey questionnaire	IV: - Perceived benefits - Attributes of EC technology - Type of ownership - Nature of business - Owner/manager experience - Education level - Marketing strategy - partners influence - environmental uncertainty DV: - Assimilation of e-commerce	• Informational and transactional implementations are determined by the environmental context (business partners' influence and environmental uncertainty). • Strategic implementation is determined by the travel agencies' marketing strategy (in terms of distribution and communication),the organisational context (type of ownership, nature of business), and the characteristics of electronic commerce (perceived advantages and technology attributes).

Table 3.3 (cont.)					
Source	**Study object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**

Chau and Tam (2000)	Open systems	Organisation	Survey questionnaire	<u>IV:</u> - Benefits
				    - Migration cost
				    - Satisfaction level with existing computing systems
				    - Market uncertainty
				    - IT human resource availability
				    - Degree of formalisation
				
				<u>DV:</u> Open systems adoption decision
					• IT human resource availability was found to be a significant positive factor in the adoption decision.
					• Migration costs had an impact on the decision to adopt open systems.
					• An organisation is less likely to adopt the new technology, unless the existing system is unsatisfactory.

Cengalur-Smith and Duchessi (1999)	Client-server systems	Organisation	Survey questionnaire	<u>IV:</u> - Market position
				    - Structure and culture
				    - Size
				    - Migration strategy
				    - Scope of system
				    - Scale of system
				    - Cost of system
				<u>DV:</u> - Initiation and adoption process
					• An organisation's market position, its migration strategy, and the system's scope and scale have a significant effect on the initiation and adoption process of client-server systems.

Premkumar and Roberts (1999)	Information & communication technologies (ICTs)	Organisation	Survey questionnaire	<u>IV:</u> - Perceived Benefits
				    - Cost-effectiveness
				    - Complexity
				    - Compatibility
				    - Top management support
				    - Size
				    - IT Exposure
				    -Competitive pressure
				    - External Support
				    - Vertical Linkages
				
				<u>DV:</u> - Adoption of ICTs
					• Relative advantage, top management support, organisational size, external pressure and competitive pressure are important determinants of ICTs adoption.

Source	Study object	Unit of analysis	Methodology used	Explanatory variables	Major findings
Fink (1998)	Information technology (IT)	Organisation	Survey questionnaire	<u>IV</u>: - IT benefits - IT availability - Organisational culture - IT expertise - Internal resources - IT implementation - IT selection - External Environment - Outside support - External resources <u>DV</u>: - IT adoption	• The positive attitude toward the use of IT is a dominant factor in shaping organisation culture. • Top management support and IT expertise are important determinants of IT adoption • The need to stay competitive is the major requirement for successful IT adoption.
Larose and Hoag (1996)	Internet	Organisation	Survey questionnaire	<u>IV</u>: - Innovation characteristics - Size - Sector - Top management support - In-house champion - Innovation cluster <u>DV</u>: Adoption/non-adoption of the Internet	• Internet adoption is related to the adoption of related clusters of innovations and innovation clusters were superior predictors compared to organisational innovativeness and innovation characteristics.
Gatian et al. (1995)	Strategic information system (SIS)	Organisation	Survey questionnaire	<u>IV</u>: - Innovative climate - Investment strategy <u>DV</u>: Implementation of SIS	• The organisational innovation climate significantly affects the aggressiveness of the firm's strategy for investment in information technology, the perceived success of investments in SIS, and the involvement of end-users in application development. • Top management support is critical in SIS success.

Table 3.3 (cont.)

Source	Study object	Unit of analysis	Methodology used	Explanatory variables	Major findings
Table 3.3 (cont.)					

Thong and Yap (1995)	Information Technology (IT)	Organisation	Survey questionnaire	IV: - Size
				   - Competitiveness
				   - Information intensity
				   - CEO attitude
				   - CEO innovativeness
				   - CEO knowledge of IT
				
				DV: IT adoption
					• CEO characteristics are important factors affecting IT adoption in organisations. Small firms are more likely to adopt IT when the CEOs are more innovative, have a positive attitude towards IT adoption, and possess greater IT knowledge.
					• Competitiveness in the environment and information intensity do not significantly influence the adoption of information technology.

Brancheau and Wetherbe (1990)	Spreadsheet Software	Individual	Survey questionnaire	IV: - Communication channel
				   - Innovativeness
				   - Year of adoption
				   - Adoption decision stage
				
				DV: - Four adoption stage: knowledge, persuasion, decision and implementation
					• Early adopters were younger and more highly educated. Interpersonal communication channels were dominant in all adoption stages.
					• Earlier adopters of spreadsheet software were younger, more highly educated, more familiar with mass media and more involved in interpersonal communication.
					• Interpersonal channels of communication were dominant in all adoption stages.
					• IS departments played a minor role in the diffusion process.

Table 3.3 (cont.)					
Source	**Study object**	**Unit of analysis**	**Methodology used**	**Explanatory variables**	**Major findings**
Cooper and Zmud (1990)	Material requirements planning (MRP)	Organisation	Survey questionnaire	IV: - Task characteristic - Technology characteristics DV: IT adoption and infusion	• Task-technology compatibility is a major factor in explaining MRP adoption.
Huff and Munro (1989)	Microcomputers	Individual	Survey questionnaire	IV:- Perceived innovation characteristics DV: Adoption and implementation	• Microcomputers diffused quickly because of favourable perceived characteristics. • Management of the process of information technology assessment and adoption is of critical importance to organisations.

Leonard-Barton, and Deschamps (1988)	expert system	Individual	Survey questionnaire	IV: - Individual characteristics
				    - Innovativeness
				    - Job-determined importance
				    - Task subjective importance
				    - Task related skill
				    - Software use skills
				    - Sales performance
				    - Managerial influence
				    - Management support
				    - Managerial urging
				
				DV: Extent of the current use
					• Management directives are mediated by individual characteristics in their relationship to implementation of a new technology.

Zmud (1982)	Software practices	Individual	Survey questionnaire	IV: - Centralisation
				    -Formulisation
				    - Innovation type
				    - Technological administrative
				    - Innovation capabilities
				
				DV: Initiation, adoption and implementation
					• Centralisation is positively associated with initiation of administrative innovations, while formulisation is positively correlated with the adoption of technical innovations.

3.5 Attributes of the innovation

Much of the early research stresses the need to understand how potential users perceive the innovation (Rogers, 1995; Damanpour, 1987; Hag, 1987; Tornatzky and Klein, 1982; Moch and Morse, 1977). The perceived attributes of an innovation are important background factors for introducing IT and also are important aspects of the explanation of the rate and pattern of adoption of an innovation (Rogers, 1995).

Downs and Mohr (1979) stated that at the organisational level, it is necessary to make a distinction between innovation 'primary attributes' and 'secondary attributes'. Downs and Mohr (1979) concisely explain the usage of these terms and note that ''secondary qualities'' are those which are perceived by the senses, and so may be differently estimated by different percipients, such as the perception of cost, while ''primary qualities'' are those which are essential to the object or substance and so are inherent in it, whether they are perceived or not. Examples of primary attributes include actual cost, radicalness, and physical properties. Secondary attributes are believed to vary according to the subject's perception of the object and are more likely than primary attributes to shed light on the adoption factors and impacts of technological innovations (Damanpour and Schneider, 2009; Wilson et al., 1999; Moore and Benbasat, 1991). Downs and Mohr (1979) further note that while the innovation-attributes research has focused on both primary and secondary attributes of innovations, it fails to relate the distinctions and relative importance between the two. Thus, the failure to distinguish between the primary and secondary characteristics created the inconsistency in the findings of innovation studies (Downs and Mohr, 1979). However, based on the critique by Downs and Mohr (1979), Tornatzky and Klein (1982) argued that differentiating primary from secondary attributes is itself subjective and perceptually based. Subsequently, Tomatzky and Fleischer (1990) suggest that innovation attributes are "useful starting point(s) for understanding innovation" (133). This latter perspective is adopted in this research.

It is believed that, although many researchers in the past have proposed and examined innovation attributes (Damanpour, 1987; Hag, 1987; Tornatzky and Klein, 1982; Moch and Morse, 1977), no accepted list of attributes has emerged (Wolfe, 1994; Wilson et al., 1999). Rogers and Shoemaker (1971), through a synthesis of several previous studies examining adoption behaviours, identified several attributes of an innovation that explain 49–87% of the variance in the rate of adoption of new technology.

According to Rogers and Shoemaker (1971), these characteristics include relative advantage, compatibility, trialability, complexity, and observability. Since the emergence of these initial attributes in the literature, an expanded stream of attributes and characteristics of innovation has evolved. For example, Zaltman et al. (1973) extended Rogers and Shoemaker's (1971) list of five attributes to a list of 21 attributes of innovation. Moreover, drawing upon information technology literature and refining the work of Rogers and Shoemaker (1971) and others, Moore and Benbasat (1991) expanded the innovation characteristics set and developed an instrument of seven constructs (relative advantage, ease of use, compatibility, image, result demonstrability, visibility, and trialability) to measure the perceived characteristics of using an innovation. Other typologies and attributes have appeared since then (e.g. Agarwal and Prasad, 1997). Wolfe (1994) urges researchers to make a conscious effort to specify the attributes of the innovations they investigate in order to contribute much to the generalisability of a particular study. The author concludes that "the lack of a broadly accepted typology of attributes is not a justification for ignoring the characteristics of innovations one studies" (Wolfe, 1994: 418).

Recent research for IS innovations, in general, and Internet-based innovations, such as B2B e-marketplace and e-commerce, in particular, has focused on the consideration of innovation attributes such as relative advantage, compatibility and cost (Zhu et al. 2006a; Premkumar and Roberts, 1999; Tornatzky and Klein, 1982). A meta-analysis by Tornatzky and Klein (1982) identified ten characteristics which had been addressed the most frequently in the 105 articles they reviewed. These included the five characteristics identified above by Rogers and Shoemaker (1971) plus cost, communicability, divisibility, profitability, and social approval. Among them, relative advantage, compatibility and costs were found to be the most frequently identified factors for innovation diffusion among organisations (Tornatzky and Klein, 1982).

According to Hadaya (2008), firms will be more inclined to adopt and use electronic intermediaries that provide services of high quality and are easy to use with numerous functionalities; they further note that, evidently, firms will also be more willing to use electronic intermediaries that have the right technological competencies to develop. Moore and Benbasat (1991) noted that in studying the individual level adoption of an information technology (IT) innovation within an organisation, cost did not seem to be an appropriate

characteristic to study. However, the authors suggest that issues related to cost are most likely addressed at the organisational level. Therefore, it was decided to consider this characteristic in the study.

The innovation literature has shown that compatibility is an important factor to explain innovation usage by organisations (Zhu et al. 2006a; Zhu et al., 2006c, Cooper and Zmud, 1990). Compatibility is the degree to which potential adopters feel that the innovation is consistent with their existing values and practices. The adoption of e-business requires firms to transform traditional systems heavily dependent on physical processes and paper-based work procedures to those that rely on computers and modern technologies and may even involve the reengineering of the entire value chain (Lin and Lin, 2008; Zhu et al., 2006c).

Researchers have also identified that the degree of perceived risk of the technology could also affect the rate of adoption of the technology. Where risk was perceived to be high, then adopters would be less willing to adopt the technology and its application (Shoemarker and Shoaf, 1975). Further, the greater the risk tendencies are, the shorter the rate of diffusion of a typical innovation (Shoemaker and Shoaf, 1975). Perceived security risk represents a unique characteristic of e-business (Zhu et al., 2006a) because e-business technologies are primarily based on the Internet in which the guarantee of the security of information flow is the important concern in the adoption decision among organisations (Wu and Chuang, 2009). Thus, this makes security issues particularly significant, and the failure to provide security would retard the further usage of e-business among organisations (Jones et al., 2000)

Lastly, language and content related barriers have become an issue in the adoption of Internet technologies as the Internet is typically in English and mostly text based (De Boer and Walbeek 1999; Palmer 2000). In fact, it is believed that non-English speaking nations find difficulties in accessing English internet content. Salman (2004) argues that these content related barriers need to be seriously addressed.

3.5.1 Relative advantage

Relative advantage has been studied very extensively in past research and it is found to be a key variable emerging consistently in practically all studies associated with adoption of innovations (e.g. Kuan and Chau 2001; Wilson et al.,1999; Moore and Benbasat,1991;

Tornatzky and Klein, 1982). In fact, technological diffusion is primarily viewed in terms of benefit: the higher the perceived profit from an innovation, the faster adoption will occur.

Relative advantage refers to the expected benefits and the usefulness arising from e-business applications in comparison to other applications (Rogers, 1995). According to Moore and Benbasat (1991), this construct is similar to the notion of perceived usefulness (PU) in the technology acceptance model (TAM) (Davis et al., 1989), in which usefulness is defined as the user's "subjective probability that using a specific application system will increase his or her job performance within an organisational context"(p.985). In fact, the relative advantage has an influence on the rate of adoption of the innovation (Rogers, 1995).

The degree of relative advantage can be measured by technical factors, economic factors or sociological factors such as economic profitability or conveying social prestige. It is to be noted that relative advantage has been expressed in several ways, such as economic profitability, social benefit, and enhanced status of the organisation in its industry or among its clients (Damanpour and Schneider, 2009; Schneider 2007; Nystrom et al., 2002; Rogers 1995; Tornatzky and Klein; 1982). Rogers (1983) identified several sub-dimensions of relative advantage; namely, degree of economic profitability, low initial cost, a decrease in discomfort, a saving in time and effort, and the immediacy of the reward. These sub-dimensions are directly related to the perceptions of an adopter about an innovation's contribution to potential organisational performance (Tabak and Barr, 1998)

Afuah and Tucci (2001) suggest that businesses adopt new technologies to reinforce an existing competitive advantage, surpass existing competitors, deter new competition, or to improve profit. Moreover, when an IS innovation is perceived to offer comparatively greater benefits over the firm's current practices, it is more likely to be adopted and the firm would begin the trial stage (Lee et al., 2004). In addition, Thong and Yap (1995) reported that the formation of a favourable or unfavourable attitude towards an innovation's attributes takes place before a decision to adopt is made.

Premkumar and Roberts (1999) found in their study that relative advantage is the only significant variable to discriminate adopters from non-adopters in all four types of communication technologies (e-mail, online data access, internet access and EDI), because adopters were aware of the many benefits but non-adopters were not. In fact, adopting

organisations' perceptions of an innovation's relative advantage have been shown to be different from the perceptions of non-adopting organisations (Moore and Benbasat, 1991). Similarly, Iacovou et al. (1995) assert that the anticipated list of benefits determined by non-adopters significantly differs from the list of obtained benefits described by adopters (Iacovou et al, 1995).

3.5.2 Compatibility

In the innovation literature, compatibility of the innovation has been shown to be an important factor in influencing the rate of adoption of the innovation and explaining innovation usage by organisations (Cooper and Zmud, 1990; Zmud, 1982). Premkumar (2003) found compatibility to be an important determinant of IS innovations' adoption. Generally speaking, the adoption of new technologies can bring significant changes to the work practices of businesses, and resistance to change is a normal organisational reaction (Premkumar and Roberts, 1999).

Compatibility of new technology with the firm's existing technology influences the adoption process. Lin and Lin (2008) emphasise that compatibility may significantly influence initial e-business adoption, but not the extent of implementation because e-business adopting firms may have already made requisite organisational changes, reducing the influence of organisational compatibility in distinguishing different levels of e-business diffusion. However, their study did not find compatibility to significantly influence e-business diffusion (Lin and Lin, 2008). Thus, it can be conceived that when firms perceive e-commerce as compatible with existing beliefs and work practices, they are more likely to be positively predisposed to promoting its adoption and implementation.

3.5.3 Cost

Innovation adoption costs have widely been examined because cost is a key component of the efficiency dimension of organisational performance (Damanpour and Schneider, 2009; Tornatzky and Klein, 1982; Wolfe, 1994). Literature concerned with the diffusion of innovation suggests that costs will hinder a firm's decision to use and implement technology — the higher the cost, the slower diffusion will occur (Downs and Mohr, 1976; Rogers, 1995; Schneider, 2007; Tornatzky and Klein, 1982). The IS literature also provides such evidence

to inter-organisational information systems (Williamson, 2007), EDI (Premkumar et al., 1997), e-commerce (Kshetri, 2007), and e-business (Zhu et al., 2006a).

A study by Walczuch et al. (2000) identified high cost as the most important reason for small firms not to use the Internet in their business. In a more recent study, Alam (2009) empirically examines the decision of small to medium-sized enterprises (SMEs) to adopt the Internet in their businesses using a survey of 465 sampled SMEs from the Klan valley area in Malaysia. Their results suggest that cost of adoption has significant relationships with internet adoption. It is noteworthy that, in developing countries, ICT access charges, such as fees to access the Internet, costs for telephone calls to stay connected to the Internet and Internet service providers (ISPs) subscription fees, are prohibitively expensive (Kshetri, 2007). This may significantly set an overwhelming barrier to e-business adoption by organisations in these countries.

It is believed that the higher the level of concern on costs, the lower the ICT-intensity is in organisations (Zhu et al., 2006a). Although considerable work has been done on cost and the adoption of Internet technologies, little research explores links between cost and the level of e-commerce technologies within firms.

3.5.4 Security concern

One new concern found in the Internet literature (Larose and Hoag, 1996) is the security issue, a global concern that companies around the world must account for whilst engaged in electronic trading (Clear, 2007). In fact, security risks are emerging as a unique feature of e-business. Recent research for Internet-based innovation, such as B2B e-marketplace and e-business, has focused on the consideration of security as innovation attribute (Wu and Chuang, 2009; Zhu et al., 2006a).

As noted by Clear (2007), there is a dearth of research that provides a general and deep discussion on security risks in the context of e-commerce adoption. In a similar vein, Zhu et al. (2006a) argue that, although few studies have examined it, security concerns deserve special attention in the context of e-commerce. Figure 3.2 illustrates some security risks related to the Internet such as credit card fraud, hacking or unauthorized software being run.

Khalifa et al., (1999) note that much of the risk associated with the adoption of e-commerce centres around perceived risk in the form of security. In fact, security concerns may retard e-commerce diffusion, because if parties involved in on-line transactions have severe concerns about privacy and fraud on the Internet, they will be reluctant to participate in on-line transactions (Zhu et al., 2006a: 604). In addition, if the Internet does not serve as a secure platform for sharing business data, potential adopters would perceive the exchanging of important business information, such as data about product design, key technology, customer accounts, payments and financial documents as being a high risk activity (Stewart and Segars, 2002).

| Figure 3.2 | Security Risks of the Internet |
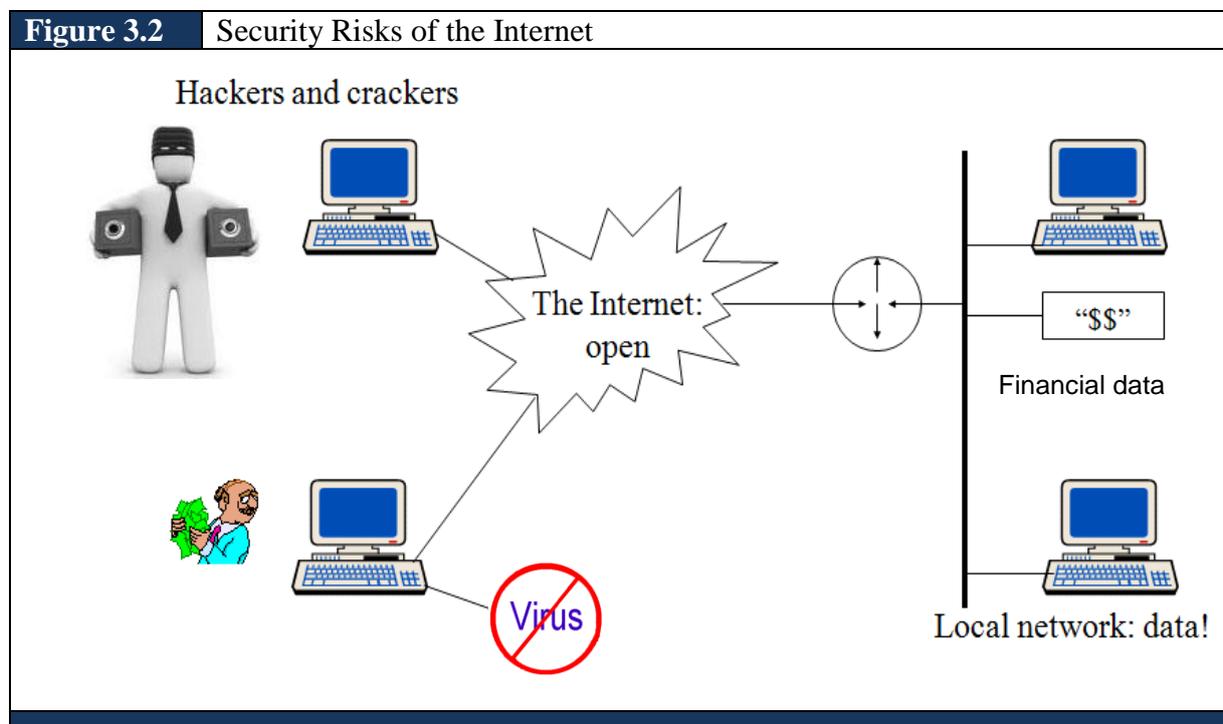
Source: Current study

3.5.5 Language concern

Recent advancements in information and communication technologies (ICTs) seem to be of minor importance to many cultures because of language differences. It is believed that such differences can shape a nation's dependence on technology itself, and is the reason certain cultures are unlikely to adopt such recent advancements such as wireless communications and web-specific e-commerce technologies (Beekhuyzen et al., 2005). Accordingly, similar divides are evident across different organisation settings.

Subsequently, Khasawneh and Ibrahim (2008) note that while most ICT applications are innovated and introduced under the developed nation's language, people in these countries can easily adopt the new technology with no language barrier. However, people in developing countries use different languages than those used in developed countries. This scenario inadvertently could create challenges in the adoption and innovation of the new technology (Khasawneh and Ibrahim, 2008).

A study by PriceWaterHouseCoopers, cited by Scupola (2003), found that an important factor that inhibited many Chinese SMEs from adopting the Internet and certain technology was the English language barrier. Further, Beekhuyzen et al. (2005) note that language barriers will continue to be a large adoption impediment, and they suggest that this barrier can be overcome with the support of multilingual applications (Beekhuyzen et al., 2005). However, Alam (2009) empirically examines the decision of SMEs to adopt the Internet in their businesses using a survey of 465 sampled SMEs from the Klan valley area in Malaysia. Their study finds a non-significant relationship between language and Internet adoption among SMEs.

The next section reviews the literature regarding organisational factors which have been correlated to the adoption decision and/or continued use of information technology innovations.

3.6 Organisational context effects

Much is known about organisations and much remains to be discovered (Bedeian, 1986). While innovation attributes play an undeniably important role in determining organisational innovation adoption, the study of organisations is also important and is an emerging discipline (Bedeian, 1986). Damanpour (1987) found organisational variables to be particularly important in predicting technological innovation and innovations which produce changes in products and/or services. In fact, an organisation is the primary context for innovation and indeed innovation cannot be studied independently of the organisation that adopts and assimilate it (Kimberly, 1987). Moreover, innovation and organisational behaviour research have been used to theoretically explain the relationship between organisational factors and technology adoption (Premkumar et al., 1997).

It is believed that, with the rapid transformation of economies, the impact of globalisation, and increasing multinational business cooperation, the organisational context is more important today than ever before, as it has a crucial effect upon an organisation's performance and ability to adopt changes (Wilkins and Ouchi, 1983). These changes include fast technological changes, change in industries and markets, deregulation, the global economy, increased organisational complexity, and new business models (Hagberg Consulting Group, 2004). Cameron and Quinn (1999) argue that organisational context is important because plans for any changes adopted without including organisational determinants normally would have unforeseen and usually negative consequences.

Many studies report that one of the most common causes given for failure of most planned organisational changes, mergers and acquisitions, and the adopting of new technologies is neglect of the impact of organisational determinants (Abdul Rashid et al., 2004; Al-Mashari and Zairi, 2000; Fey and Denison, 2003; Frotaine and Richardson, 2003). In fact, enough progress has been made; however, more research is needed to offer some indication of the more critical variables and to suggest various areas which might be usefully investigated to improve our understanding of successful organisational innovation adoption.

3.6.1 Information technology (IT) readiness

Information technology (IT) readiness signifies coherent IT-related components that are integrated to fulfil business objectives and to transmit information for more effective decision making (Morris and Strickland, 2009; King, 2002). In fact, advancements in IT have significantly improved the extent of internal and external organisational information sharing (Sanders and Premus, 2005).

The important role of IT readiness for innovation diffusion has been examined by empirical studies (Hsu et al., 2006; Zhu et al., 2003, 2006c). It is believed that organisational IT readiness has the overall potential to provide a significant competitive advantage to firms and can be a differentiating factor in terms of company performance (Kathuria et al., 1999; Ives and Jarvenpaa, 1991). To remain competitive, companies are investing millions of dollars in technologies such as Enterprise Resource Planning (ERP) systems, network software, and e-business capabilities. Companies with sophisticated IT capabilities undoubtedly focus on a

specific set of competitive priorities, different from their less technologically sophisticated counterparts (Sanders and Premus, 2002).

The literature suggests that information technology (IT) readiness operates on two basic components; namely, technical readiness (i.e. technological infrastructure) and personnel IT knowledge (i.e. human resources that are precursors to the adoption of information systems innovation) (Patrakosol and Lee 2009; Zhu and Kraemer, 2005; Wang and Tsai, 2002; Bharadwaj, 2000; Mata et al., 1995, Swatman and Swatman, 1991)

Melville et al. (2004) and Wheeler (2002) point out that IT readiness is a source of efficiency. In fact, it is believed that, because of the lack of skill and the technical knowledge required in the development process, many organisations delay innovation adoption, and tend to wait until they have sufficient technical expertise (Hung et al., 2010). Further, studies have found that organisational IT readiness positively affects firms' adoption of different types of technological innovations such as EDI (Iacovou et al., 1995), Internet-based technologies (Chang and Chen, 2005) and B-to-B e-marketplaces (Stockdale and Standing, 2004).

The literature asserted that employees' IT knowledge or skills in organisations are critical for successful information technology adoption (Kwon and Zmud, 1987). Indeed, employees with more knowledge of technological innovation are more likely to adopt and use more IS innovation (Davis, 1989; Rose and Straub, 1998; Tower et al., 1994). Mehrtens et al. (2001) state that, firms with high levels of IT knowledge are more likely to adopt Internet technologies. Furthermore, Wang and Tsai (2002) stress that firms need to acquire the technical skills and knowledge related to the Internet in order to reduce costs and improve efficiency. Obviously, as noted by Mavondo and Farrell (2003), the perceived barriers to innovation adoption are financial, market demand and, in particular, skilled labour. It is commonly believed that e-commerce is a complex technological innovation whose successful adoption requires technical know-how (McGowan and Madey, 1998). Montealegre (1998) notes that to implement IT, managers in less-developed countries (LDCs) would have to develop/acquire the IT resources that are needed by the new systems and that are not readily provided by the national context. Indeed, high-skilled workers can make ICT investment and adoption easier because their higher educational level enhances ICT usage and impacts (Bayo-Moriones and Lera-López, 2007)

3.6.2 Management team support

Top management support is common prescription associated with successful innovation (Tidd et al., 2001). Moreover, management advocacy is found to be a key requisite for successful implementation and adoption of any technology (Lederer and Mendelow, 1988). Management participation refers to the extent to which executive management explicitly encourage the use of new innovation and technology (Wattal et al., 2009). Top management vision, commitment, and participation have emerged as key variables in past research on implementation and adoption success in IS (Sanders and Courtney, 1985) and in innovation adoption literatures (Lee and Kim, 2007; Ramamurthy et al., 1999; Premkumar and Ramamurthy, 1995; Zmud, 1984). Innovation literature suggests that top management advocacy is positively related to the adoption of new technologies in organisations (Gatignon and Robertson, 1989; Tornatzky and Klein, 1982).

Empirical studies in information system (IS) implementation have demonstrated that adoption success is affected by top management support for an adoption project (Caldeira and Ward, 2003; Akkermans and van Helden, 2002; Wixom and Watson, 2001). Moreover, top management support has a positive effect on innovation adoption (Ives and Olson, 1984; Kwon and Zmud, 1987). Rai and Patnayakuni (1996) found that top management participation has a positive effect on CASE tools adoption behaviour in information system departments. Cho (2010) asserts that if senior executives support new information systems such as electronic document management systems (EDMS), they should establish some reward systems to encourage staff to use the new system; if this is implemented, performance of the whole company would increase as individual outcome improves. Moreover, he concludes that top management advocacy is the most important factor that influences the adoption of new technology.

Top management involvement is an important factor associated with the effectiveness of an information system adoption. For example, Mahmood et al. (2001) identified that organisational support has a significant effect on system usage, which is an indicator for system effectiveness. In their study on the client/server system, Guimaraes and Igbaria (1997) identified that top management is an important factor affecting user satisfaction, usage, and IS impacts. Moreover, Baroudi et al. (1986) suggested that management support has a positive and direct effect on the use of microcomputers. Malhotra and Temponi (2010) note that top management support as well as executive participation in providing clear direction,

adequate monitoring, and feedback are required management metamorphoses for successful implementation of ERP. Zaltman et al. (1973) note that the attitudes organisational members have towards a technology are important and if top organisational echelons (managers, committees and boards) are motivated to innovate and/or have favorable attitudes toward the innovation, there is likely to be a positive attitude to implement the innovation and resources will be allocated for its acquisition, alteration and assimilation (Meyer and Goes, 1988). In sum, many researchers have found lack of commitment, especially by top executives, as one of the chief obstacles affecting IT implementations. The same problem is echoed in the e-commerce literature (Hartman et al., 2000; Marshall et al., 2000)

3.6.3 Organisational learning orientation

Since its introduction by Cangelosi and Dill (1965), the topic of organisational learning has received increasing interest from researchers and practitioners. This interest reflects the idea that firms need to develop progress for learning and improve their products and processes constantly in order to survive, prosper and adapt in the current competitive environment (Joe et al., 2009; Bapuji and Crossan, 2004; Vince, 2000; Crossan and Guatto, 1996; Bedeian, 1986). Bedeian (1986) notes that with the constant shifting of the larger environment, a high capacity for learning is a crucial requirement for the successful functioning of an organisation, and suggests that we must expand our understanding in this important area.

According to Crossan et al. (1999), organisational learning is a multilevel process that begins with individual learning, which then leads to group learning and, finally, to continuous transformation of the organisation in a direction that is increasingly satisfying to its stakeholders (Dixon, 1999). Crossan et al. (1999) further elaborated that, while insight and innovative ideas occur to individuals - not organisations - knowledge generated by the individual does not come to bear on the organisation independently. Individual ideas are shared, common meaning developed, relationships become structured, and some of the individual learning and collective understandings developed by groups become institutionalised as organisation artefacts (Crossan et al., 1999).

A widely accepted definition of organisational learning has been put forward wherein definitions vary greatly in terms of the breadth of ideas covered (Tsang, 1997). Organisation learning has been examined from a variety of disciplinary perspectives (Tsang, 1997). Table 3.4 illustrates the most common definitions for organisational learning. Drawing on Hult's

(1998) work, we define learning orientation as the degree to which an organisation creates, acquires, shares, and transfers knowledge and modifies its behaviour to reflect new knowledge and insights. In fact, learning orientation is believed to promote innovation (Hurley and Hult, 1998), and learning organisations are more likely to be skilled at knowledge generation, acquisition, and transfer; more importantly, they also modify their behaviour to reflect new knowledge (Garvin 1993). Salavou (2005) found that learning orientation is a key organisational capability in developing newer and more unique products and services for the market. Moreover, Lee and Tsai (2005) showed that learning orientation has an impact on business performance.

Table 3.4	Organisational learning definitions
Author(s)	**Definition**
Vera and Crossan (2003)	The continually evolving knowledge stored in individuals, groups, and nonhuman repositories.
Robey et al (2000)	An organisational process, both intentional and unintentional that enables the acquisition of, access to, and revision of organisational memory, thereby providing direction to organisational action.
Dibella et al. (1996)	The organisational capability, through embedded processes, to maintain or improve performance based on experience.
Slater and Narver (1995)	The development of new knowledge or insights that have the potential to influence behaviour.
Sinkula (1994)	The means by which knowledge is preserved so that it can be used by individuals other than its progenitor.
Huber (1991)	A change in the range of an organisation's potential behaviours which may or may not contribute to enhanced effectiveness.
Cohen and Levinthal (1990).	The ability to evaluate, adopt, exploit external knowledge, and, more importantly, the ability to recognise the value of new information, assimilate it, and apply it to commercial ends.
Fiol and Lyles (1985)	The process of improving actions through better knowledge and understanding.
Argyris and Schon (1978)	A process by which organisational members detect gaps or errors and correct them by embedding the result and actions of their inquiry into organisational maps and images.
Cyert and March (1963)	A process by which an organisation as a collective group of individuals, learns through interaction with their environment.

In recent years, the generalisability of management theories developed in one culture or nation to other cultures and nations has been seriously questioned (Hofstede, 1980; Austin, 1990). Tsang (1997) argued that organisational learning researchers are unaware of the cultural constraints of their theories in which most of these researchers simply put up an ideal model and explain the way to achieve the ideal without considering cultural issues. An example demonstrating the importance of culture is the empirical study conducted by

Sullivan and Nonaka (1986) in which senior Japanese executives showed a significantly stronger learning orientation than the Americans did. The implication is that organisation learning studies should take into account cultural differences. Hence, without empirical backup, prescriptive generalisations across cultures are dangerous (Tsang, 1997).

Attewell (1992) places organisational learning at the center of his theory by focusing on institutional mechanisms that lower the burden of organisational learning surrounding adoption.[11] Moreover, Attewell (1992) argues that many organisations will defer adoption until knowledge barriers are sufficiently lowered. Fichman and Kemerer's (1997) empirical study found significant association between organisational learning and innovation process. They note that organisations that are best positioned, from a structural standpoint, to accommodate the burden of organisational learning surrounding complex process technologies are more likely to initiate and sustain the assimilation of these technologies.

Recent research conducted by Cegarra-Navarroa et al. (2007) reveals that the success of e-business depends on a company's ability to develop a spirit of learning and sharing that could feed the company with customer knowledge and development solutions and, more importantly, could offer new products and services through e-commerce. The authors suggested that organisational learning provides insights for helping e-commerce to achieve a competitive advantage (Cegarra-Navarroa et al., 2007). Similarly, Lin (2007) suggests that to achieve successful e-commerce implementation, managers should pay more attention to the development of a climate where learning is valued and should establish mechanisms that facilitate effective learning environments. However, Lin (2007) notes that the importance of organisational learning orientation as a facilitator that influences the extent of e-commerce diffusion has seldom been addressed.

Tsang (1997) argued that researchers should take into account an organisation's starting point or the level of technology use. Subsequently, the empirical study conducted by Lin and Lee (2005) reveals significant associations between organisational learning and the level of e-commerce systems adoption. The authors found that firms with greater levels of e-business knowledge and training activities are found to attain higher levels of e-business systems adoption.

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[11] These mechanisms include: mediating institutions that specialize in acquiring and propagating knowledge (such as consulting and service firms); special buyer-supplier relationships structured around learning (such as user groups); adoption by end-users as a service; and technology simplification (Fichman and Kemerer, 1997).

3.6.4 Receptivity toward change

The emergence of new innovations like e-commerce has created a quantum leap in work flow and has led to a radical overhaul of existing ways of doing business. In fact, innovation is a means of changing an organisation, whether as a response to changes in its internal or external environment or as a pre-emptive action taken to influence an environment (Damanpour, 1991). Moreover, with the impending move toward globalisation and liberalisation of markets, organisations have to be prepared to cope with the rapid changes in business dynamics (Abdul Rashid et al., 2004).

Receptiveness of organisations to change has been found to be a significant factor for achieving success in technical innovations (Leonard-Barton and Deschamps, 1988; Zmud, 1984). Moreover, empirical studies have found that receptivity toward change is a predictor of innovation diffusion and assimilation (Rymound, 2001; Fichman and Kemerer, 1997; Grover et al., 1997; Damanpour, 1991). Receptivity toward change refers to the extent to which organisational members favour change (Damanpour, 1991), recognise the legitimacy of such change (Huy, 1999) and oppose organisational inertia (Francalanci and Morabito, 2008). Analogous to this definition, Petroni and Rizzi (2001) and Hurley and Hult (1998) defined organisational receptiveness or willingness as organisational members' openness towards the technology and its application. Moreover, Deshpandd et al. (1993) defined organisational receptivity toward change as the degree to which a firm deviates from existing practices in creating new products and/or processes.

Change is not a simple transformation that can be accomplished overnight. Its introduction must endure resistance from those clinging to old ways, and it must be cultivated within a firm rather than simply bought (or transferred) from the open marketplace or competitor (Menguc and Auh, 2006). Moreover, after considerable investments of time and resources, many innovations are often blocked, underused or misused by organisational members (Keen, 1981). Therefore, the general receptivity toward change held by an innovating organisation's actors has been found to be an important determinant of innovation success (Petroni and Rizzi, 2001; Dewar and Dutton, 1986; Zmud, 1984; Pierce and Delbecq, 1977). Petroni and Rizzi (2001) argue that one of the greatest barriers to implementing new technology is overcoming employees' resistance to organisational change. They note that it is important to consider the stages that must be passed through before adoption, as this will allow time to

develop strategies to alleviate some resistance. Indeed, positive attitude towards change is critical in developing the organisational ability to innovate (Francalanci and Morabito, 2008) and is also found to influence the outcome of investment decisions (Damanpour, 1991).

Resistance toward change of an organisation's members has been found to be also important, and organisational change literature has suggested it should be overcome (Cooper and Zmud, 1990). In fact, the resistance toward technological change is assumed to be negatively associated with the success of an innovation in an organisation. Effective implementation of IT depends on the organisation's vision of change, either by deliberate design or as an emergent phenomenon (Montealegre, 1998).

Receptivity toward change has been considered as a strategy in a change process wherein the primary mechanism for creating 'receptivity' is a corporate culture that captures the assumption and beliefs shared by members of the organisation and also embraces an ability to change (Armenakis et al., 1993; Johnson, 1992). Strategy scholars and chief executive officers (CEOs) seem to be in agreement that the effect of organisational culture on technical innovation strategy success is an important area for investigation (Gatian et al., 1995; Zahra and Pearce, 1992). In fact, receptivity to change requires the adoption of a new mindset or attitude that shapes a culture into one that is proactive and receptive to change, possibly increasing the likelihood of successful adoption of technological innovations as employee resistance would be lessened (Garrison, 2009). In fact, receptivity to change is critical because attitudes are difficult to change as people seek to maintain a state of affairs that is comfortable with what they have learned or know due to a fear of taking risks, intolerance of uncertainty, and, more importantly, the need to maintain tradition (Abdul Rashid et al., 2004). Firms that have high innovativeness, which is akin to an organisational culture that encourages employees to be innovative, are likely to adopt new technological innovations (Menguc and Auh (2006). Huang and Palvia (2001) note that the use of information technology innovation in developing countries faces challenges related to economic and cultural issues. Hence, the adoption may face strong resistance. This resistance may stem from an extensive perception that technological innovation degrades personal communications.

Following the theoretical underpinnings of the resource-based view of the firm (RBV), recent research has regarded organisational receptiveness as an organisational capability that is

embedded in the social structure and culture of the firm and that is also difficult to transplant from firm to firm or trade on the market, creating sources of competitive advantage (Garrison, 2009; Menguc and Auh; 2006; Srinivasan et al., 2002; Lado and Wilson, 1994). Garrison (2009) examines "organisational technological-sensing and response capabilities" as a determinant that may impact the early adoption of two technologies: Voice over Internet Protocol (VoIP) and open-source software. Further, he points out that technological resources alone are unlikely to provide organisations with sustained competitive advantage and, therefore, organisations need to develop organisational capabilities to better sense and respond to new technological developments ahead of their competitors in order to remain viable in today's technology-driven environment.

Menguc and Auh (2006) argued that receptiveness to innovation is a critical capability that will enhance a firm's performance. They elaborated that firms that possess high innovativeness will be able to leverage this to their advantage to improve firm performance. Receptivity to change implies a firm being proactive by exploring new opportunities rather than merely exploiting current strengths. Srinivasan et al. (2002) extended the RBV of the firm by investigating why some firms proactively adopt radical technologies whereas others do not. The researchers argued that "technology-response capability" is an organisation's willingness to respond to new technological information it senses in its environment that may affect organisational competitive posture. As Hult and Ketchen (2001) pointed out, receptivity to change contributes to a firm's positional advantage and, in turn, competitive advantage.

3.6.5 Strategic orientation

With the growth of information technology adoption, companies are asked to be more creative and unique to gain a better strategic position in the market (Koo et al., 2007). Moreover, organisations develop strategies to build competitive advantage in order to minimize the uncertainty arising from dependence on the environment for resources (Pfeffer and Salancik, 1978; Pfeffer, 1982). Generally speaking, successful exploitation of information technology (IT) requires having a well defined strategy for IT that links between an organisation's strategy and the technology that supports it. Also, it requires managing widespread ICT applications that are integrated and that facilitate flexible and adaptive behaviour on the part of the firm and its employees. Cao and Schniederjans (2004) note that

the link between the IS strategic orientation and business strategy determines performance success. In addition, strategic orientation may provide a source that helps firms build dynamic capabilities in fast changing environments (Zhou and Li, 2010). According to Montealegre (1998), the ability to develop an effective strategy for IT and organisation change requires a superior competence in understanding the forces shaping the environment and the interactions that exist among the business, organisation, and IT strategies.

The above discussion leads to the following question: what exactly is "strategic orientation"? Basically, strategic orientation is a kind of organisational framework or philosophy of how firms should interact with external environments to conduct business through a deeply rooted set of values and beliefs (Zhou and Li, 2010; Gatignon and Xuereb, 1997; Day, 1994). In fact, if strategic orientation is adopted and implemented, it could, through time, become culturally embedded in an organisation (Hunt and Morgan,1995).

Previous research has addressed strategic orientation from both behavioural and cultural perspectives (Homburg and Pflesser, 2000). The behavioural perspective focuses on the activities of firms that are associated with the generation and dissemination of, and responsiveness to, market intelligence (Kohli and Jaworski, 1990). The cultural perspective focuses on organisational beliefs and values that promote behaviours (Narver and Slater, 1990). Narver and Slater's (1990) study was the first to identify strategic orientation as the determinant of a company's profitability; they defined "strategic orientation" as the organisational culture that effectively and efficiently creates the proper behaviours for the continuous superior performance of its business (Narver and Slater, 1990).

The issues of strategic orientation have attracted considerable interest in both the management and marketing literature (Zhou and Li, 2010; Laforet; 2009; Gatignon and Xuereb, 1997; Cooper, 1994; Slater and Narver, 1994; Narver and Slater, 1990), and evidence is plentiful that strategic direction helps companies to adapt to customer needs and respond to competitor actions and, thus, results in superior performance (Zhou and Li, 2010; Zhou et al., 2007; Lee and Tsai, 2005; Gatignon and Xuereb, 1997; Narver and Slater, 1990). Laforet (2009) argues that the extent to which businesses innovate effectively would depend on their ability to plan ahead, to have a clear strategy and to manage strategically, which is reflected in companies being willing to learn as well as to innovate and to take risks.

Furthermore, Gordon (1991) argues that the business environment has become very competitive, necessitating firms to be strategically oriented.

It is worth emphasizing that strategic orientation reflects an outward-looking view of the fit between strategic choices and environment, shaping the organisational responses appropriate for environmental exigencies facing the organisation (Mavondo and Farrell, 2003); it also impacts the way firms acquire, allocate, and utilise resources (Zhou and Li, 2010). It has been argued that strategic orientation is positioned around the systematic and continuous gathering of information regarding target customer needs, competitor capabilities, and the use of this information to develop new processes and new products or service enduring superior customer value (Schindehutte et al., 2008; Hunt and Morgan, 1995).

It is commonly believed that strategic orientation is important to a firm's effectiveness, and it creates continuing performance improvements within the organisation (Laforet, 2009; Gatignon and Xuereb, 1997). Lee and Tsai (2005) showed that strategic orientation is associated with a company's innovativeness and has an effect on business performance. Their study was drawn from large Taiwanese manufacturing and service firms. Further, Mavondo and Farrell (2003) proposed a model which linked organisational culture, business environment, organisational strategy, functional strategies and their impact on a company's performance. The model was empirically tested with companies in the food manufacturing industry in Zimbabwe. In addition, the study suggested that strategic orientation has a significantly positive impact on the degree of innovation, and managers, who encouraged risk taking, were responsive to market needs and were more likely to be more effective in marketing, innovation and superior financial performance. Morgan and Strong (1998) studied strategic orientation in the context of medium and large firms and found that firms that continuously monitor customer and competitor environments tend to experience limited risk.

3.6.6 Decentralization Level

Decentralization refers to the degree to which decision making is pushed down to lower level managers and employees (Robbins, 1998). Decentralization is found to be another factor that is likely to be helpful in predicting the rate of innovation (Mohamed, 2002). This factor is derived from the organisational social structure theory (Hatch, 1997), which posits a

relationship between organisational structural characteristics and various measures of performance.

Previous research finds that ICT helps firms to decentralize and break down hierarchies in which ICT permits top management to communicate with bottom-layer workers without the need for mediation by middle managers (Bayo-Moriones and Lera-Lo´ pez, 2007; Pérez et al., 2005). It is accepted that a decentralisation structure pushes decision making to the lowest levels capable of making a rational decision, improving commitment, morale, involvement and motivation, and this will be positively related to the implementation of innovation (Saran et al., 2009). Research finds that pushing decision authority down the hierarchy creates a climate of trust and evokes a sense of responsibility on the part of organisational departments to translate that power into continuous improvement initiatives and innovative outcomes (Mohamed, 2002).

In the context of a developing country, Tarafdara and Vaidyab (2006) studied the challenges in the adoption of e-commerce technologies in India. Their study shows that if decision-making is decentralized, the inclination to adopt e-commerce in an organisation is high because there is a high degree of interaction between IS professionals and top management. Therefore, in decentralized organisations, if IS professionals are proactive about e-commerce adoption, then unfavourable attitudes of top management can be changed to favourable ones, over time (Tarafdara and Vaidyab, 2006).

3.6.7 Formalisation Level

Formalization reflects the degree of structure of rules and procedures in conducting organisational activities and is measured by rule manuals and job descriptions, leading to better coordination of actions and a singleness of purpose for effective technology adoption and implementation (Saran et al., 2009). Most studies on innovations have suggested that the formalization of the organisation is negatively related to the trail of innovations (Grover and Goslar, 1993; Hage and Aiken, 1970), but positively related to the adoption of innovations (Dewar and Dutton, 1986) and the implementation of innovations (Cooper and Zmud, 1990; McGowan, 1994). In fact, for generating ideas and problem solving, the organisation would unstructure itself, but for implementation the organisation needs a higher degree of coordination of action and the organisation could restructure itself into a more hierarchical

form, tightening up its lines somewhat (Zaltman et al., 1973). Kim and Lee (2008) assert that in organisations, once the innovation has crossed the adoption stage, formalization would be an asset for implementation, since it helps in delineation of authority and responsibility, reducing conflict of opinions and interests. Moreover, technology implementation requires a high degree of coordination of action; formal rules and established procedures add an element of structure to the organisation (Evan and Black, 1967; Zaltman et al., 1973).

Iyer et al. (2004) note that formulisation is unrelated to B2B e-commerce. Similarly, Yang et al. (2005) investigate the relationship between organisational characteristics, including firm size, formalization, centralization and industry type and enterprise information portal (EIP) adoption. Their study finds that the relationship between formalization and the adoption of EIP was not significant (Yang et al., 2005).

This next section reviews the literature regarding the environmental variables which have been correlated with adoption and diffusion of information technology innovation.

3.7 Environmental determinants

3.7.1 External pressure from customers, trading partners and competition

Organisations conduct activities within an environmental context. Innovation scholars have posited that the external environment provides opportunities (information, resources, technology) and constraints (regulation, restriction on capital or information) (Damanpour and Schneider, 2006). In business organisations, the structure of the market (competition, concentration) is considered the prominent environmental factor influencing technological product and process innovations. External pressure refers to influence from the organisational environment (Iacovou et al., 1995), and external pressure has a critical role in encouraging firms to adopt IT and Internet–based technologies. According to Hadaya (2008), Rueylin (2001), Premkumar et al. (1997) and Iacovou et al. (1995), organisations are likely to be induced to adopt and use e-commerce by external isomorphic pressures from competitors, trading partners and customers. In fact, the decision to use web services is influenced by the technology already adopted or rejected and by those related to partnerships that permit the manufacture, distribution and use of products and services. This is particularly true when adoption occurs within the same industry segment. Abrahamson (1991) found that previous adopting organisations may provide information about the costs and benefits of engaging in

the innovation that may provide an incentive for future adoption when decision makers are concerned about maintaining legitimacy.

Numerous studies have highlighted the role of competition intensity in the adoption literature (Zhu et al., 2003; Kowtha and Choon, 2001; Kuan and Chau, 2001; Mehrtens et al., 2001; Mirchandani and Motwani, 2001; Iacovou et al., 1995). Competitive pressure refers to the "the degree that the company is affected by competitors in the market" (Zhu et al. 2004, p. 24). In less-developed countries (LDCs), the competitive environment is more often shaped by the relationship between business and the government than by market forces. According to Montealegre (1998), the rules of the competitive game are often unclear and unstable, reflecting the underlying instability of the political and economic environments and the information imperfection of the markets. Moreover, in LDCs, government often exerts more influence over industries and organisations, controlling, for example, access to key resources and setting costs and prices (Montealegre, 1998).

According to Chengalur-Smith and Duchessi (1999), market leaders are motivated by technology's ability to increase productivity, reduce costs, and reduce cycle time through improved operations. Without competition the concern for efficiency is reduced (Thong and Yap, 1995; Dekimpe et al., 2000). Kimberly and Evanisko (1981) found that competition is correlated with the adoption of innovation, and organisations that are faced with competition encourage innovation adoption for competitive advantage. Lin and Lin (2008) point out that competitive pressure is a key determinant of e-business adoption in which e-business is expected to be adopted most successfully in highly competitive environments, and firms that are first-movers in deploying e-business have tended to derive the greatest advantages. Furthermore, Ottesen and Gronhaug (2004) reported a case of one successful Swedish company that operated in a turbulent environment. The study revealed that external factors such as suppliers, competitors and customers initiated the majority of the firm-environment interactions. Conversely, Thong (1999) concludes that the environmental characteristic of competition does not have any significant direct effect on the decision to adopt information system (IS). Moreover, Martins and Oliveira (2008) find that external pressure from a competitor did not have a significant impact on IT diffusion, and they note that it is possible that external pressure has an effect on initial adoption but not on the extent of use after adoption.

3.7.2 Regulatory environment support

Previous studies have identified that regulatory environment support is a critical driver of innovation adoption (Raymond, 1985; Premkumar and Roberts, 1999). In fact, as a particular government shows a clear commitment to the new technology, potential adopters would view the new technology more favourably and, hence, be more likely to adopt it (Yu-hui, 2008). Moreover, the literature suggests that the regulatory environment concept is similar to government policy (Zhu and Kraemer, 2005; Dasgupta et al., 1999; Umanath and Campbell, 1994). Kim and Lee (2008) conducted a study to identify the factors affecting the successful implementation of EDI systems in the context of Korean business environments. Their study finds that the existence of EDI standardization is a driving force for companies to adopt EDI systems.

Previous research found that the role of government is an important consideration that may affect the adoption of innovations, especially in developing countries (Molla and Licker, 2005a; Ang et al., 2003; King et al., 1994; Montealegre, 1999). Mia and Dutta (2007) note that the adoption of e-commerce in Singapore was a good example of governmental support driving technology innovation, in which Singapore was among the best performers of e-commerce around the world. Moreover, government policy positively affected the likelihood of EDI adoption in Hong Kong (Chau and Hui, 2001; Kuan and Chau, 2001). Similarly, the existence of supportive policies were related significantly to e-commerce decisions in China (Cui et al., 2006) and the extent of e-commerce adoption in Pakistan (Seyal et al., 2004). Mann (2002) further posited that the slowness or failure of e-commerce adoption in some developing countries was the result of policy inaction or wrong action by their governments.

Lack of governmental support was a significant barrier to online banking adoption in Oman (Khalfan and Alshawaf, 2004). Moreover, the absence of regulations and legislations was a major barrier and/or serious limitation to e-commerce diffusion in Turkey (Kaynak et al., 2005). A study conducted by Shih et al. (2005) shows that fewer firms in China adopted e-commerce due to the less friendly legal environment, and the authors conclude that e-commerce adoption will be slow in the countries without adequate legal frameworks regulating rights and obligations in the intangible cyberspace (Shih et al., 2005).

A number of cross-country studies found that the regulatory environment in a country significantly affected e-commerce activities in that country (Zhu and Thatcher, 2010; Ndubizu et al., 2002; Oxley et al., 2001; Zhao et al., 2007). Specifically speaking, the legal and policy environment did exert a substantial positive impact on e-commerce adoption at the early stage of e-commerce. Zhu and Thatcher (2010) note that a good legal system is a safeguard for online commercial transactions. In general, government promotion would play a significant role in new innovation adoption (Yu-hui, 2008). Nasir (2004) conducted a study to explore the legal issues and related problems in e-commerce and he notes that the exponential growth of the Internet carries with it a number of new regulatory issues often related to intellectual property concerns, copyright, trademark and privacy. It is believed that the governments of developing countries often control technology development and, thus, can influence e-commerce implementation decisions (Montealegre, 1999). On the other hand, developed countries are found to have supportive legal environments for e-commerce. For example, the US legal environment is more supportive of e-commerce than in other countries and this support has led to a higher percentage of US firms using e-commerce (Shih et al., 2005). Moreover, Hsu et al. (2006) confirmed that the U.S. did have a better legal environment supporting e-commerce use than other countries and note that US companies expressed fewer legal concerns when doing e-commerce.

3.7.3 National e-readiness

A country's electronic readiness (e-readiness) is another critical factor that should be considered to ensure that e-commerce applications are used by firms. Bui et al. (2003: p.5) define e-readiness as "the aptitude of an economy to use information and communications technologies to migrate traditional businesses into the new economy". National e-readiness can be evaluated by the availability of necessary physical infrastructure (high bandwidth, reliability, and affordable prices), transportation infrastructure, banking infrastructure and skilled workforce (Bui et al., 2003; CID, 2002).

The characteristics of national infrastructure have created a significant level of variation in the acceptance and growth of e-commerce in different regions of the world (Efendioglu et al., 2005). The literature showed that information and communication technologies (ICTs) diffused rapidly in developed industrialised countries, but slowly in developing countries, which led to a digital divide or gap in Internet access and usage of ICTs between developed countries, who are well equipped in terms of the ownership and deployment of ICTs for

social and economic prosperity, and developing countries, who are ill equipped in the ownership and deployment of ICTs (Hinson and Sorensen, 2006; Johnston and Acquaah-Gaisie, 2001; Licker and Motts, 2000). Stewart et al. (2002) note that the broadband penetration rate is one of the factors best explaining the different levels of e-commerce adoption and development observed in developed countries where the Internet access infrastructure is widely available (Dutta, 1997). For example, Denmark, Sweden and the USA (which head the 2009 Network readiness rankings produced by the World Economic Forum) have Internet penetration of about   84, 89 and 74 percent respectively, whilst Bangladesh, Burundi and Chad (poor states which rated worst among the 134 economies listed in the index) had internet penetration of only 0.4, 0.7 and 1.3 percent respectively (InternetWorldStats, 2009; World Economic Forum, 2009). According to the International Telecommunication Union (ITU) (2008), Internet use in developing economies was only about one-fifth that in developed economies at the end of 2007, and in 1999 only 0.1% of the Arab population was connected to the Internet (Mansell, 2001). This indicates that developing economies lag considerably behind developed economies (ITU, 2009).

Researchers have reported that the slow adoption and diffusion of the Internet and its technologies in developing countries is due to poor telecommunication infrastructure, insufficient IT human resources in the market, the high cost of Internet access and network connectivity, online transactions insecurity and high costs of hardware (Molla, 2006; Molla and Licker, 2005b; Xu et al., 2004). In fact, the penetration of low-cost broadband in the population allows companies to collaborate with business partners and provide a better service to their customers as it allows them to develop websites with personalization mechanisms (Rodríguez-Ardura et al., 2008; Ansari and Mela, 2003). Figure 3.3 provides a comparison of Internet users in developing countries with those in developed countries from 1994-2007.

| **Figure 3.3** | A comparison of Internet users in developed countries with those in developing countries from 1994-2007 |

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Source: ITU, 2009

The national infrastructures are the systems that support the development of e-commerce, such as transportation infrastructure and banking infrastructure (Peng and Kurnia, 2008). Their existence, coverage and reliability have been widely believed to be critical to the development and utilisation of e-commerce (Chvaja et al., 2001; Gibbs et al., 2003; Jiang et al., 2002). It is believed that addressing infrastructural, financial and capacity-related barriers would go some way to further facilitate the diffusion of the Internet among enterprises in developing countries. Karanasios and Burgess (2008) and Mansell (2001) claimed that liberalisation of key services sectors and the provision of appropriate infrastructure and technical assistance combined with greater access to information and knowledge could make important contributions; such contributions would go some way to facilitating the diffusion of information and communication technologies (ICTs) such as the internet and internet applications like e-commerce among enterprises in developing countries.

It is widely acknowledge that the availability and affordability of services from the IT industry, the development of the financial sector, and the penetration and reliability of carrier and transportation facilities are found to be critical e-commerce supporting industries

(Humphrey et al., 2003; Travica, 2002). Peng and Kurnia (2008) assert that the existence of financial institutions that support e-payments and transportation infrastructures are major facilitators of e-commerce transactions and, consequently a major influence in e-commerce technologies' development and e-commerce activities' growth. Indeed, e-commerce is not all about the technology to allow customers to point and click. Rather, its key component is the ability to move products speedily and in a flexible way in order to meet the customers' needs (Jiang et al., 2002).

The transportation infrastructure in a country adopting e-commerce needs to be supportive, reliable and efficient. Universally, it is believed that a country's postal and delivery services is an important part in an e-business project. Travica (2002) notes that since e-commerce can open up the global marketplace to customers, the capability of the delivery infrastructure to support significant fluctuations in geographical delivery patterns is crucial (Travica, 2002). Peng and Kurnia (2008) assert that for organisations in developing countries, the adoption of e-commerce will need to be supported by significant infrastructure investments on supporting infrastructures such as the national transportation system and telecommunication systems on the national level.

A study by Karanasios and Burgess (2008) indicated that the deployment of the Internet in the least developed countries is associated with issues such as the IT and Internet skill levels of existing employees as well as gaining access to skilled human resources in the local workforce. Collectively, limitations and/or barriers to Internet and e-commerce adoption in developing countries include limited Internet accessibility, lack of competition in international telephone traffic (which increases the cost of a network), lack of intra-regional infrastructure, lack of knowledge and skills and disproportionate penetration of the telephone in urban areas (Raven et al.,2007).

3.7.4 Technology consultants' participation and involvement

Rapid developments in ICTs are making it difficult for many organisations to manage the increasingly complex information system (IS) function (Yates and Benjamin 1991; Scott Morton, 1991). As the IT infrastructure and applications become more sophisticated, many organisations must rely on external consultants who are better placed to remain current on state-of-the-art technologies (Gable, 1996).

Consulting has been recognised as a useful professional service that helps managers to analyse and solve practical problems faced by their organisations, improve organisational performance and learn from the experience of other managers and organisations. In general, the primary duties of a consultant are to offer specialised skills to supplement internal capability, provide additional resources to cover peak requirements and, when necessary, to help businesses implement effective information systems (Thong et al., 1994). It is noteworthy that consultancy service can involve performing information requirements analysis of the business needs, recommending suitable computer hardware and software, and managing implementation of the information systems (Thong et al., 1994). In fact, consultants acquire experience and knowledge from their interaction and from working with multiple client organisations (Robey et al., 2000).

A main goal of the technology consultant's role is to expedite the technology implementation (Winston, 1999; Gable, 1991; Rogers, 1995; Thong et al., 1994). In fact, technology consultants play an important role in innovation adoption by serving as intermediaries between a technology and client firms (Weigelt and Sarkar, 2009). Their role and expertise are particularly relevant for organisations adopting innovations, such as e-commerce, where innovations not only involve new technological infrastructures and software applications but also require IT strategy development, IT systems assessment, business process improvement and software applications integration with core business processes on an IT platform to offer services through electronic, interactive communication channels (Swanson, 2010; Weigelt and Sarkar, 2009; Curran and Meuter, 2005; Meuter et al., 2005). Kole (1983) notes that important characteristics of IT consultants for IT systems implementation include: 1) experience with similar business function in a computer environment, 2) facility with communication and the change process, and 3) flexibility and creativity in project management

Research shows that, as the strategic importance of technology adoption increases, more organisational learning is likely to occur and organisations will be more motivated to seek out new sources of information (Dawes et al., 2007). In fact, technology consultants have a profound effect on information search and organisational learning processes by providing technological, implementation, and training know-how to help clients overcome adoption challenges (Weigelt and Sarkar, 2009). Robey et al. (2000) argue that the use of

intermediaries such as consultants and telecommunications service providers remains a valuable source of knowledge and a major option for organisations to learn without developing internal knowledge capabilities and, more importantly, continues to be a useful way for organisations to overcome knowledge barriers. For example, many organisations depend upon telecommunications providers to overcome corporate knowledge barriers to Internet use. Numerous theorists (Huber, 1991; Menon and Varadarajan, 1992; Slater and Narver, 1995) argue that acquiring second-hand experience from people outside the organisation, such as external consultants, is likely to be an important factor in the process of organisational learning.

Client learning or improved client understanding is an important objective or result of many consultancies (Gable, 1996). Moreover, it is suggested that consultants should help organisations to develop the capability to solve their problems (Lucas and Plimpton, 1972). However, according to Gable (1996), the consultant's intervention in the organisation should be directed not only at solving the immediate problem (e.g. selecting hardware and software), but also at improving the organisation's ability to anticipate and solve similar problems "in order to increase the ecological wisdom of the organisation through improvement of its ability to survive and grow in its environment" (Gable, 1996: 1177).

Successful exploitation of IT requires having a well defined strategy for IT that links between an organisation's strategy and the technology that supports it. A survey of 378 organisations conducted by the Gartner Group in 2001 found that 90% of organisations surveyed were doing e-commerce; however, only 40% of them had a clearly articulated and well-documented e-commerce strategy that was integrated with their enterprise strategy (Krammer, 2001). In fact, the use of new technology needs to take place within a clear IT strategy and one which fits the overall strategy for the future development of the business (Kubr, 1986). Technology consultants can play an invaluable role in this area: mainly because they have the ability to look at the strategic aspects of the technology, how it is used and how it interacts with corporate strategy.

The process of technology adoption includes several stages ranging from an organisation's initial evaluation of technology to the formal adoption decision being made by the appropriate decision makers and, finally, to its full scale deployment and installation. Such a complex process requires high levels of innovative capabilities in order to foster a greater use of the technology within that organisation (Bessant and Rush, 1995). The skills and

experience required to implement a particular technology may be perceived by managers as being significantly different from those they have. As a result, they perceive a risk that they will not be able to perform successfully at implementing the technology. This perceived risk can, by itself, be the cause of low commitment and support from management.

3.7.5 Economic downturn

Investments in innovation seem to occur more in businesses that have been doing well in terms of profits rather than in businesses in financial crisis (Lynch, 2007). Moreover, organisations with greater economic wealth invest more in innovation and have available capital for IT investments (Chwelos et al., 2001). Thus, they can afford to take more risk and can more easily absorb the cost of failure (Aiken and Hage, 1971; Nystrom et al., 2002). Indeed, wealth provides economic security in tough times and protection against financial stress. Teo and Ranganathan (2004) conducted research to examine Web-based B2B e-commerce initiatives in Singapore and their study showed that 52.8% firms had adopted B2B e-commerce; of these, two-thirds had a formal plan and/or task force for B2B e-commerce deployment. Moreover, Teo and Ranganathan (2004) note that the problem of financially justifying e-commerce investments was a significant issue in which the economic downturn in the 2000–2003[12] period had considerably increased the resource constraints on firms across the globe.

In fact, the 2001-2003 economic downturn was a technology depression in which spending stopped, projects were cancelled and excess inventory flooded the market, destroying pricing. For example, Cisco - a well-known technology provider - lost half a trillion dollars of market capital (Forrester, 2008). Indeed, financial strength has a direct effect on the adoption of new technology such as e-commerce (Azam and Quadddus, 2009). Moreover, Iacovou et al. (1995) note that the availability of financial resources was found to encourage firms to implement EDI systems. Furthermore, these authors found that firms that can afford more costly, EDI projects are more likely to enjoy higher benefits from the use of such systems. In

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[12] The economic downturn or the bursting of the dot-com bubble in the 2000–2003 period began in the second quarter of 2000 and was caused by the rise of internet sites and the tech industry in general. In fact, many investors lost substantial sums of money on the dot-com bubble. By the end of the year, the economic downturn had spread broadly throughout the IT and telecommunications sectors. Funding for new IT ventures fell between the second quarter of 2000 and the fourth quarter of 2002, before starting to recover in 2003 (Adkinson et al., 2004).

addition, Cragg and King (1993) found that economic wealth affected the firm's ability to adopt EDI. In Malaysia, the economic downturn in the region in 2001 resulted in a slump in the information technology sector (Malaysian Economic Report, 2003).

The recent global economic downturn which began in the summer of 2007 took the world completely by surprise, moving from the financial to the household and industrial sectors. In fact, since 2007 its impact on business has been profound. Hundreds of firms and factories have closed and millions of people have lost their jobs. Moreover, governments have been affected in different ways through income decline and higher service demand. Indeed, economies that lack a diverse industry base or skilled workforce have been adversely affected by the economic downturn.

On the other hand, the global economic crisis has been found to have fundamentally shifted consumer buying behaviour toward gaining the most value for every dollar spent. According to 'Empowering E-Consumers', a December 2009 report by the Organisation for Economic Co-operation and Development (OECD), while many sectors have suffered severely from the current economic crisis, online retail has fared well during the economic crisis and has even exhibited continued growth in many countries. These trends are the result, in part, of consumers becoming more cost conscious, and increasingly doing comparison shopping online to save money. For example, in the United States, while most economic sectors were experiencing a downturn in the first quarter of 2009, online retail sales for 80 retailers rose by an average of 11 percent. Also, Amazon generated net revenue of US$ 177 million in the first quarter of 2009, an increase of 24% from the first quarter of 2008. There was a similar pattern in France where the French electronic commerce and distance selling federation estimated that, for the first quarter of 2009, e-commerce sales grew by 26 percent (OECD, 2009; Valle, 2009).

In addition, a leading market analysis firm, Forrester Research (2008), has indicated that due to the last economic fallout, firms have been using technological innovation to fight the recession and deal with the changes they have experienced. Moreover, firms have focused on their websites, e-commerce and social computing and strategies to increase customer responsiveness and to stay closer to their customers. For example, e-commerce has increased by 85% in the USA. In addition, companies were found to have long-term technology plans

in place that are unlikely to be cut back. In fact, technology now sits at the centre of companies' operations and IT has become business technology (Forrester Research, 2008).

3.8 Chapter summary

This chapter explored the theories and addressed key gaps determined in prior research. Moreover, it reviewed the relevant literature utilized to guide the foundation for the conceptual framework presented in the coming chapter.

Chapter Four: Conceptual framework and development of hypotheses

Figure 4.1	Overview of chapter four

4.1 Introduction

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4.2 Organisational innovation Adoption

⬇

4.3 Toward a model for organisational e-commerce adoption and diffusion

⬇

4.4 E-commerce adoption and diffusion: A phased involvement

⬇

4.5 Expected relationships and research hypotheses

⬇

4.6 Chapter summary
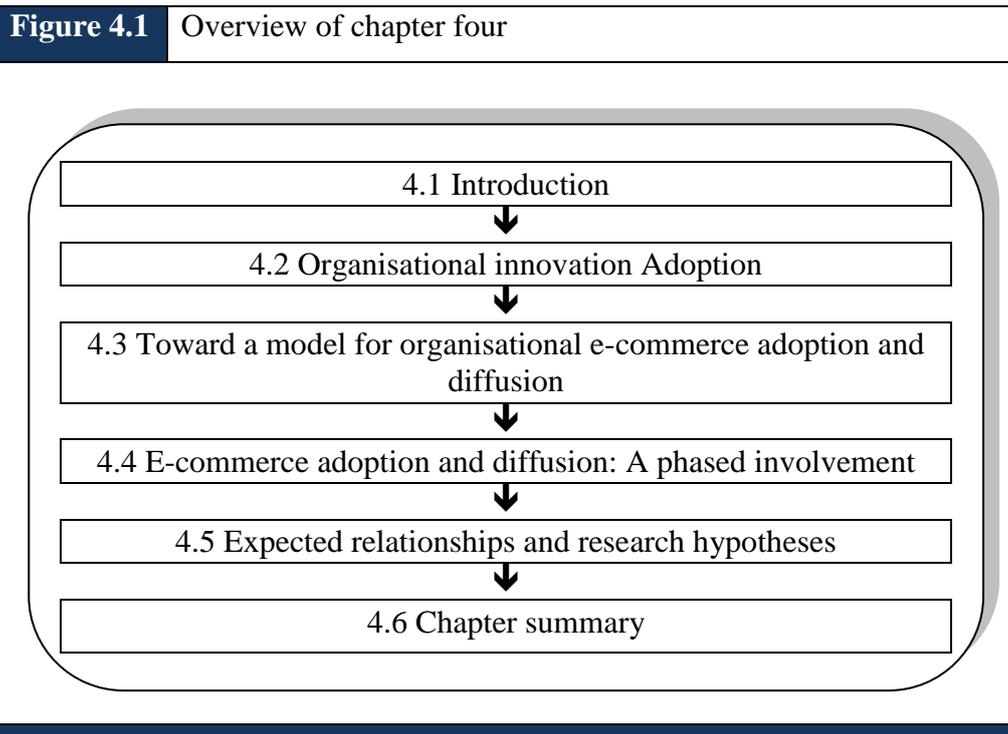
4.1 Introduction

In the previous chapter, relevant literature and the factors that are found to impede or enhance the innovation adoption were discussed. Subsequently, this chapter builds on the theoretical foundation developed in the previous chapter and has the purpose of developing various hypotheses based on past literature regarding the proposed relationship of' the variables in this study. An overview of the organisation of this chapter is shown in Figure 4.1 (previous page).

4.2 Organisational innovation Adoption

When an organisation learns to do something it did not know how to do before, and then proceeds to do it in a sustained way, a process of innovation has occurred (Shepard, 1967). In fact, firms, like consumers, differ in their likelihood and speed to adopt new innovation. However, the process of organisational innovation is very different from adoption of innovations by individuals. According to Pennings (1987), diffusion among organisations presents special challenges because, unlike individuals, they are complex human aggregates with various decision centres and are endowed with traditions, values, and procedures that may impede or enhance the adoption decision process. In fact, innovation adoption in organisations requires the active and coordinated use of multiple organisational members to benefit the organisation. Therefore, the innovation literature on individual behaviour falls short in providing insight about organisations as adopters (Pennings, 1987).

Technology adoption is a complex developmental process (Straub, 2009). Hence, organisations are found to follow a relatively stable and predictable pattern of development through a number of successive, cumulative and identifiable stages (Van de Ven and Poole, 1995). Achievement of the first stages of development allows the organisation to gain experience to move on to the next stage of development (Alonso-Mendo et al., 2009). However, although much research has been done on the adoption of technological innovation, such as internet technologies and e-commerce (Kauffman and Walden, 2001; Tan and Teo, 1998; Bloch and Segev, 1997) few have holistically attempted to examine the topic of the adoption stage of the diffusion process; most also tend to be conceptual rather than empirical in nature. Therefore, researchers have long been calling for an increased focus on a stage-oriented approach to understand the adoption of innovations by organisations (e.g. Teo and

Pian, 2004; Gallivan, 2001; Kim and Srivastava, 1998; Klein and Sorra, 1996; Nutt, 1986). In particular, Klein and Sorra (1996) bemoan the absence of multi-determined, multilevel frameworks to capture the innovation adoption phenomena and the authors suggest that researchers must move beyond single-site and qualitative case studies to analyse innovation implementation across organisations.

Conceptually, the concept of stages in innovation is useful for its ability to simplify a complex process. Also, it is useful for capturing the reality of innovation decision making more effectively than static models, and hence has more to offer policy makers and managers alike (Tornatzky et al., 1983). This study adds to the existing literature by investigating the dynamics of the factors influencing e-commerce adoption, and extensively uses a stage-oriented approach to illustrate and conceptualise organisational maturity in terms of the use and management of e-commerce to support and facilitate business activities, processes, and operations. The following section discusses the research model.

4.3 Toward a model for organisational e-commerce adoption and diffusion

E-commerce is ultimately about using ICTs to enable modern day organisations to share knowledge and collaborate across geographical boundaries (Davenport and Prusak, 1998). A research model is developed to address the research questions pertaining to e-commerce adoption. The suggested model in this study draws its theoretical foundations from the diffusion of innovation literature in order to identify the contextual factors that are potentially affecting the e-commerce adoption process in order to offer some indication of the more critical variables and to improve our understanding of successful organisational e-commerce adoption. As discussed in Chapter 3, the TOE framework and DOI offer comprehensive framework for identifying potential factors influencing innovation adoption in organisations.

The TOE framework is found to help strengthen what has been generally ignored in the DOI theory, such as the circumstances of a potential adopter and its macro arena (Zhu et al., 2006a). In fact, e-commerce is "enabled by technological development of the Internet, driven by organisational factors such as structure, and influenced by environmental factors related to customers, business partners, as well as competitors" (Zhu et al., 2003: 253). Therefore, the implicit assumption of this study is that organisations are only passively influenced by

innovations, their own characteristics and functioning, and the external environment (Kurnia and Johnston, 2000).

It is commonly acknowledged that the effects of different factors may vary depending on the stage of adoption, in which factors that influence early adopters of a particular innovation may differ significantly from those that impact late adopters (Waarts et al., 2002; Damanpour, 1988). In addition, the tendency for a firm to adopt innovation is not constant across all innovations wherein factors interact together with the specific dimension an innovation possesses to determine the likelihood of innovation adoption (Waarts et al., 2002). Accordingly, this study examines the dynamics of the factors influencing e-commerce adoption using a stage-oriented approach to illustrate and conceptualise organisational maturity in terms of the use and management of e-commerce to support and facilitate business activities, processes, and operations. One of the main goals is to discover the factors which explain the failure or success of e-commerce adoption.

The research model is depicted in Figure 4.2 and in this model e-commerce adoption is determined by a comprehensive set of factors (e-commerce technology characteristics, organisation, and environment contexts) which this researcher believes affect each phase of the e-commerce adoption process directly.

Figure 4.2   The research model used in this study

E-commerce technology characteristics

- Relative Advantage
- Compatibility
- Adoption costs
- Security concern
- Language concern

Organisational context

- Information technology (IT) readiness
- Management team support
- Learning orientation
- Receptivity toward change
- Strategic orientation
- Decentralization level
- Formalisation level

Environmental context

- Customer pressure
- Trading partner pressure
- Competitive pressure
- Regulatory and legal environment
- National e-readiness
- Technology consultants' participation
- Economic downturn

E-commerce Adoption

Non-interactive Adoption

If | Adopted

Interactive Adoption

If | Adopted

Stabilisation

Previous research suggests that organisations pass through several stages on their way to full implementation or assimilation of the new technology (Damanpour and Schneider, 2006; Gallivan, 2001; Rogers, 1995; Zaltman et al., 1973; Shepard, 1967). Rogers' (1995) model for the innovation diffusion process is widely used to understand the rate of innovation adoption. The model for this study is consistent with Rogers' (1995) description of the innovation process, which starts with knowledge about the existence of the innovation and ends with a confirmation of the decision to adopt and put the innovation into use (Van de Ven, 1993). In their study of the implementation of material requirements planning (MRP),

Cooper and Zmud (1990) report that, while 73% of surveyed organisations were adopting MRP, only 27% of them had progressed in their adoption and integrated MRP into their capacity planning, which indicated a significant assimilation gap and a relatively low level of utilisation.

According to Lin and Lee (2005), the adoption stage is a valuable construct that can be used to understand various issues related to e-commerce systems. Further, Eastin (2002) examined influences on four e-commerce activities (e.g. online shopping, online banking, online investing, and electronic payment), and found that all diffusion antecedents (perceived convenience and financial benefits, risk, previous use of the telephone for a similar purpose, self-efficacy, and internet use) significantly influence the adoption processes. Molla et al. (2006) stressed that e-commerce adoption is not a one-time activity. Instead, e-commerce adoption is seen to start when managers become aware of e-commerce and evaluate its adoption potential. Following an adoption decision, the process then continues to assimilation of e-commerce.

Based on Rogers' (1995) innovation process, for this study a three level model was initially proposed to examine e-commerce adoption, that is, non-interactive adoption, interactive adoption and stabilisation of e-commerce. The non-interactive or the initiation stage of e-commerce refers to the decision to invest in e-commerce and the preparation for redesigning business activities that lead to a choice to adopt or reject the innovation (Rogers, 1995). Subsequently, the preliminary interactive adoption stage is the process for trying to use e-commerce in which organisations make the first attempt to utilize the particular innovation and further accept to use the innovation. Finally, stabilisation of the new technology occurs when the decision is made to fully integrate the innovation into the ongoing activities of the organisation (Zaltman et al., 1973); as a result of such integration, stabilisation continues as the organisation then continuously gains experiences of using e-commerce that lead to regular use of the innovation and the increased likelihood that the innovation would become more integrated into the firm's activities and processes, requiring changes to – and ultimately transformation of – related business processes and back-office information systems (Molla et al., 2006).

The nature and the characteristics of the technology play an undeniably important role in determining organisational IS innovations adoption in general, and internet-based

innovations, such as B2B e-marketplace and e-commerce, in particular. In fact, innovation characteristics as perceived by adopters are believed to determine the ultimate rate and pattern of adoption. A number of researchers have examined the influence of innovation characteristics on adoption in several industries and markets (e.g. Hartmann et al., 2008; Argawal and Prasad, 1998; Tabak and Barr, 1998; Voellink et al., 2002). Moore and Benbasat (1991) showed that perceptions of relative advantage, compatibility, complexity, result demonstrability, visibility, and trialability in addition to voluntariness predicted technology acceptance. However, in a meta-analysis of the work on innovation characteristics, Tornatzky and Klein (1982) found that only three innovation characteristics—relative advantage, complexity, and compatibility—have been related consistently to adoption. They also identified other characteristics of innovation diffusion: cost, communicability, divisibility, profitability and social approval. They concluded that cost is consistently deemed important in the adoption issue (Tornatzky and Klein, 1982). Moreover, Jeyaraj et al. (2006) conducted a review and analysis of the rich body of research on the adoption and diffusion of IT-based innovations by individuals and organizations. They analyze 48 empirical studies on individual and 51 studies on organizational IT adoption published between 1992 and 2003. Furthermore, their sample includes both quantitative and qualitative studies. Jeyaraj et al. (2006) found that 15 innovation characteristics—communicability, compatibility, complexity, ease of use, information intensity, observability, perceived barriers, perceived usefulness, relative advantage, result demonstrability, system quality, trialability, visibility — have been related consistently to IT adoption.

This study is interested in exploring the attributes of the innovation that facilitate or inhibit e-commerce adoption by organisations in the private sector, and it relies on expert ratings of five characteristics (relative advantage, compatibility, adoption costs, security concern and language concern) of e-commerce technologies. In fact, innovation characteristics constructs for this study were chosen because of their relative importance in other studies and articles that discuss the potential benefits of Web adoption and because of their pertinence to the characteristics of both IS innovation adoption in general and internet technologies in particular (Wu and Chuang, 2009; Zhu et al., 2006a; Beatty et al., 2001; Agarwal and Prasad, 1997). Table 4.1 provides a summary of such prior research.

Table 4.1	Key studies examining innovation characteristics factors	
Study	**Explanatory variables**	**Major findings**
Damanpour and Schneider (2009)	<u>IV:</u> - Cost - Complexity - Impact - Manager Characteristics <u>DV:</u> -Innovation Adoption	• Innovation complexity did not have a significant effect on innovation adoption. • Innovation cost is positively related to innovation adoption. • Innovation impact positively affects innovation adoption. • Manager characteristics, especially managers' personal characteristics, have significant direct effects.
Wu and Chuang (2009)	<u>IV:</u> - Relative Advantage - Complexity - Ability to Provide Security - Peer Pressure - Transaction Climate - Environmental uncertainty - Supplier Interdependence <u>DV:</u> - diffusion of electronic supply chain management (e-SCM)	• Relative advantage, complexity, ability to provide security and peer pressure are important antecedents at the earlier stages of e-SCM diffusion. • Environmental uncertainty plays an important role in the latter stages of e-SCM diffusion.
Zhu et al. (2006a)	<u>IV:</u> - Relative Advantage - Compatibility - Costs - Security Concern - Technology competence - Organization size - Competitive pressure - Partner readiness <u>DV:</u> - E-business usage	• The study finds that relative advantage and compatibility significantly drive e-business usage while costs and security concerns significantly inhibit e-business usage. • Ttechnology competence, partner readiness and competitive pressure significantly drive e-business usage while large size retards e-business usage.
Martins et al. (2004)	<u>IV:</u> - Relative advantage - Compatibility - Complexity - Trialability - Observability <u>DV:</u> - Internet adoption	• Observability and trialability are the two variables that appeared as the most significant ones that better support the acceptance of the Internet as a teaching tool in Brazilian language schools. • Relative advantage, compatibility and complexity exerted little influence.

Table 4.1 (Cont.)		
Study	**Explanatory variables**	**Major findings**

Brown et al. (2003)	<u>IV:</u> - Relative advantage
	   - Perceived compatibility
	   - Perceived complexity
	   - Trialability
	   - Cell phone experience
	   - Banking needs
	   - Perceived risk
	   - Self-efficacy
	   - Facilitating conditions
	   (technology support)
	
	<u>DV:</u> Cell phone banking adoption
		• Factors likely to influence adoption include relative advantage, trialability, the customer need for banking services from a cell phone, and lower perceptions of risk,
		
		• Compatibility, Complexity, Cell phone experience, facilitating conditions, and Self-efficacy did not show any influence on cell phone banking adoption.

Beatty et al.(2001)	<u>IV:</u> - Perceived benefits
	   - Organizational compatibility
	   - Technical incompatibility
	   - Complexity
	   - Management support.
	
	<u>DV:</u> Corporate Web site adoption.
		•The results provide support for hypotheses relating to perceived benefits, organisational compatibility, technical incompatibility and organizational support but not for complexity.
		
		•Corporate Web site was not perceived as highly complex by firms. In fact, of the five constructs, complexity has the lowest mean.

Agarwal and Prasad (1998)	<u>IV:</u> - Relative advantage
	   - Ease of use
	   - Compatibility
	   - Information about a new IT
	    from alternate channels
	
	<u>Moderator:</u> Personal Innovativeness in the Domain of IT (PIIT)
	
	<u>DV:</u> Intentions to use a new IT
		• Compatibility is the only one that necessitates a significant change in the work behaviour of a potential adopter.
		
		• PIIT did not moderate the relationships between ease of use, relative advantage, and usage. Significant moderation was observed for only one of the innovation characteristics—that of compatibility.

Parthasarathy and Bhattacherjee (1998)	<u>IV:</u> -Usefulness (relative advantage)
	   - Ease of use (inverse of complexity)
	   - Compatibility
	   - Network externality
	<u>DV:</u> - online service use.
		• Potential discontinuers can be discriminated from continued adopters based on perceived service attributes (usefulness and compatibility) and network externality (complementary product usage), during their time of initial adoption.
		
		• Later adopters are more likely to discontinue due to disenchantment than replacement, and are more influenced by interpersonal sources and utilize the service less during their adoption period than replacement discontinuers.

Table 4.1 (Cont.)		
Study	**Explanatory variables**	**Major findings**
Agarwal and Prasad (1997)	<u>IV:</u> - Innovation characteristics - Relative advantage - Ease of use - Compatibility - Trialability - Visibility - Result demonstrability - Image - Voluntariness <u>DV:</u> - Current use of an innovation and future use.	• Innovation characteristics of visibility, compatibility and trialability are relevant in explaining acceptance behaviour and external pressure to use innovation as measured voluntariness has an impact on adopters' acceptance behaviour. Current use is an influence on future use intention.
Cooper and Zmud (1990)	<u>IV:</u> - Task compatibility - Technology compatibility - Task complexity - Technology complexity <u>DV:</u> - Material Requirements Planning (MRP) implementation	• Task-technology compatibility is a major factor in explaining MRP adoption behaviours. • Task-technology interactions, however, did not seem to significantly affect MRP infusion.
Premkumar et al. (1994)	<u>IV:</u> - Relative advantage - Technical compatibility - Complexity - Costs - Communicability - Elapsed Time <u>DV:</u> - EDI adoption	• The results indicate that three innovadon characteristics—technical compatibility, relative advantage, and cost—significantly lead to better adaptation of EDI in organisations.

According to Hadaya (2008), firms will be more inclined to adopt and use electronic intermediaries that provide services of high quality and are easy to use with numerous functionalities; evidently, firms will also be more willing to use electronic intermediaries that can develop and maintain efficient and more importantly have the right technological competencies.

The innovation literature has shown that compatibility is an important factor to explain innovation usage by organisations (Zhu et al., 2006a; Zhu et al., 2006c; Cooper and Zmud, 1990). The adoption of e-commerce requires firms to transform traditional systems heavily dependent on physical processes and paper-based work procedures to those that rely on computers and modern technologies, and may even involve the reengineering of the entire value chain (Lin and Lin, 2008; Zhu et al., 2006c).

Researchers have identified that the degree of perceived risk of the innovation could also affect the rate of adoption of an innovation. Where risk was perceived to be high, then adopters would be less willing to adopt (Shoemarker and Shoaf, 1975). Further, the greater the risk tendencies are, the shorter the rate of diffusion of a typical innovation (Shoemaker and Shoaf, 1975). Security concern represents a unique characteristic of e-business (Zhu et al., 2006a) because e-business technologies are primarily based on the Internet; consequently, the guarantee of the security of information flow is the important concern in the adoption decision among organisations (Wu and Chuang, 2009). Thus, this makes security issues particularly significant, and the failure to provide security would retard the further usage of e-business among organisations (Jones et al., 2000). Lastly, language and content related barriers have become an issue in the adoption of internet technologies as the Internet is typically in English and mostly text based (De Boer and Walbeek 1999; Palmer 2000). In fact, it is believed that non-English speaking nations find difficulties in accessing English internet content. Salman (2004) argues that these content related barriers need to be seriously addressed.

While innovation attributes play an undeniably important role in determining organisational innovation adoption, the study of organisations is also important context (Bedeian, 1986). In fact, an organisation is the primary vehicle for innovation because it has scientific knowledge and management expertise, production means, better access to capital, and often some degree of monopoly power, all of which increase the likelihood of investing in innovation (Afuah, 2003). Indeed, innovation cannot be studied independently of the organisation that adopts and assimilates it (Kimberly, 1987).

Research shows that organisational variables to be particularly important in predicting organisational innovation adoption which produces changes in products and/or services (Damanpour, 1987). It is believed that, with the rapid transformation of economies and the impact of globalisation and increasing multinational business cooperation, organisational domain is more important today than ever before, as it has a crucial effect upon an organisation's performance and ability to adopt changes (Wilkins and Ouchi, 1983). These changes include: fast technological changes, change in industries and markets, deregulation, the development of the global economy, increased organisational complexity, and new business models (Hagberg Consulting Group, 2004).

Many studies report that one of the most common causes given for failure of most planned organisational changes, mergers and acquisitions, and adoption of new technologies is neglecting the impact of organisational determinants (Abdul Rashid et al., 2004; Al-Mashari and Zairi, 2000; Fey and Denison, 2003; Frotaine and Richardson, 2003). In fact, enough progress has been made, however, to offer some indication of the more critical variables and to suggest various areas which might be usefully investigated to improve understanding of successful organisational innovation adoption. Clearly, a major concern is to understand the structure and functioning of organisations. Although many variables are of significance in developing this understanding, an enhanced knowledge of (a) organisational information technology (IT) readiness, (b) organisational management team support (c) organisational learning orientation, (d) organisational receptivity to change, (e) organisational strategic orientation, (f) organisational decentralisation level, and (g) organisational formalisation level seems especially critical for advancing organisational innovation adoption in general, and organisational e-commerce adoption in particular. Therefore, the present study considers these seven factors. Each is especially rich in prospects for further research and important to both theorists and practitioners alike.

The environment of an organisation is defined as a system that is outside the organisation which influences the behaviour and properties of the organisation (Ackoff, 1981). One of the big stumbling blocks facing organisations is the capacity to manage the external environment enveloping the firm. External environment is a complex system consisting of multiple types and dimensions (Ackoff, 1981; Scott, 1992); therefore, organisations change their business processes and strategies by adopting new technologies in response to and in coordination with the changes in the external environment. Research shows that the environmental dimension is particularly important in predicting technological innovation adoption (Damanpour and Gopalakrishnan, 1998).

Various theoretical models have been developed to address different dimensions of the phenomenon of technology adoption and diffusion in organisations. Clearly, these models explain part of the technology diffusion process but none of these models provide a holistic view of the phenomenon that can provide researchers and practitioners some clear guide so they can deal with the complex issue of technology adoption (Cooper and Zmud, 1990; Nilcanta and Scamell, 1990; Zmud, 1982). Additionally, while each study has contributed to our knowledge, and tested part of the IT diffusion process, no single study has tested a model

of organisational e-commerce adoption that comprehensively provides a 'big picture' and that can be used to identify key concepts and issues as well as provide an understanding of the complex interaction of process and context in successful adoption. Consistent with the TOE framework and considering characteristics of e-commerce adoption, three critical factors impacting e-commerce adoption are identified: (1) innovation characteristics or e-commerce-specific factors, which are related to the nature of the application and its impact, (2) organisational factors, which are related to the resources, processes, and structure of the focal enterprise, and (3) environmental factors, which lay outside the boundaries of the focal enterprise factors that influence or hinder the prospecting and stabilisation of e-commerce as a technological innovation.

4.4 E-commerce adoption and diffusion: A phased involvement

E-commerce is a revolution that many industry and academic observers believe will transform the conduct and structure of business. In fact, the range of interesting developments and innovations that are happening in information goods, firm business processes, e-marketplaces, and emerging industries in the economy further increases the motion to broaden efforts in research on electronic commerce (Kauffman and Walden, 2001). Hence, this study focuses exclusively on business-to-business (B2B) interactions which have increasingly become an important initiative among organisations in the last few years.

E-commerce is a technological innovation consisting of a combination of a number of web technologies varying from the very simple use of e-mail to more complex collaborative platforms that are used to deliver services to employees within the firm and also to its partners and customers (Chaffey, 2009; Brown and Lockett, 2004). Rogers and Shoemaker (1971) define the term adoption as "making full use of a new idea as the best course of action available" (26). On the other hand, diffusion is defined as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers and Shoemaker, 1971: 10). In fact, understanding the adoption requires an understanding of the whole innovation process, which starts with the recognition of a need and eventually results in the implementation of an innovation (Rogers, 1995).

Diffusion research shows that adopters are of various types; early, late and non-adopters all have different attitudes and time frames for accepting and learning about new technologies

(Agha Khan et al., 2009; Ramamurthy et al., 2008). In fact, as noted by Agha Khan et al. (2009), the process of innovation adoption and diffusion is a complex phenomenon in which an organisation needs a process to build the capacity, capability, and commitment of the internal user community to move from an organisation's current state to its future state with the introduction of the new technology (Agha Khan et al., 2009). Therefore, the dependent variable in this study was carefully defined to gain better insight into organisational adoption process perspectives.

Several studies propose that organisational innovation adoption may be described as a phased involvement, and these studies have suggested numerous models to classify the stages of the adoption process of an innovation. However, diffusion literature indicates that there is little agreement on the number of stages in the innovation adoption process (Rogers and Shoemaker, 1971). For instance, Hage and Aiken (1970) utilized a four-stage process. Zaltman et al. (1973) proposed two stages, as did Molla and Licker (2005a, 2005b). Cooper and Zmud (1990) regarded IT implementation as a technological innovation diffusion process and proposed a six-staged model. Klein and Sorra (1996) postulated five stages while Zhu et al. (2006d) and Shepard (1967) proposed a three-stage model. A brief summary of the innovation adoption and diffusion process identified in the academic literature is presented in Table 4.2.

Table 4.2	Summary of innovation adoption models and stages	

Becker and Whisler (1967)
1. Stimulus
↓
2. Conception
↓
3. Proposal
↓
4. Adoption decision
 	
Shepard (1967)
1. Idea generation
↓
2. Adoption
↓
3. Implementation
	Hage and Aiken (1970)
	1. Evaluation
	↓
	2. Initiation
	↓
	3. Implementation
	↓
	4 Routinisation
		Zaltman et al. (1973)
		I. Initiation stage
		  1. Knowledge and Awareness sub-stage
		  ↓
		  2. Formation of attitudes towards the innovation sub-stage
		  ↓
		  3. Decision sub-stage
		  ↓
		II. Implementation stage
		  1. Trial Implementation sub-stage
		  ↓
		  2. Sustained implementation sub-stage

Pierce and Delbecq (1977) 1. Initiation ↓ 2. Adoption ↓ 3. Implementation	**Daft (1978)** 1. Initiation of Idea ↓ 2. Proposal ↓ 3. Adoption (decision) ↓ 4. Implementation	**Pelz and Munson (1980)** 1. Diagnose ↓ 2. Design/planning ↓ 3. Implementation ↓ 4. Stabilisation

Zmud (1982)
1. Initiation
↓
2. Adoption (Decision)
↓
3. Implementation
	Kwon and Zmud (1987) / Cooper and Zmud (1990)
	1. Initiation
	↓
	2. Adoption
	↓
	3. Adaptation
	↓
	4. Acceptance
	↓
	5. Routinisation
	↓
	6. Infusion
		Rogers (1995)
		I. Initiation stage
		  1. Agenda-Setting
		  ↓
		  2. Matching
		------------------------→ decision to adopt
		II. Implementation stage
		  1. Redefining /Restructuring
		  ↓
		  2. Clarifying
		  ↓
		  3. Routinisation

Klein and Sorra (1996) 1. Awareness ↓ 2. Selection ↓ 3. Adoption ↓ 4. Implementation ↓ 5. Routinisation	**Dholakia and Kshetri (2004)** 1. Pre-adoption ↓ 2. Adoption ↓ 3. Routinisation	**Lin and Lee (2005)** 1. Initiation ↓ 2. Propagation ↓ 3. Networking ↓ 4. Business integration ↓ 5. Business transformation
Molla and Licker (2005a, 2005b) 1. Initial adoption ↓ 2. Institutionalization	**Kamal (2006)** 1. Motivation ↓ 2. Specific conception ↓ 3. Formal proposal ↓ 4. Actual adoption decision ↓ 5. Implementation ↓ 6. Confirmation ↓ 7. Acceptance ↓ 8. Integration	**Zhu et al. (2006d)** 1. Initiation ↓ 2. Adoption ↓ 3. Routinisation

Source: Current study

It is interesting to note that not only has there been great diversity in the number of stages used in the past inquires, but there has also been an entertaining variety of terms used for the stages (Rogers and Shoemaker, 1971). However, Tronatzky and Klein (1982) argue that the specific terminology is less important than the recognition of the phenomenon.

Rogers (1995) proposed two main broad stages for the innovation process in an organisation: initiation and implementation. The initiation stage is defined as the information gathering, conceptualizing and planning for the adoption of an innovation leading up to the decision to adopt or reject it. It is noteworthy that the decision to adopt (shown as a horizontal dotted line in Table 4.2 above) divides the initiation stage from the implementation stage. The implementation stage includes all events, actions, and decisions involved in putting an innovation into use. The implementation stage is composed of three sub-stages: redefining/restructuring, clarifying, and routinisation (Rogers 1995: 389-404).

Tornatzky and Klein (1982) note that implementation has been variously termed as either routinisation (Yin, 1980), incorporation (Lambright, 1980), stabilisation (Pelz and Munson, 1980) or institutionalisation (Eveland et al., 1977). Basically, these are all terms for the process by which an innovation becomes part of the more or less permanent standard practice of an organisation.

Based on Rogers' (1995) stages, the adoption model of the B2B e-commerce process can be built. The dependent variable in this study is 'e-commerce adoption' and will be examined using a three-level process model in order to capture a firm's status concerning the application of B2B e-commerce technology. The present conceptualisation consists of three functions or stages of e-commerce adoption: namely, non-interactive e-commerce, interactive adoption of e-commerce as represented by an organisational mandate for change, and stabilisation of e-commerce such that it becomes ingrained with organisational processes. The sequence starts with a firm's initial evaluation of e-commerce at the non-interactive or initiation adoption stage, moves to its interactive adoption and then, finally, ends with its full-scale deployment at the stabilisation stage in which e-commerce becomes an integral part of the value chain activities. Figure 4.3 illustrates the adoption process of e-commerce and will shortly be described in detail.

Figure 4.3	B2B E-commerce adoption process

Non-interactive adoption

• Firm starts to recognise the importance of e-commerce for efficient internal and external communication with others and proposes its adoption.

• Informational Web Presence that provides basic information about the organisation without any interactivity.

Interactive adoption

• Firm makes the first attempt to utilize e-commerce and further accepts to use an interactive web presence that accepts queries from users.

• Top management decides to adopt e-commerce and allocates resources.

Stabilisation

• The decision is made to fully integrate the innovation into the ongoing activities of the organisation.

• E-commerce is widely used as an integral part of a firm's activities and processes, requiring changes to back-office information system.

• The technology is 'taken for granted' and integrated into a firm's computer systems, allowing most of the business transactions to be conducted electronically.

• The technology is integrated into supply chain so manufacture and delivery become seamless.

Business Benefits (vertical axis)

Extent of organisational change and sophistication (horizontal axis)

Source: Current study

The model will be applied to examine B2B e-commerce among organisations in the private sector in Saudi Arabia. In fact, studies that have so far been conducted in the context of Saudi Arabia have focused on B2C e-commerce rather than B2B e-commerce or organisational level adoption (Ahmed et al., 2006; Aleid et al., 2009; Al-Somali et al., 2009). However, the outcomes from these studies are limited and do not cover other issues that might directly influence organisational tendency toward e-commerce adoption in Saudi Arabia. This necessitates investigating the factors that impact e-commerce adoption in organisations in order to give a clear evaluation of e-commerce phenomena in Saudi Arabia. Finally, the investigation of the sequence of B2B e-commerce adoption will address the third research

question in chapter one: namely, how to conceptualize and operationalize organisational e-commerce adoption?

3.4.1 Non-interactive e-commerce

Non-interactive e-commerce is the stage that leads to the later steps in the innovation process. The motivation and objective for the change is a present or anticipated "performance gap"[13] which is perceived as wide enough to seek for an innovation as one means of coping with the problem (Hyötyläinen, 1998; Rogers, 1995).

Rogers (1995) and others have described this stage as the initiation or the pre-adoption stage, that is, the point where the decision has been made to engage in activities that lead to a choice to adopt or reject the innovation (Zhu et al., 2006d; Lin and Lee, 2005; Rogers, 1995; Cooper and Zmud, 1990; Kwon and Zmud, 1987; Zmud, 1982, Daft, 1978; Pierce and Delbecq, 1977). However, most diffusion theories generally terminate their analysis at the stage of initiation (Zaltman et al., 1973). According to Kamal (2006) and Hyötyläinen (1998), initiation involves identifying and prioritizing needs and problems on the one hand, and, on the other hand, gathering, evaluating and searching the organisation's environment to locate information regarding the potential benefits of the innovation to meet the organisation's problems. Essentially, the innovation process is an information-seeking and information-processing activity in which an organisation is motivated to reduce uncertainty about the advantages and disadvantages of an innovation (Rogers, 1995). Zaltman et al. (1973) conceptualize this stage into three sub-stages: (1) a knowledge and awareness sub-stage, (2) a formation of attitudes towards the innovation sub-stage, and (3) a decision sub-stage.

In the context of e-commerce adoption, organisations in this stage start to recognize the importance of the e-commerce, gather required information, become aware of the innovation, form an attitude towards it and, more importantly, evaluate the possible benefits of e-commerce such as an expanding market share and having access to international and/or regional customer and supplier information. Accordingly, firms prepare for enterprise-wide adoption efforts and understand what quantity of e-commerce to secure and how to utilize it

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[13] Performance gap is the discrepancy between an organisation's expectation and its actual performance (Rogers, 1995, 393).

correctly. Moreover, they prepare for website implementation efforts, and this level simply involves using internet technology to access information and brochures (Lin and Lee, 2005).

The attitudes organisational members have towards an innovation are important, and if top organisational echelons (managers, committees and boards) are motivated to innovate and/or have favourable attitudes toward the innovation, there is likely to be a positive attitude to implement the innovation and thus resources will be allocated for its acquisition, alteration and assimilation (Meyer and Goes, 1988; Zaltman et al., 1973). Conversely, if there are less favourable attitudes toward the new technology, there is a greater likelihood that it will not be implemented (Zaltman et al., 1973).

Duncan (1972) notes that there are at least two important attitudinal dimensions that organisational members can exhibit about the innovation: openness to the innovation and perception of potential for innovation. According to Zaltman et al. (1973), important components of openness to innovation are (1) whether organisational members are willing to consider the innovation, (2) whether they are skeptical about the innovation, and (3) whether they feel the innovation will improve how the organisation carries out its function. On the other hand, the potential for innovation focuses on whether organisational members perceive that (1) there is some capability within the organisation for utilising the innovation, (2) the organisation has had some success in the past in utilising innovations, and (3) there is some commitment on the part of organisational members to working for the innovation and dealing with some of the potential problems that might arise as implementation is attempted (Zaltman et al., 1973). It is widely believed that before any innovation can take place or be adopted, potential adopters must be aware that there is an opportunity to utilise the innovation in the organisation. Moreover, acquiring a technology is not sufficient; in order to obtain the anticipated benefits, it must be deployed and used appropriately by the organisation and its intended users (Kamal, 2006).

The early stages of a company's e-commerce activity are almost always focused on reaching the customer, with the later stages more focused on streamlining value-chain activities to deliver more value to the customer (Norris et al., 2000). Hartman et al. (2000) note that, at the beginning of the Net readiness era, organisations use the Internet as a bulletin board for brochures, employee telephone directories, and over time, for more critical documents such as catalogues and price lists. For these companies, the Net is a one-way publishing

mechanism (Hartman et al., 2000). Moreover, Cahners Group has suggested that there are three phases of e-commerce involvement, starting from a brochure-ware or non-interactive stage which leads to pre-commerce (enough information, including price, to create online point-of-sale transactions) and then simple commerce (accept orders and payments online but little in security or online payment processing) (U.S. Small Business Administration, 1999).

Dholakia and Kshetri (2004) used a phased involvement approach to examine internet adoption behaviour by SMEs, and they proposed a three-stage model: (1) pre-adoption − the organisation owns at least a computer; (2) adoption − the organisation owns a website but does not sell on the Internet; and (3) routinisation − the organisation sells on the Internet. A recent research study by Alonso-Mendo et al. (2009) reports that, the early stages of e-commerce adoption are typified by a simple, static informational or non-interactive website containing basic information about the firm's product and service.

In fact, measuring the non-interactive adoption stage of e-commerce provides a means of examining the state of usage of e-commerce, and it provides a means of measuring and comparing the degree to which various aspects of the system were being utilized to different extents by different organisations.

4.4.2 Interactive e-commerce adoption

This stage is the "payoff" stage of the innovation adoption process in which the innovation is put in place, the process of embedding it in the organisation becomes the central activity (Martin, 2000), and the decision is made to continue full-scale use of an innovation (Rogers, 1995; Becker and Whisler, 1967). Moreover, companies create a dialog with customers by empowering the customer to come in, ask, demand and dictate the kind of value that needs to be delivered (Hartman et al., 2000). Rogers (1995) calls this stage 'implementation' and it occurs when the innovation is re-invented to better accommodate the organisation's needs and structure more closely. Correspondingly, the structure of the organisation has to be changed to fit the innovation.

In this stage, firms consider the decision to commit resources to utilise the technology and evaluate proposed ideas from technical, financial and strategic perspectives. More importantly, top management decides to adopt the innovation and allocate resources (Rogers,

1995; Chau and Tam, 1997). However, in the preliminary interactive adoption stage, organisations face the problem of obtaining adequate financial resources and finding adequately trained personnel with the IT skills and knowledge to fill the occupational slots created by the adoption of the innovation (Hage and Aiken, 1970). In fact, even the large organisations can have these difficulties depending upon the cost of the new technology and the availability of the IT professionals in the market (Hage and Aiken, 1970).

Research on the adoption of information systems shows that lack of technological knowledge often is a barrier to innovation implementation, and basically organisations have postponed adoption of these complex technologies until they have obtained adequate know-how to implement the new technology effectively (Rogers, 1995). Rogers and Shoemaker (1971) argue that, in the case of innovations that are relatively complex such as e-commerce, the amount of knowledge needed for proper adoption is much greater than the case of less complex innovations. Moreover, when an adequate level of sufficient knowledge is not obtained prior to the adoption of an innovation, rejection and discontinuance are likely to result (Rogers, 1995; Rogers and Shoemaker, 1971).

In fact, knowledge and familiarity of firms' employees with a technology is a critical aspect, and if firms' employees are knowledgeable regarding a new technology, they are likely to be better capable of dealing with technology adoption (Lin and Lee, 2005). Indeed, the more advanced the knowledge, the greater the stimulus the new technology may have for the organisation. McGowan and Madey (1998) found that level of electronic data interchange (EDI) knowledge positively influences the extent of EDI implementation. In response to knowledge barriers, companies rely on external support from technology providers and consultants in order to progressively lower these barriers, making it easier for firms to adopt and use the technology without extensive in-house expertise (Attewell, 1992).

The interactive adoption stage represents a level of commitment by the organisations with repeated or continued usage (Zaltman et al., 1973). It is noteworthy that the depth of commitment moves this stage toward the integration of e-commerce because adopters perceive that the innovation has at least a certain degree of relative advantage. Indeed, the stronger the adoption commitment that is made, the more satisfactory the outcome will be achieved. In fact, interactive adoption is the central event in the analysis of innovation which divides the organisations not adopting the technology (rejection) from those that do adopt the

technology. However, each stage in the innovation adoption process is a potential rejection point. For example, it is possible to reject an innovation at the initiation stage by simply forgetting about it after gaining adequate knowledge because unsatisfactory outcomes were achieved (Zaltman et al., 1973).

It is commonly believed that the value of any innovation depends on the context of its use. For instance, in market research, adoption might be usefully defined in terms of whether the item under consideration has been purchased and actual use of the product is not relevant. In education, the adoption of a new education program by the school board may not indicate that anything meaningful is going to happen if further decisions by school principals and individual teacher are still to be made (Tronatzky and Fleischer, 1990). Tornatzky and Fleischer (1990) argue that the adoption process is often made up of a series (or even parallel sets) of activities that are not visible to all the participants. In such cases, the term adoption is appropriately applied to those activities that involve making the technology available to the users (Tornatzky and Fleischer, 1990). Molla and Licker (2005a, 2005b) state that the interactive adoption of e-commerce begins when the organisation makes the first attempt to utilize e-commerce and further accepts to use an interactive web presence by establishing two-way communication on the Internet involving online orders, feedback, and other forms of interactions such as accepting queries from users. It is to be noted that many researchers have accepted interactive e-commerce as the beginning of the e-commerce adoption process (Treese and Stewart, 1998; Kalakota and Whinston, 1996).

4.4.3 Stabilisation of e-commerce

At the end of the interactive adoption phase an organisation incorporates the candidate technology into ongoing practice as a means of creating change to maintain or improve the level of effectiveness (Zaltman et al., 1973; Damanpour and Schneider, 2006). Stabilisation occurs when the innovation has become incorporated into the regular activities of the organisation and organisational members no longer think of the innovation as a new idea. In fact, at this stage, the innovation is completely absorbed into the organisation's ongoing activities and firms recognise that changes to processes, structures and skills are necessary to exploit the technology (Levy and Powell, 2003). Martin (2000) and Hyötyläinen (1998) argued that stabilisation is the period in which the innovation proves itself as organisational practice and is consolidated and adapted to the ongoing practice.

As noted by Hage and Aiken (1970), it is entirely possible that a new program may meet an organisational need, providing effective solution for the customers or clients of the organisations, but that the organisation may decide to discontinue the implementation of the new technology. Indeed, if there has been too much conflict in the interactive adoption stage, the decision to embed the new technology into the structure of the organisation is rejected.

The stages of clarifying and routinizing according to Rogers (1995) can be seen to belong to the stabilisation phase. Clarifying occurs when the innovation is put into more widespread use in the organisation. It is believed that routinization occurs when the innovation has become incorporated into the regular activities of the organisation, as part of normal use (Hyötyläinen, 1998; Rogers (1995).

Once a decision to adopt a technology had been made, it is believed that its deployment follows more or less automatically. However, a variety of empirical studies (e.g. Cooper and Zmud, 1990; Tornatzky and Klein, 1982) have led to the conclusion that this assumption is not sustainable (Tornatzky and Klein, 1982). For instance, in their study of the implementation of material requirements planning (MRP), Cooper and Zmud (1990) report that, while 73% of surveyed organisations were adopting MRP, only 27% of them had progressed in their adoption and stabilised MRP into their capacity planning, which indicated a significant assimilation gap and a relatively low level of utilisation. Correspondingly, Liker et al. (1992) report that although computer aided design (CAD) technologies had achieved extensive market penetration in the 1980s, even as late as 1992 widespread deployment of CAD was rare, which implies that widespread acquisition of an innovation is not necessarily followed by widespread use by the acquiring organisation (Fichman and Kemerer, 1999). Hence, interactive adoption and stabilisation or routinisation are seen as two distinct stages (Zhu et al., 2006d) because in the stabilisation stage, the technology is no longer perceived as something out of the ordinary; instead, it is 'taken for granted', and pervasively integrated into the organisation (Tolbert and Zucker, 1996).Moreover, that stabilisation stage is characterised by using the Net to expand transaction-oriented processes such as selling product, procuring supplies, enabling internal processes (i.e. human resources activities) and tracking orders on the website (Alonso-Mendo et al., 2009; Hartman et al., 2000). Finally, at the most sophisticated stages, the business website is fully integrated with the back office

systems, such as enterprise resource planning (ERP), customer relationship management (CRM), and supply chain management (SCM) applications.

Molla and Licker (2005a, 2005b) note that the process of e-commerce adoption in organisations can be broadly viewed as a multi-phase process and they describe the stage following the initial adoption collectively as e-commerce institutionalization, a stage which requires the e-commerce to be integrated with the internal business process and systems to accommodate and enhance changing relationships with customers and business partners (Norris et al., 2000).

It is widely acknowledged that innovation implementation requires that organisational members accept the changes mandated by a decision to adopt. The willingness of members to accept such change might be enhanced by an organisational context characterised by a sense of openness and flexibility or by a context in which organisational imperatives requiring change are accepted (Zmud, 1982).

4.5 Expected relationships and research hypotheses

In the previous chapter, relevant literature related to the constructs adopted in this study was discussed in detail. The constructs are categorised into the following three sets: e-commerce technology characteristics, organisational dimension, and environmental dimension. The purpose of this chapter is to discuss and develop various hypotheses regarding the proposed relationship of' the constructs in this study based on past literature. Research hypotheses for empirical testing will be discussed in the next section. Figure 4.4 shows a list of hypotheses for expected relationships.

Figure 4.4   The hypothesized relationship between independent and dependent variables

E-commerce technology characteristics

- Relative Advantage ($H_{1.1}$, $H_{1.2}$, $H_{1.3}$ +, +, +)
- Compatibility ($H_{2.1}$, $H_{2.2}$, $H2_{1.3}$, +, +, +)
- Adoption costs ($H_{3.1}$, $H_{3.2}$, $H_{3.2}$, -, -, -)
- Security concern ($H_{4.1}$, $H_{4.2}$, $H_{4.3}$, -, -, -)
- Language concern ($H_{5.1}$, $H_{5.2}$, $H_{5.3}$, -, -, -)

Organisational context

- IT readiness ($H_{6.1}$, $H_{6.2}$, $H_{6.3}$, +, +,+)
- Management team support ($H_{7.1}$, $H_{7.2}$, $H_{7.3}$, +, +, +)
- Learning orientation ($H_{8.1}$, $H_{8.2}$, $H_{8.3}$, +, +, +)
- Receptivity toward change ($H_{9.1}$, $H_{9.2}$, $H_{9.3}$, +, +, +)
- Strategic orientation ($H_{10.1}$, $H_{10.2}$, $H_{10.3}$, +, +, +)
- Decentralization level ($H_{11.1}$, $H_{11.2}$, $H_{11.3}$, +, +, +)
- Formalisation level ($H_{12.1}$, $H_{12.2}$, $H_{12.3}$, +, +, +)

Environmental context

- Customer pressure ($H_{13.1}$, $H_{13.2}$, $H_{13.3}$, +, +, +)
- Trading partner pressure ($H_{14.1}$, $H_{14.2}$, $H_{14.3}$, +, +, +)
- Competitive pressure ($H_{15.1}$, $H_{15.2}$, $H_{15.3}$, +, +, +)
- Regulatory & legal environment ($H_{16.1}$, $H_{16.2}$, $H_{16.3}$, +, +, +)
- National e-readiness ($H_{17.1}$, $H_{17.2}$, $H_{17.3}$, +, +, +)
- Technology consultants' participation ($H_{18.1}$, $H_{18.2}$, $H_{18.3}$, +, +, +)
- Economic downturn ($H_{19.1}$, $H_{19.2}$, $H_{19.3}$,, -, -, -)

4.5.1. Hypotheses concerning e-commerce technology characteristics and their relation to non-interactive e-commerce, interactive adoption of e-commerce and stabilisation of e-commerce technology

Innovation attributes were defined to include five major drivers for e-commerce adoption: namely, relative advantage, compatibility, adoption costs, security risk and language concern.

Relative advantage: Relative advantage of e-commerce in this research study is defined as the potential to help increase sales, reduce cost, increase customer satisfaction and improve

coordination and communications (Zhu et al., 2006a). The e-commerce literature has reported empirical evidence to support the potential of e-commerce to improve business performance, including revenue generation (Barua et al., 2004), greater efficiency of internal processes, improved customer service and improved relationships and coordination with trading partners (Zhu and Kraemer, 2005). More importantly, e-commerce broadens an organisation's customer base due to the possibility of operating globally through electronic means.

In addition, Clayton and Goodridge (2004) point out that firms that use e-business for conducting their business processes and activities are found to have higher average labour productivity than firms without such links, because it is believed that employee appreciation of the relative advantages of the new system influences the extent of implementation (Chwelos et al., 2001). Indeed, these potential benefits provide incentives for companies to use e-business (Rogers, 1995). Seyal and Rahman (2003) found that relative advantage was an insignificant contributor to e-commerce adoption within small and medium enterprises. However, a study by Levenburg (2005) has indicated that the use of e-business tools such as electronic supply chain management (e-SCM) offers many opportunities to small and medium businesses, such as increased sales and profits, reduced direct costs to create products and/or services, reduced shipping costs, and increased net profits. Hence, this study hypothesises that the higher relative advantage of e-commerce is likely to facilitate the pre-adoption, preliminary adoption and the stabilisation of e-commerce technologies.

Hypothesis H $_{1.1}$: Relative advantage contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{1.2}$: Relative advantage contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{1.3}$: Relative advantage contributes significantly (and is positively related) to the stabilisation of e-commerce.

Compatibility: Consistent with Rogers' (1983) and Zhu et al.'s (2006a) conceptualisation, compatibility is defined as the degree to which e-commerce applications are compatible with firms' objectives, the existing work practices of companies, procedures, infrastructures, values and the corporate culture of potential adopters. In fact, adopting e-commerce entails the selection and implementation of a suite of technologies (i.e. hardware, software) and high

compatibility is believed to reduce the perception of uncertainty by displaying consistency with the present values, past experiences, and current needs of the organisation (Tabak and Barr, 1998). Therefore, if the technical and procedural requirements of the innovation are highly (or minimally) compatible with the structure, activities of the organisation, existing work practices and firms' objectives, firms will be more likely to adopt them (Lertwongsatien and Wongpinunwatana, 2003; Downs and Mohr, 1976).

E-commerce can lead to significant changes in work procedures because it replaces numerous manual paper-based work procedures with electronic means and may even involve the reengineering of an entire value chain (Lin and Lin, 2008). Indeed, a greater fit between e-commerce functions and existing work practices is desirable because it increases the likelihood of achieving successful e-commerce adoption (Lin and Lin, 2008).

Lin and Lin (2008) and Chatterjee et al.(2002) noted that if conducting transactions over the Internet is compatible with existing processes, strategies, telecommunications infrastructure and systems, companies would require lower efforts to deal with incompatibility and thus are more capable of adopting the new technology. Conversely, lack of compatibility may result in organisational resistance, which might retard e-commerce adoption (Premkumar et al., 1994). Furthermore, Kwon and Zmud (1987) concluded that incompatibility of new technologies with existing values and business practices is one of the greatest inhibitors in IS adoption. On that basis, the following hypotheses are developed:

Hypothesis H $_{2.1}$: Compatibility contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{2.2}$: Compatibility contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{2.3}$: Compatibility contributes significantly (and is positively related) to the stabilisation of e-commerce.

Cost of adoption: Cost is linked to the perceptions of the adopter regarding the capital needed for investments. In many cases, e-commerce applications are very expensive (Matopoulos et al., 2009). Drawing upon IS literature, cost of adoption is defined in this research study as the costs of implementing necessary technologies for on-line transactions, including initial development investments and recurring operating expenses (Zhu et al.,

2006a; Walczuch et al., 2000). In fact, the implementation projects of e-commerce systems are complex projects and they require substantial resources.

E-commerce requires investments in necessary internet technologies, as well as employee training and supporting hardware and related software packages such as ERP and CRM (Chircu and Kauffman, 2000). It also requires companies to build telecommunication connections, workstations, higher-speed computer systems, and high skill information systems specialists to handle different connectivity arrangements, search engines and electronic catalogues (Zhu and Kraemer, 2005; Davila et al., 2003; Kheng and Al-Hawamdeh, 2002). Additionally, the cost of dial-up and connection charges to Internet Service Providers (ISPs) will further add to the costs of e-business adoption. In fact, firms will be more inclined to use B-to-B technologies with affordable service fees as the cost of innovation is often a barrier to adoption (Tornatzky and Klein, 1982). Tidd et al. (2001) note that innovations tend to evolve over time through improvements required by early users, which may reduce the relative cost to later adopters.

Keeling et al. (2000) investigated the factors driving and inhibiting e-commerce adoption in small and medium enterprises (SMEs). They found that cost of e-commerce developments, concerns about security, and lack of customer satisfaction are major inhibitors of e-commerce adoption. Further, Crespi et al. (2004) note that cost has a negative effect on the assimilation of new technologies within firms. In addition, in a 2002 literature review of the ICT area, Dixon et al. (2002) note that high initial set-up costs are found to be common aspects in relation to e-business adoption barriers for SMEs and indeed for other firms that have financial problems. Based on the literature reviewed, it makes intuitive sense to suggest that adoption costs are more likely to hinder e-commerce adoption. Therefore, the following hypotheses are suggested:

Hypothesis H $_{3.1}$: Adoption cost contributes significantly (and is negatively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{3.2}$: Adoption cost contributes significantly (and is negatively related) to the interactive adoption of e-commerce.

Hypothesis H $_{3.3}$: Adoption cost contributes significantly (and is negatively related) to the stabilisation of e-commerce.

Security concern: Security is defined as the extent to which the internet platform is believed insecure for exchanging data and conducting online transactions (Zhu et al., 2006a). Security risks are becoming greater as computer networks have become more complex and are more difficult to manage (Papazoglou and Ribbers, 2006). Many authors consider security issues such as hacking, viruses, data interception, and misuse of credit cards as the biggest concern in doing business over the Internet and the most robust factor in determining diffusion (Alam et al., 2007*;* Zhu et al., 2006a; Zhu et al., 2006d; Alam et al., 2004; Hoppe et al., 2001; Kendall et al., 2001a; 2001b; Saunders, 2000, Nath et al., 1998; Auger and Gallaugher, 1997). Security concern deserves special attention in the context of e-commerce for several reasons. First, e-commerce primarily uses the Internet and open network protocols whose underpinning technology was originally designed for sharing data in research projects rather than for the purposes of e-commerce (Ratnasingham, 1998). Moreover, companies using e-commerce generally move away from private communication networks to open public networks in which they are found to open their private network applications and information assets to customers, suppliers and business partners (Papazoglou and Ribbers, 2006). Accordingly, firms have less control over data standards and access compared to previous inter-organisational systems, such as EDI, that are based on private networks and implement less open public networks (Zhu and Kraemer, 2005). Thus, companies and their customers, suppliers and business partners would have greater concerns to move to electronic commerce because of the potential for unauthorized access to data, theft of business information and funds, alteration of financial documents, as well as the potential for illicit transactions and concerns over payment security (Papazoglou and Ribbers, 2006). This makes security issues particularly significant (Jones et al., 2000).

Second, e-commerce involves the complex interaction of multiple computer environments, communication protocol, web interfaces, policies and procedures that are more difficult to manage and must all be considered when implementing a coherent, consistent approach to e-business security. In fact, these techniques become unsustainable as a firm's e-commerce portfolio grows and as online interactions between enterprises become more complex (Papazoglou and Ribbers, 2006). A recent study by Wu and Chuang (2009) finds that the guarantee of the security of information flow is the important concern in an e-business adoption decision, and the ability to provide security is critically relevant to the further adoption of e-business (Zhu et al., 2006a; Ruppel, 2004; Smith et al., 2007). Indeed, although

e-commerce radically enhances enterprise productivity, it will never achieve its full potential in the absence of adequate security mechanisms (Papazoglou and Ribbers, 2006).

A survey conducted by Price Waterhouse Coopers (1999) to understand SMEs' e-commerce adoption, showed that concern about security/privacy is perceived as the third most important barrier to the use of e-commerce by SMEs. Moreover, Zhu et al. (2006a) empirically investigated the attributes of innovation that may be associated with organisational e-business adoption. They surveyed 1415 companies from six European countries and their findings suggest that there is a negative association between security risk and e-business diffusion. In addition, Fillis et al.'s (2004) study of 21 UK SMEs provides further support. They found that security is a possible impediment to future e-commerce development. It is commonly believed that security concern would retard organisational e-commerce adoption and future diffusion (Jones et al., 2000). In general, the degree of perceived risk is highly negatively related to the rate of diffusion (Shoemaker and Shoaf, 1975). Based on the above arguments, the following hypotheses are posited:

Hypothesis H $_{4.1}$: Security concern contributes significantly (and is negatively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{4.2}$: Security concern contributes significantly (and is negatively related) to the interactive adoption of e-commerce.

Hypothesis H $_{4.3}$: Security concern contributes significantly (and is negatively related) to the stabilisation of e-commerce.

Language concern: Language concern is emerging as a critical factor for using internet technologies for non-English-speaking communities, and it is defined as the extent to which the internet platform is believed to be easy and free of language barriers. Researchers have established that since English is the dominant language of the Internet, the language concern attribute might be a crucial factor in internet technology adoption for non-English-speaking communities (Al-Shohaib et al., 2009). For example, Nguyen and Schauder (2007) found English language as a barrier to the successful development of e-government in Vietnam. Al-Lehaibi (2001) found that lack of English language skills slowed Internet adoption in Saudi Arabia, and Al-Najran (1998) found similar results in Kuwait. Khalfan and Alshawaf (2004) also noted that "there are some barriers to technology adoption from both

cultural/environmental and managerial perspectives in Arab regions...., the cultural and environmental perspectives barriers may include privacy, security issues, language, communication, and people's preference for using 'traditional' means for doing things" (58). In fact, cultural issues and environmental factors are very important and play a major role in adopting technologies in Arab regions (Khalfan and Alshawaf, 2004).

Although considerable work has been done in studying the impact of language concern on the use of internet technologies in general, there is insufficient literature on the influence of language concern on the adoption of e-commerce, particularly by firms in non-English-speaking communities (Khasawneh and Ibrahim, 2008). Based on the literature reviewed, it makes intuitive sense to suggest that language concern is more likely to hinder e-commerce adoption.

Hypothesis H $_{5.1}$: Language barrier contributes significantly (and is negatively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{5.2}$: Language barrier contributes significantly (and is negatively related) to the interactive adoption of e-commerce.

Hypothesis H $_{5.3}$: Language barrier contributes significantly (and is negatively related) to the stabilisation of e-commerce.

4.5.2 Hypotheses concerning the organisational dimension and their relation to non-interactive e-commerce, interactive adoption of e-commerce and stabilisation e-commerce technology

Innovative organisations have identifiable organisational characteristics that distinguish them from their non-innovative counterparts (Damanpour, 1987). Further, Damanpour and Wischnevsky (2006) argue that organisations that adopt a given innovation or a set of innovations are more likely to rely on their managerial and organisational capabilities to select and implement innovations. Organisation is the primary vehicle for innovation because it has scientific knowledge and management expertise, production means, better access to capital, and often some degree of monopoly power, which increases the likelihood of investing in innovation (Afuah, 2003). Clearly, a major concern is to understand the structure and functioning of organisations.

The present study considers important factors drawn from organisational behaviour theories to uncover organisational variables potentially affecting the innovation adoption and implementation process. Each is especially rich in prospects for further research and important to both theorists and practitioners alike. Taking an eclectic approach, organisational variables examined in this thesis are information technology capabilities, learning orientation, receptivity to change, strategic orientation and organisational structural characteristics.

Information technology (IT) readiness: Consistent with prior studies, information technology readiness in this study consists of technology infrastructure and employees' IT knowledge. Technology infrastructure (or technological resources) refers to hardware, operating systems and software resources that enable internet-related businesses (e.g. EDI, EFT, intranet and extranet) (Byrd and Turner, 2001), while employees' IT knowledge or skills refer to IT professionals possessing the knowledge and skills to use and implement internet-related applications effectively (Huang et al., 2006; Zhu and Kraemer, 2005). IT knowledge includes employees' knowledge of programming, website design, systems analysis and design, internet security knowledge and competencies in emerging technologies (Wang and Shi, 2009).

Previous studies have concluded that firms' technological readiness and employees' IT knowledge are among the most important organisational characteristics affecting innovation adoption (Scupola, 2003; Harrison et al., 1997; Iacovou et al., 1995; Cragg and King, 1993). Thong (1999) suggested that the higher IT readiness the staff have, the higher is their potential in the use of information systems, and thus the higher the potential of adopting IT. Organisations without such capacity will be less able to adopt innovation and thus demonstrate lower technology competence. In their study to identify organisational characteristics that would influence the adoption of customer relationship management systems (CRMS) by hospitals in Taiwan, Hung et al. (2010) find that IS capabilities have significantly affected CRMS adoption and the authors conclude that the enhancement of the information literacy of hospital staff and information technology capability will increase the possibility of adoption of CRMS.

Organisational IT readiness has also been identified as one of the main factors influencing the adoption of information systems by small and medium enterprises (SMEs) (Grandon and Pearson 2004; MacKay et al., 2004; Mehrtens et al., 2001; Nikolaeva, 2006) as SMEs often lack the financial and non-financial resources, as well as the knowledge, to implement sophisticated technologies (Cragg and King, 1993; Mehrtens et al., 2001). In the same vein, Hadaya (2008) finds that a firm's technological predisposition is a key for firms to use B-to-B e-commerce to sell products. This result reinforces previous findings (Iacovou et al., 1995; Premkumar and Ramamurthy, 1995; Swatman and Swatman, 1991) that have demonstrated that technical and human resources are essential when adopting technological innovation. Accordingly, Wang and Shi (2009) note that firms with IT readiness would be likely engage more in e-commerce activities. This leads to the following hypotheses:

Hypothesis H$_{6.1}$: Information technology readiness contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H$_{6.2}$: Information technology readiness contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H$_{6.3}$: Information technology readiness contributes significantly (and is positively related) to the stabilisation of e-commerce.

Management team support: Successful innovation adoption requires support from top management in order to integrate the innovation into business activities and processes. In a study of 77 Australian travel agencies conducted by Standing et al. (1998), it was found that management involvement was the driving force behind the adoption of the World Wide Web among those agencies.

Many empirical studies have pinpointed the role of top management participation in the acquisition and diffusion of innovation (Kimberly and Evanisko, 1981; Meyer and Goes, 1988; Rai and Patnayakuni, 1996). It is believed that an innovation is adopted when top managers decide to go ahead with the new innovation and allocate adequate resources for acquiring it and overcoming resistance to change (Damanpour and Schneider, 2006; Premkumar and Roberts, 1999; Kim and Sirvastava, 1998; Leonard-Barton and Deschamps, 1988; Rai and Patnayakuni, 1996). According to Srinivasan et al. (2002), the role of top management is important because new technologies may entail the destruction of existing

assets for which the management's approval will be required. Moreover, top management is liable for providing a general guide on information systems and top management advocacy is a very important factor in the success and failure of information systems (Kim and Lee, 2008). Furthermore, top management determines the logical and physical configuration of the systems. The level and usage direction of new technology are dependent upon top management support.

It has been widely recognized that the support of top management is a crucial success factor in information technology (IT) adoption (Premkumar and Ramamurthy,1995; Premkumar et al., 1997) because top management support and participation generally requires personal and managerial knowledge of the new technology, such as B2B e-commerce (Eid et al., 2002). Management information system (MIS) research confirms that the introduction of new systems is less likely to be successful without the support of top management (Dong, 2001; Wixom and Watson, 2001; Lucas *et al.*, 1990; Delone, 1988; Doll, 1985; Zmud, 1984). Ketler et al. (1997) assert that strong upper management support, including financial and personnel resources, is a crucial success factor for telecommunications technology adoption projects. The authors conclude that, without such support, EDI is not practical. Kim and Lee (2008) find that management advocacy promotes the possibility of the successful implementation of EDI systems.

As the investment of new technology in a firm requires a substantial amount of firm resources, top management commitment to the innovation is essential in order to dedicate a high level of resources and support to foster a greater use of information systems within that organisation. In fact, top management's commitment ensures adequate resources for implementing the innovation (Delone, 1988; Grover and Goslar, 1993). Grover and Goslar (1993) argued that there are two determinants which support the IT implementation process: namely, top management's knowledge of information technology and top management's involvement in IT planning. Ahmed (1998) pointed out that among the characteristics that distinguish highly innovative firms from less innovative firms are when top management commits both financial and emotional support to innovation adoption.

In the context of enterprise-level e-commerce adoption, various studies identified top management participation and commitment as key factors for successful implementation of e-commerce processes for an organisation (Chaffy et al.*,* 2000; Chan and Swatman, 2000).

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Poon and Swatman (1999) found that direct management involvement was common for firms that adopted e-commerce. Also, Chan and Swatman (2000) emphasised that management at the supervisory level plays the most critical role in implementing business-to-business international internet marketing (B2B IIM) successfully. This is similar to the findings of Eid et al. (2002) who found that top management teams' advocacy is critical to the success of B2B e-commerce for organisations and is one of the keys to integrate the Internet effectively with the strategic marketing plan. In fact, adopting and implementing e-commerce technology requires a high level of resources that are accelerated mainly with the continued support of top management. In addition, top management support for e-commerce would encourage both senior and line management to participate actively in promoting and facilitating e-commerce initiatives in order to enhance performance of the whole company. Broadly speaking, e-commerce may be exacerbated by poor management commitment and support. In summary, top management participation and commitment is important for the adoption of new technology and researchers argue that the lack of top management support is a serious handicap to innovation adoption (Cooper and Kleinschmidt, 1987; 1988; Gupta and Wilemon, 1990). Damanpour and Schneider (2006) assert that, in general, the initiation and implementation phases of the adoption process are more complex and more challenging for top managers than making the adoption decision. With the above research findings in mind, the following hypotheses are proposed:

Hypothesis H$_{7.1}$: Management team support contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H$_{7.2}$: Management team support contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H$_{7.3}$: Management team support contributes significantly (and is positively related) to the stabilisation of e-commerce.

Organisational learning orientation: Organisational learning has been noted by various strategic scholars as an important determinant of successful firms (Hurley, 2002) and an important determinant for the creation of sustainable competitive advantage (Hurley and Hult, 1998). In fact, success and innovation in today's highly competitive global marketplace requires companies with the availability to learn and change quickly (Bartezzaghi et al., 1997; Tichy and Cohen, 1998). Geus (1998) further emphasized the importance of learning

capability, which is the ability to learn faster than competitors, and which might be the only sustainable competitive advantage.

Learning orientation influences what kind of information is gathered (Dixon, 1992) and how it is interpreted (Argyris and Schon, 1978), evaluated (Sinkula et al., 1997) and shared (Moorman and Miner, 1998). Consequently, Calantone et al. (2002) showed that firms with high level of learning orientation can be expected to exhibit high level of competencies across the areas of measuring customer expectations, identifying quality variance, implementing quality improvements, identifying market change and using technology to acquire data. Undoubtedly, an organisation committed to learning is likely to possess state-of-the-art technology (Gatignon and Xuereb, 1997). Senge (1990) believed that companies which are committed to learning, view learning as its fundamental core activities. Similarly, Tobin (1993) mentioned that commitment to learning is to give employees the ability to think and reason outside the pre-established framework.

Recent studies have shown that developing organisational learning is an effective and efficient means of successful technological innovation adoption (Martin and Matlay, 2003; Gilbert and Cordey-Hayes, 1996; Raymond and Blili, 2000). Attewell (1992) suggests that the lack of technical know-how and organisational learning orientation may act as knowledge barriers, preventing the adoption of innovations. His research shows that organisational learning plays an important role in the diffusion of complex IT innovations. Salavou et al. (2004) further showed that learning-oriented firms facing strong competition tended to be more innovative. They found that learning increased firms' innovative activity. A case study conducted by Larsen (1998) on a large healthcare business firm to explore the relationship between the implementation of business process re-engineering (BPR) and organisation learning found that organisational learning orientation has an effect on BPR implementation. Furthermore, a survey questionnaire on 500 companies using an Electronic Document Management System (EDMS) in Hong Kong found that the learning orientation of a company does affect the satisfaction of employees using an EDMS and has a positive impact on the performance of employees after using the system (Cho, 2010).

A growing number of studies have recognised the sharply contrasting consequences experienced by comparable organisations deploying and using the same technologies (Robey and Boudreau, 1999). One way to account for such differences is the relative ability of

organisations to learn how to use the same technologies (Robey et al., 2000). A high organisational learning ability will facilitate the capture and interpretation of information flows both within and across the boundaries of the business once e-business initiatives are adopted in its communication processes and activities. On the other hand, the extent of e-commerce integration in order-taking, interacting with customers and buying and selling requires technologically complex applications that link multiple parts of the business unit to each other and with outside units.

Businesses with a higher organisational learning ability are more likely to successfully manage this transition by allocating their resources to update their applications, dealing with the various technological and organisational complexities involved, and working with their stakeholders to accomplish these boundary-spanning tasks (Wu et al., 2003). Cho (2010) argues that companies with a strong learning culture can face the challenges of the ever changing environments and may also have a better utilisation of an information system.

Adequate e-commerce knowledge is a necessary first step towards e-commerce systems adoption, and firms that increase their knowledge of e-commerce can be expected to be more willing than other firms to adopt e-commerce systems (Lin and Lee, 2005). Moreover, since e-commerce adoption represents an ongoing process of assimilation and transformation, training activities potentially affect employees' attitudes to e-commerce, encouraging them to accept it, and thus training leads to greater firm adoption of e-commerce systems. In fact, training activities increase existing know-how and encourage the exchange of information and knowledge related to the new technology (Fichman and Kemerer, 1999). Further, Francalanci and Morabito (2008) argued that acquiring knowledge related to a new IT domain by investing in training can help evaluate future opportunities that may be offered by technological development over time (Francalanci and Morabito, 2008).

Research has shown that firms must undergo an intensive learning process to bridge the gap between what they currently know and what the new technology requires them to know. In fact, organisational learning orientation plays an essential role in shaping information technology adoption and in explaining and resolving the problems of adopting and implementing new IT in firms. This perspective has been supported by several recent studies (Ke and Wei, 2006; Raymond and Blili, 2000). Martin and Matlay (2003) argued that

developing organisational learning and knowledge management strategies has been considered an effective and efficient means of successful technological innovation.

When e-commerce is first introduced, firms inflict a considerable burden on the adopter in terms of the knowledge required to understand and adopt it efficiently (Purvis et al., 2001; Gibbs and Kraemer, 2004). However, although links between organisational learning and e-business implementation have often been assumed, little empirical evidence is available to support this perspective and, more importantly, empirical studies have seldom examined the relationship between organisational learning orientation and the e-business applications adoption process. Therefore, the impact of organisational learning orientation on e-commerce adoption success needs to be identified and examined. Motivated by the arguments discussed above and based on the organisational learning literature, the following hypotheses are put forward:

Hypothesis H $_{8.1}$: Organisational learning orientation contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{8.2}$: Organisational learning orientation contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{8.3}$: Organisational learning orientation contributes significantly (and is positively related) to the stabilisation of e-commerce.

Receptivity toward change: Consistent with Menguc and Auh (2006), receptivity toward change is defined in this study as organisational members' proclivity, willingness, and inclination to engage in innovative behaviour and adopt ideas that depart from the usual or old way of approaching business. In fact, receptivity toward change can be characterised by varying degrees of an organisation's members' willingness to forgo old habits and try untested ideas, to move from passive acceptance to enthusiastic endorsement (Huy, 1999). In general, a favourable attitude towards change leads to an internal climate conducive to innovation and a willingness to take on external ideas (Rothwell, 1992; Damanpour, 1991). However, researchers have reported that favourable attitude toward change in organisations is less likely to be achieved quickly or easily, and more time and resources will be needed to

convince an organisation's members to participate constructively in accepting the innovation (Huy, 1999; Rogers and Shoemaker, 1971).

Organisations that are reluctant to accept technological changes are less likely to encourage an organisation's members to use new technologies (Taalikka, 2004). More recently, Abdul Rashid et al. (2004) indicated that managing the human part of the organisation is a major challenge in handling change processes in organisations as it involves values, preferences, and attitudes toward a particular activity. Undoubtedly, if top managers (committees and/or boards) are motivated to innovate and/or have favourable attitudes toward the innovation, there is likely to be a positive attitude to implement the technology, and resources will be allocated for its acquisition and alteration (Meyer and Goes, 1988). Conversely, if there are less favourable attitudes toward the innovation or technology, there is a greater likelihood that it will not be implemented (Zaltman et al., 1973).

It is to be noted that this research study falls into the cultural stream of receptivity to change research in which receptiveness toward change is regarded as an attitudinal trait of the members of the firm and as an aspect that resides in the corporate culture, or shared values and beliefs of the firm. In fact, receptivity toward change is a firm-specific and valuable characteristic that is not easily transferable or imitable by other firms and, more importantly, is one that promises to leverage organisational performance (Hult and Ketchen, 2001; Hurley and Hult, 1998). The greater the extent to which innovativeness is embedded in the cultural and social fabric of the firm, the greater its value (Menguc and Auh, 2006). Firms that are receptive to change are more innovative and are thus more likely to be successful in using new technologies such as e-business to achieve a competitive advantage.

Recent research by Taalikka (2004) has found that organisational openness toward new technologies does not have any effect on the adoption of corporate websites. However, Taalikka (2004) found that management's own open attitudes increase the level of organisational openness. Finally, Dong (2001) reported that top management can promote organisational receptivity of IT innovation and reduce uncertainties around technical changes and organisational transformation by training, by formal presentation, and by establishing communication channels with targeted users.

According to Taalikka (2004), an open and innovative organisation with positive attitude toward change is more likely to adopt innovations aggressively and realise greater implementation success. An organisation's receptivity and ability to respond to the new technologies is an indicator of the ability of organisational actors to view change in a positive light (Agarwal and Tanniru, 1996).

Despite the growing interest in the area of technological innovation literature, few studies have focused on the core stages in the innovation process and receptivity to change. The little research that has been conducted in this area suggests that receptivity to change is expected to be of particular significance as process innovations require substantial changes in the nature of the work itself (Zmud, 1984). Therefore, the following hypotheses are suggested:

Hypothesis H$_{9.1}$: Receptivity toward change contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H$_{9.2}$: Receptivity toward change contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H$_{9.3}$: Receptivity toward change contributes significantly (and is positively related) to the stabilisation of e-commerce.

Strategic orientation: Strategic orientation refers to the philosophy of firms and how firms should interact with external environments to conduct business through a deeply rooted set of values and beliefs (Zhou and Li, 2010; Gatignon and Xuereb, 1997; Day, 1994). When a firm decides to adopt new technology such as e-commerce, the planning and implementation of such a technology would have a direct impact on the organisation's strategy (e.g. through change in organisational processes) and information strategy (e.g. through new technologies that are changing information flows) (Dubelaar et al., 2005). A survey of 378 organisations conducted by the Gartner Group in 2001 found that 90% of organisations surveyed were doing e-commerce; however, only 40% of organisations had a clearly articulated and well-documented e-commerce strategy that was integrated with their enterprise strategy (Krammer, 2001). Thus, operations management researchers have called for substantiating business strategy research in an e-commerce environment (Cao and Schniederjans, 2004).

Previous research has agreed that setting strategic goals is a critical factor for e-commerce implementation. Eid et al. (2002) note that B2B e-commerce implementation depends on how clearly defined the strategic goals are for an organisation. Moreover, Chaffy et al. (2000) point out that internet marketing must be consistent with business objectives. Dougherty and Hardy (1996) suggest that there must be three elements for an organisation to develop the capacity for continuous and sustained innovation: (1) available resources, (2) collaborative structures, cross-functional teams and processes to solve problems, and (3) innovation as part of the business strategy.

It should be stressed that in this research study strategic orientation is treated as an important part of organisational culture (Hunt and Morgan, 1995). The importance of this perspective has been emphasised by Narver and Slater (1998) who argue that if a strategic orientation were just a set of organisational activities that are totally disassociated from organisational norms and values, then a strategic orientation could simply be implanted by the organisation at any time. However, this is not what is observed (Narver and Slater, 1998). In the same vein, Hunt and Morgan (1995) note that strategic orientation is a philosophy of doing business that should be a major part of a successful firm's culture.

Gatignon and Xuereb (1997) determined three components of strategic orientation that reflect an underlying organisational culture that would seek to adopt information technology innovation: namely, customer, competitor, and technology orientations. The concept of customer orientation refers to a firm's sufficient understanding of its target buyers or consumers and the ability to develop products and services to satisfy their wants, tastes, desires and needs in order to be able to create superior customer value (Narver and Slater, 1990). Competitor orientation refers to the ability and the will of the firm to identify, analyze, and respond to competitors' actions (Narver and Slater, 1990). Technology orientation relates to the long-range strategy of an organisation to acquire new technologies that affect the development of new ideas, new processes and new products or service (Salavou et al., 2004). The following section discusses these orientations in more details.

Customer orientation is vital for success in today's competitive environment and it emphasizes driving business decisions to meet customer needs (Gulati and Oldroyd, 2005). According to Appiah-Adu and Singh (1998), customer orientation is found to permeate the overall activities of a company. It is not an easy task since it does require the commitment of

considerable human, financial and other organisational resources (Appiah-Adu and Singh, 1998). Moreover, Laforet (2009) notes that customer orientation is the driver of organisational innovation,and his study recognises that customer orientation has a strong effect on innovation practices and on a company's innovativeness. Webster (1994) notes that organisations must be customer-oriented, market driven, global in their scope, flexible in their ability and have a long-term vision to deliver superior value to customers whose preferences and expectations change continuously.

A customer orientation, with its detailed analyses of customer needs and wants, helps a firm satisfy its customers whose preferences and expectations change continuously, and thus is more likely to lead to a differentiation advantage (Zhou et al., 2007). Correspondingly, such a business is likely to have a more proactive approach towards the adoption of new technologies, including those related to e-business, in its business processes (Wu et al., 2003). In fact, customer-oriented business tends to accentuate activities that could establish a close relationship with customers and that will lead to enhanced customer satisfaction, trust and increased loyalty. Moreover, Wu et al. (2003) assert that a customer-oriented business is more likely to consider future customer needs and have a long-term vision. In addition, Wu et al. (2003) note that a higher customer orientation is likely to influence e-business adoption, in which a customer-oriented business would seek to regularly exchange information with its customers to better understand their needs and provide superior service. A study by Appiah-Adu and Singh (1998) found a link between customer orientation and new product success. Furthermore, Bernroider and Hampel (2004) indicate that the link between firms and their customers is believed to be strengthened by enabling e-business. Previous research has emphasised that firms should identify and satisfy customer needs more effectively than their competitors (Day 1994; Kotler 2002). A business with a high degree of customer orientation will implement new innovation such as e-business in their business by facilitating online order taking as well as integrating an on-line 'store' with other business systems (e.g. order processing, accounts and/or marketing) (Wu et al., 2003).

Competitor orientation emphasizes observing and responding to the competitive moves of competitors (Porter, 1985). Competitor orientation focuses on a company's understanding of the strengths, weaknesses, capabilities and strategies of key and key potential competitors and, more importantly, on the monitoring of their activities (Mueller et al., 2001). Generally, competitive effects play an important role in a firm's strategy (Porter, 1985) and, more

specifically, in their innovation strategy and performance (Gatignon and Robertson, 1993; Robertson and Gatignon, 1986). Wilson et al. (1999) examined the relationship between organisational climate and the adoption of imaging technology innovations in 70 hospitals and found that a hospital would adopt a new medical technology due to the competition in the market, and this would relate to a strategic relative advantage. Deshpandé et al. (1993) and Armstrong and Collopy (1996) argue that competitor orientation, with its focus on the strengths and weaknesses of its competitors rather than the particular needs of its customers, can be antithetical to a customer orientation. However, Day and Wensley (1988) emphasise that customer and competitor orientations are two distinct approaches that lead to competitive advantage; hence, they suggest a balance of an organisation's customer and competitor.

In fact, competitor oriented businesses tend to watch costs closely, so they may quickly match the marketing initiatives of competitors which may lead to a cost advantage. However, competitor orientation may be more/less effective in different situations (Zhou et al., 2007). For example, a competitive orientation in high-growth markets is useful because it enables the firm to position the new product or service well and develop innovations with lower costs, which is a critical element of success. It is believed that a competitor-oriented business will implement e-business technologies in its business processes in order to acquire information about competitors in the target market and assimilate it throughout the business (Narver and Slater, 1990). Furthermore, increased sensitivity to competition is found to accelerate innovation adoption (Gatignon and Robertson, 1989). Businesses that are sensitive to competitors' initiatives would invest in e-business technologies and facilitate online order taking and the procurement process (Wu et al., 2003).

Technology orientation involves investing in technological infrastructure, human resource development as well as attention to acquiring technological solutions and applications to meet existing and new customer expectations. Gatignon and Xuereb (1997) note that a firm wishing to develop an innovation superior to the competition and also wishing to achieve a superior level of performance should be customer and technology-oriented.

Organisations' technological orientation has been examined as a determinant of innovation adoption in which innovation adoption is seen to be highly linked to the use of sophisticated technologies in the development of new products or services (Cooper, 1984; 1979a, 1979b). Moreover, many empirical studies have pinpointed the impact of technological orientation on

firms' innovative behaviour and have suggested that technology orientation has a significant and direct effect on organisational innovation adoption (Salavou, 2005; Salavou et al., 2004; Wilson et al., 1999). It is believed that firms that proactively acquire new technologies may be more innovative, because they employ such technologies for developing new products and services (Cooper, 1994; 1984). Gatignon and Xuereb (1997) note that a technology oriented firm would support the acquisition of new technologies, and the application of the latest technology. In addition, technology oriented firms reflect their attitude and commitment to innovation by recruiting technical personnel, committing funds to new technology development and building or maintaining a tradition of being at the forefront of a technological area in a particular industry (Salavou et al., 2004).

In fact, e-commerce adoption in organisations is basically related to advanced technologies, and the extent to which a firm invests in the related infrastructure, processes and human resources gains importance (Kabasakal et al., 2006). Indeed, investment in technologies is a prerequisite to successful e-commerce adoption by a firm (Trevino and Webster, 1992; Drew, 2002; 2003). Generally speaking, customers prefer technologically superior products and services (Gatignon and Xuereb, 1997; Wind and Mahajan, 1997).

Investing in technological infrastructure as well as committing funds to new technology development will urge the firm to develop new strategic initiatives for innovations, such as e-business adoption. According to Kabasakal et al. (2006), creating a competitive advantage through e-commerce adoption is undoubtedly related to the level of investment of a firm in technological solutions and training. Similarly, Salavou et al. (2004) assert that a firm's technological orientation has a positive effect on innovation adoption. Taking all the above into account, it can be proposed that:

Hypothesis H $_{10.1}$: Strategic orientation contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{10.2}$: Strategic orientation contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{10.3}$: Strategic orientation contributes significantly (and is positively related) to the stabilisation of e-commerce.

Organisational structural characteristics

Work on the diffusion of IT has studied the influence of various characteristics of a firm's organisational structure on the adoption of these innovations. This study focuses on the two most widely accepted dimensions of organisational structure: namely, the decentralization of authority and the formalization of rules and procedures (Grover and Goslar, 1993; Scott, 1987; Hall, 1982; Hage, 1980; Hickson, 1966).

Decentralization refers to the degree to which decision making is pushed down to lower-level managers and employees (Robbins, 1998). On the other hand, formalization refers to the presence of written rules, procedures, and documents (Miller, 1987; Hage and Aiken, 1967). Although they are not the only structural factors affecting organisation design, they may often be the vital ones and are the two fundamental elements in control and co-ordination. These two structural variables have also been included in many IT and organisational innovation studies to examine their effect on IT initiation, adoption and implementation (Thong and Yap, 1995; Grover and Goslar, 1993; Zmud, 1982). However, according to Tarafdara and Vaidyab (2006), the influence of decentralisation and formalisation on e-commerce adoption has not been frequently explored in current literature (Tarafdara and Vaidyab, 2006).

Decentralization level: Decentralization reflects the degree to which decision-making power is distributed or shared in an organisation (Mohamed, 2002). Collins et al. (1988) argued that decentralization of authority in organisations improves the chance that compatible technologies will be proposed and adopted, limits the inevitable loss of information as decisions are passed up the organisational hierarchy, and increases the acceptance of and commitment to change. In fact, the concentration of decision-making authority is found to prevent innovative ideas, while the distribution or sharing of power is a prerequisite for developing and implementing change (Thompson, 1965).

Decentralisation is found to broaden the perspectives and initiatives of lower level members' potential to process information (Saran et al., 2009). Kim and Lee (2008) conducted a study to identify the factors affecting the successful implementation of EDI systems in the context of Korean business environments. Their study finds that companies that heavily use EDI systems are characterised by having a decentralised structure. Similarly, Grover and Goslar (1993) reported that the decentralization of the organisation has a positive influence on the adoption, implementation and execution of telecommunication technologies.

Iyer et al. (2004) find that decentralization is unrelated to B2B e-commerce and they argue that decentralization of information technology adoption decisions may mean that information is too spread out across functional units, while centralized decision making may mean that information is too overloaded at the top of the firm. Taken together, it seems that companies that are more decentralized and flexible in their structure adopt and implement e-commerce more easily. Moreover, it is expected that B2B e-commerce will increase with higher levels of decentralization of information technology (IT) adoption decisions. A higher degree of decentralization facilitates the implementation phase (Pierce and Delbecq, 1977). This leads to the following hypotheses:

Hypothesis H $_{11.1}$: Decentralization of organisations contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{11.2}$ Decentralization of organisations contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{11.3}$: Decentralization of organisations contributes significantly (and is positively related) to the stabilisation of e-commerce.

Formalisation level: Formalisation refers to the presence of written rules, procedures, and documents (Miller, 1987; Hage and Aiken, 1967). Research shows that implementation of a technology such as B2B e-commerce is more likely to be adopted when there is a clearly specified body of rules and control mechanisms (Zaltman et al., 1973). Kim and Lee (2008) reported that formalisation of organisations positively affects the extent of EDI integration with internal applications.

Zaitman et al. (1973) claim that formalisation influences the adoption and implementation phase. However, Hage and Aiken (1967) found that the presence of rule manuals was negatively related to innovation. It is expected that B2B e-commerce will increase with higher levels of formalisation of information technology (IT) adoption decisions. Grover (1990) posited that formalisation is positively related to the adoption and implementation of inter-organisational information systems (IOIS). Thus, the more formalised the processes and methods of working are and the more there is a tendency for documentation of the regulations

and rules, the higher an organisation's level of technology implementation tends to be (Kim and Lee, 2008). Based on the above discussion, it is proposed that:

Hypothesis H $_{12.1}$: Formalization of organisations contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{12.2}$: Formalization of organisations contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{12.3}$: Formalization of organisations contributes significantly (and is positively related) to the stabilisation of e-commerce.

4.5.3 Hypotheses concerning the environmental dimension and their relation to non-interactive e-commerce, the interactive adoption of e-commerce and the stabilisation of e-commerce technology

The environment-related variables considered in this study are customer pressure, business partner pressure, competitive pressure, regulatory and legal environment, national e-readiness, technology consultants' participation and economic downturn.

Customer pressure: The impact of the external environment on the adoption of technology has been studied in detail. For example, Lefebvre et al. (1996) showed that the influence of customers is one of the strongest determinants of the future adoption of advanced manufacturing technologies by SMEs. Customer pressure on firms to adopt e-commerce technologies is considered to be an important category. Harrison et al. (1997) found that external pressure from customers had a strong influence on IT adoption. Moreover, Mehrtens et al. (2001) report that internet adoption by SMEs is influenced by customer readiness to adopt internet technologies. From the perspective of EDI, Teo et al. (2003) found that customer pressure is a major driving force in the adoption decision. Furthermore, Harrison et al. (1997) found that customer readiness has a strong influence on IT adoption. With the above research findings in mind, the following hypotheses are developed:

Hypothesis H $_{13.1}$: Customers pressure contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{13.2}$: Customers pressure contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{13.3}$: Customers pressure contributes significantly (and is positively related) to the stabilisation of e-commerce.

Trading partner pressure: Considerable empirical support exists for the importance of firms' suppliers or business partners' readiness to successfully implement internet–based technologies, since partner relationships are significant determinants of inter-organisational systems adoption and implementation (Lin and Lin, 2008; Chau and Tam, 1997). Iacovou et al. (1995) suggest that a powerful supplier may pursue IS strategies to encourage its trading partners to use and adopt new technology. Simatupang et al. (2002) also argue that the greater the supplier and business partner expertise, the greater the likelihood businesses will engage in e-business adoption. This leads to the following hypotheses:

Hypothesis H $_{14.1}$: Trading partner pressure contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{14.2}$: Trading partner pressure contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{14.3}$: Trading partner pressure contributes significantly (and is positively related) to the stabilisation of e-commerce.

Competitive pressure: Numerous studies have recognised the role of competition intensity as an important driver for adopting innovations. As more competitors and trading partners become IT-capable, firms are more inclined to adopt IT in order to maintain their own competitive position. In fact, competitive pressure forces the firm to adopt a technology, and the fear of being left behind their competitors is found to force many firms to reactively implement new technology such as e-commerce; indeed, firms facing significant competition tend to attribute more value to IS innovations (Zhu et al., 2004). Chengalur-Smith and Duchessi (1999) argued the importance of competitive motives for a company to utilize IT.

Many empirical studies show that external pressure is a powerful driver of IT adoption and diffusion (Hadaya, 2008; Rueylin, 2001; Premkumar et al., 1997; Iacovou et al., 1995). The probability of being an e-commerce adopter is positively influenced by the level of IT diffusion in the whole industry. In this regards, Lai et al. (2006) assert that, as more peers adopt e-business, a larger market for complementary goods, such as hardware, software, and e-business related professional services (e.g. payment, logistics, and network security) will emerge. Accordingly, this will accelerate e-commerce adoption as the larger market may result in intensified competition and force product and service price reductions (Lai et al., 2006). Tidd et al. (2001) note that where competitors adopt an innovation, affirm may adopt because of the threat of lost competitiveness, rather than as a result of any rational evaluation of benefits. Moreover, Hadaya (2008) argues that the influence of external partners and competitors is critical when the innovation is an interdependent technology since, as the weakest partners in inter-organisational relationships, small and medium organisations are extremely susceptible to coercion by their larger partners. According to Hadaya (2008), Alcan, one of the major producers of aluminium, pressured its small and medium suppliers to conduct some of their inter-enterprise activities with the prime contractor on the Quadrem B-to-B e-marketplace. With the above research findings in mind, the following hypotheses are developed:

Hypothesis H $_{15.1}$: Competitive pressure contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{15.2}$: Competitive pressure contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{15.3}$: Competitive pressure contributes significantly (and is positively related) to the stabilisation of e-commerce.

Regulatory and legal environment: The creation of a supportive environment for e-commerce adoption has formed much of the policymaking debate since the end of the 1990s (Zhu and Thatcher, 2010). Indeed, e-commerce regulation is very important for the cyberspace market as it can facilitate or inhibit the organisations to adopt e-commerce. In fact, the open nature of the Internet brings with it many issues including uncertainty, lack of transparency, fraud and credit card misuse, which in turn pose unique demands on regulatory

support which are different from other internet technologies such as e-commerce. It is widely acknowledged that a government may create incentives and barriers to adoption and use. Moreover, government support to push e-commerce and the existence of e-commerce regulation are important factors that may affect the decision to introduce or adopt e-commerce. In fact, while e-commerce does not know any boundaries, the law does. Dasgupta et al. (1999) found that government policy was an important determinant of IT adoption in India, in which companies operating in an environment where government policies are restrictive had low IT adoption.

There appears to be a widespread impression that companies operating in the industry where regulation is well established are found to make innovation adoption decisions more easily (McGowan, 1994; Premkumar et al., 1994). Yu-hui (2008) conducted an empirical investigation to identify the major factors that impact the adoption of electronic procurement in Chinese manufacturing enterprises. He found that government promotion was not a significant influencing factor of enterprises' e-procurement adoption, in which existing measures taken by the government to promote e-procurement adoption were not very effective and had little influence on the adoption.

Organisations hope relevant government agencies take more active measures to build a supportive regulatory environment for electronic trading to lessen the taxation barriers of new innovation such as e-commerce, and to strengthen the legal protection of e-commerce (Yu-hui, 2008). In fact, governmental actions can destroy the value-creating potential of resources through laws and regulation. Ndubizul and Arinze (2002) examine the effects of the quality of legal rules and enforcement on the global spread of e-commerce. Their study finds that electronic hackers and poor legal rules and enforcement are major threats to the global spread of e-commerce. In particular, many claim that poor legislation and law enforcement create incentives for hackers to intensify their activities (Ndubizul and Arinze, 2002; Dolven et al., 2000; Zabala, 2000).

If a government shows a clear commitment to e-commerce, this becomes apparent in its policy measures, which in turn can encourage e-commerce transformation (Dutta et al., 2004). In addition, a government can encourage a country's private sector to adopt e-commerce by providing supportive infrastructure, legal and regulatory frameworks, and electronic trading use directives (Yu-hui, 2008; Kuan and Chau, 2001; Oxley and Yeung,

2001). Zhu and Thatcher (2010) note that the more effective is the legal environment for e-commerce in a country, the more extensive is the e-commerce adoption in that country.

In general, the commitment of government to support e-commerce influences firms' confidence and level of e-commerce aspirations (Dutta et al., 2004; Oxley and Yeung, 2001). However, different firms may perceive the level of legal environment and government support differently. This will probably influence their decisions to adopt e-commerce and then to move beyond entry-level adoptions and transformation of e-commerce. Drawing on empirical assertions, this study hypothesizes that an adequate and supportive legal environment should have a positive impact on e-commerce adoption, as follows:

Hypothesis H $_{16.1}$: The existence of a regulatory environment contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{16.2}$: The existence of a regulatory environment contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{16.3}$: The existence of a regulatory environment contributes significantly (and is positively related) to the stabilisation of e-commerce.

National e-readiness: As an application of the Internet, e-commerce depends on information infrastructures and telecommunications for its development (Rodríguez-Ardura et al., 2008). Universally, e-commerce depends on several layers: an infrastructure layer - transportation (roads, air, railroads, etc.); a telecommunications layer (pervasive, modern, secure, and affordable channels); and a software industry to support e-commerce and the opportunity for e-payments (Alfuraih, 2008; Raven et al., 2007). Molla and Licker (2005a) report that financial institutions are found to be an important trigger as the development of such industries creates advantages by making available efficient, rapid, and sometimes preferential access to e-commerce inputs. In addition, Peng and Kurnia (2008) report that the lack of support for IT, telecommunications, logistics and banking are found to be a major obstacle to e-commerce adoption in the developing countries (Peng and Kurnia, 2008). Further, Whiteley (1999) asserts that e-payment is a necessary link in the trade cycle of e-commerce. In fact, a country's ability to make adequate investment to improve these infrastructures is again a major determinant of e-commerce's future development in the developing countries. Only with an e-commerce ready national infrastructure can the organisations adopt and use e-commerce to its full potential (Peng and Kurnia, 2008).

For e-commerce to be widely used, organisations will need to be able to acquire e-commerce applications and website servers (Peng and Kurnia, 2008). A software industry capable of supporting standard e-commerce applications is of utmost importance (Amor, 2000; Rajput, 2000). Indeed, a software industry needs to be capable of adopting software imports and maintaining them. E-commerce requires the use of central commerce applications residing on website servers. These applications provide services, including online customer authentication and authorisation, order and payment processing, automated tax and shipping calculation, and interactive customer support. Integrated decision support systems will be a key component (Cunningham and Fröschl, 1999).

According to Peng and Kurnia (2008), developing countries are usually unable to improve or re-establish their national infrastructures to the level that is common in the developed nations in the short term due to their low levels of economic development. Moreover, research shows that, in most developing countries, the IT industry is not sufficiently developed to play supply-push roles, the financial sector is not well established enough to handle electronic transactions, and transportation facilities are poorly developed (Molla and Licker, 2005b; Dutta et al., 2004; Hadidi, 2003; Humphrey et al., 2003; Tigre, 2003). However, different firms may perceive the national e-commerce readiness differently and so there may be variations in e-commerce adoption and institutionalization (Molla and Licker, 2005a; Oxley and Yeung, 2001). Based on the above discussion, the following hypotheses seem fitting:

Hypothesis H $_{17.1}$: National e-readiness contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{17.2}$: National e-readiness contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{17.3}$: National e-readiness contributes significantly (and is positively related) to the stabilisation of e-commerce.

Technology consultants' participation: When organisations innovate with information technology (IT) to take advantage of global markets, they often find that their plans are hindered by the fragmented systems which exist within the organisations and the lack of technical competence due to the advanced scientific base of the new technology (Weigelt and Sarkar, 2009; Kubr, 1986). In fact, technical experts are needed in the successful

implementation of new innovation (Kim and Lee, 2008). It is observed that adoption requires an understanding of scientific concepts (i.e. digital certificates, firewalls, and data privacy issues) as well as technical know-how to integrate a new technology with core business processes (Weigelt and Sarkar, 2009). Virtually, organisations make continual use of external consultants who may proffer technical expertise and who aim to help the organisation gain some critical resources (Wickham, 1999). In short, organisations frequently hire outside technology consultants who specialise in the problem area and can deal with the issues under consideration based on their expertise and insights.

To adopt new technology, organisations require access to not only technical knowledge, but also expertise related to re-designing work processes, products, and services on a new platform to meet evolving market needs (Weigelt and Sarkar, 2009). Some authors have demonstrated that lack of access to advice from IT vendors is often a major barrier to IT and e-commerce adoption (MacGregor and Vrazalic, 2006a; Thong, 1999; Thong et al., 1996). Hadaya (2008) argues that adopters of B-to-B e-commerce often rely on the support from consultants, integrators and vendors to integrate their applications and business processes with those of the electronic intermediary in order to properly use the IOIS[14]. The support from technology consultants is also critical for organisations willing to adopt B-to-B e-commerce (Hadaya, 2008). Organisations in developing countries have limited IT expertise and e-commerce experience. For example, Yu-hui (2008) conducted an empirical investigation on the determinants of e-procurement adoption in Chinese manufacturing enterprises and found that enterprises are more willing to risk trying e-procurement if they feel there is adequate third party support available

Technology consultants serve as a catalyst for change by influencing an organisation's IT decisions, implementing applications successfully and ensuring that users adapt to the applications (Kole 1983). Winston (1999) points out that IT consultants can help organisations to achieve a rewarding, rather than a frustrating, implementation experience by providing end-user training, advocating the innovative use of e-commerce, preparing the firm to be more receptive to change and transforming business. Implementation success occurs when an organisation routinizes and institutionalizes the new technology (Sanders, 2007; Wu et al., 2003; Cooper and Zmud, 1990).

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[14] Inter-organisational information *systems* (IOIS*): an information and management system that transcends organisational boundaries via electronic linkages with trading partners.

In fact, information technology consulting opportunities arise due to the organisations' desire to undertake change by implementing new technology such as e-commerce and its realization that it requires external help to do this. In fact, technology consultants or vendors play a critical role in the change or the movement towards the new technology adoption (Winston, 1999; Ginsberg and Abrahamson, 1991). Moreover, technology consultants have the skill in bridging the gap between commercial and technological considerations. In short, it is suggested that the new technology adoption is likely to be facilitated by technology consultants' participation and involvement. With the above research findings in mind, the following hypotheses are developed:

Hypothesis H $_{18.1}$: Technology consultants' participation contributes significantly (and is positively related) to the non-interactive adoption of e-commerce.

Hypothesis H $_{18.2}$: Technology consultants' participation contributes significantly (and is positively related) to the interactive adoption of e-commerce.

Hypothesis H $_{18.3}$: Technology consultants' participation contributes significantly (and is positively related) to the stabilisation of e-commerce.

Economic downturn: Today, more than ever before, there is a severe pressure on ICT budgets. The spending of every penny needs to be justified (Teo and Ranganathan, 2004). In fact, the recent global economic downturn added additional downward pressure on new technology adoption in which senior executives in many businesses had to cut back on innovation and ICT spending. Recent research by the Gartner group (2009) indicated that, worldwide, the year 2009 witnessed continued, weak ICT spending because of the economic situation – in fact, ICT spending declined by 6 percent during this year. Moreover, negative growth was also anticipated for telecommunication, computer software and hardware spending in 2009 (see Figure 4.5).

| **Figure 4.5** | Worldwide ICT Spending (Billions of US Dollars) |

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Source: Gartner, 2009

Stoneman (2001b) notes that financial constraints are particularly significant in the adoption and diffusion process of an innovation. In fact, innovation adoption involves more learning by doing and using and more intangible assets. Indeed, firms with extensive financial sources may find adoption easier (Stoneman, 2001b). Gomez and Vargas (2009) find that availability of funds has a positive effect on the decision to adopt new technologies. It is to be noted that the literature suggests that different firms in different countries will face different financial constraints that may change over time as financial markets mature and/or develop (Stoneman, 2001a, 2001b).

Moreover, investments in innovation seem to occur more in businesses that have been doing well in terms of profits rather than in businesses in financial crisis (Lynch, 2007). Oxley and Yeung (2001) note that, e-commerce activity is likely to correlate significantly with the level of economic development in a country.Generally, a stable economic condition will entice the business to make e-commerce investment and push e-commerce diffusion further across the country (Peng and Kurnia, 2008).This leads to the following hypotheses:

H $_{19.1}$: Economic downturn contributes significantly (and is negatively related) to the non-interactive adoption of e-commerce.

H $_{19.2}$: Economic downturn contributes significantly (and is negatively related) to the interactive adoption of e-commerce.

H $_{19.3}$: Economic downturn contributes significantly (and is negatively related) to the stabilisation of e-commerce.

4.6 Chapter summary

This chapter discussed the research model and outlined a set of hypotheses for empirical testing concerning the factors that influence or inhibit the process of e-commerce adoption in organisations. Table 4.3 provides a summary of the research hypotheses. The following chapter will describe the research design and the research methodology employed.

Table 4.3	Summary of hypotheses and expected relationships	
Research Hypotheses		**Anticipated directions**
H $_{1.1}$, H $_{1.2}$, H $_{1.3}$: Relative advantage contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{2.1}$, H $_{2.2}$, H $_{2.3}$: Compatibility contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{3.1}$, H $_{3.2}$, H $_{3.3}$: Adoption cost contributes significantly (and is negatively related) to the non-interactive adoption, preliminary interactive adoption and stabilisation of e-commerce.		**-**
H $_{4.1}$, H $_{4.2}$, H $_{4.3}$: Security concern contributes significantly (and is negatively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**-**
H $_{5.1}$, H $_{5.2}$, H $_{5.3}$: Language concern contributes significantly (and is negatively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**-**
H $_{6.1}$, H $_{6.2}$, H $_{6.3}$: Information technology readiness contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{7.1}$, H $_{7.2}$, H $_{7.3}$: Management team support contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{8.1}$, H $_{8.2}$, H $_{8.3}$: Organisational learning orientation contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{9.1}$, H $_{9.2}$, H $_{9.3}$: Receptivity toward change contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{10.1}$, H $_{10.2}$, H $_{10.3}$: Strategic orientation contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{11.1}$, H $_{11.2}$, H $_{11.3}$: The decentralization level of organisations contributes significantly (and is positively related) to the initiation, interactive adoption and stabilisation of e-commerce.		**+**
H $_{12.1}$, H $_{12.2}$, H $_{12.3}$: The formalization level of organisations contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.		**+**
H $_{13.1}$, H $_{13.2}$, H $_{13.3}$: Customers pressure contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.		**+**
H $_{14.1}$, H $_{14.2}$, H $_{14.3}$: Trading partner pressure contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.		**+**

Table 4.2 Cont.	
Research Hypotheses	**Anticipated relationships**
H $_{15.1}$, H $_{15.2}$, H $_{15.3}$: Competitive pressure contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.	**+**
H $_{16.1}$, H $_{16.2}$, H $_{16.3}$: The existence of regulatory environment contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.	**+**
H $_{17.1}$, H $_{17.2}$, H $_{17.3}$: National e-readiness contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.	**+**
H $_{18.1}$, H $_{18.2}$, H $_{18.3}$: Technology consultants' participation contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.	**+**
H $_{19.1}$, H $_{19.2}$, H $_{19.3}$: Economic downtown contributes significantly (and is negatively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.	**-**

Figure 5.1	Overview of chapter five

5.1 Introduction

5.2 Research Paradigms

5.3 Planning and Data Collection

5.4 The research population

5.5 Questionnaire design and development process

5.6 Operationalisation of constructs

5.7 Translation of the Questionnaire

5.8 Ethical considerations

5.9 Pilot test of the questionnaire

5.10 Administration and distribution of the questionnaire

5.11 Difficulties and problems during the data collection in this study

5.12 Estimating non-response bias

5.13 Data analysis techniques

5.14 Data screening prior to analysis

5.15 Reliability and validity assessment

5.16 Chapter summary

5.1 Introduction

The previous chapter developed a conceptual model and outlined a set of hypotheses concerning the factors that influence or inhibit the process of e-commerce adoption in organisations. The primary focus of this chapter is to discuss the research design and the research methodology employed. Figure 5.1 (previous page) portrays the organisation of the chapter.

The main objectives of this chapter are as follows:

1. To justify the research paradigm and strategy used to carry out the research;

2. to describe the data collection process, the sample, participants and ethical considerations;

3. to discuss how the dependent and independent variables were operationalised as well as the measures taken to ensure the validity and reliability of the variables;

4. to present the data analysis techniques employed;

5. to discuss the study's main sources of error and limitations.

5.2 Research paradigms

A paradigm is defined as, "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" (Kuhn,1970, p.175). The basic feature of a paradigm includes epistemology which refers to the assumptions about valid knowledge and how it can be obtained (Mayers, 1997; Hamilton and Ives, 1992; Galliers, 1985). Within IS, there are three underlying epistemologies that researchers can select in order to guide a particular research. These are positivism, interpretivism and critical research (Mingers, 2003; 2001; Orlikowski and Baroudi, 1991).

5.2.1 Positivism paradigm

Positivism is an epistemological position that assumes that reality is objectively given and can be described by measurable properties, which are independent of the observer (researcher) and his or her instruments (Myers and Avison, 2002). According to Orlikowski and Baroudi (2002), a research is considered as positivist if there was evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of

inferences about a phenomenon from the sample to a stated population (Orlikowski and Baroudi, 2002). Positivism holds out the possibility that human beings and their actions and institutions can be studied as objectively as the natural world (Fisher, 2003). Moreover, the positivist is trying to look for laws and find out causality through objective analysis of the facts that have been collected. Thus, the researcher is independent of and neither affects nor involved by the subject of the research. Since this research provides evidence of propositions (Chapter 4), quantifiable measures of variables (Chapter 5), hypothesis testing and the drawing of inferences about a phenomenon from the sample to a stated population (chapters 6 and 7), the positivist epistemology was considered to be appropriate for this research.

5.2.2 Interpretative paradigm

An interpretative paradigm is concerned with understanding human behaviour from the participant's own frame of reference (Hussey and Hussey, 1997). Moreover, it focuses upon the complexity of human sense making. Lee (1991) asserts that the interpretive approach requires that " the social scientist must collect facts and data describing not only the purely objective, publicly observable aspects of human behaviour, but also the subjective meaning this behaviour has for the human subjects themselves" (Lee,1991, p.347). In fact, an interpretative paradigm interests upon people's understanding and interpretations of their social environments (May, 1998). This implies that under this paradigm the meaning rather than measurement of social phenomena is emphasised. Lee (1991) observes that the positivist and interpretive approaches would appear to be in opposition in which the positivist approach makes the claim that its methods (the methods of natural science) are the only truly scientific ones, while the interpretive approach makes the counterclaim that the study of people and their institutions calls for methods that are altogether foreign to those of natural science. Interpretivists are likely to argue that "rich insights into this complex world are lost if complexity of social world is reduced entirely to a series of law-like generalizations" (Sauders et al, 2003). Moreover, interpretivist epistemology employs qualitative data collection with very limited respondents (Straub el al, 2005; Mayers, 1997). In fact, interpretivist epistemology was considered to be less relevant for this research because the purpose of this research was to gather evidence in a quantitative manner.

5.2.3 Critical research

Critical researchers assume that social reality is historically constituted and that it is produced and reproduced by people. The main task of critical research is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light (Myers and Avison, 2002). Critical realists agree with the positivists that there is a world of events out there that is observable and independent of human consciousness. They hold that knowledge about this world is socially constructed (Denzin and Lincoln, 2005).In fact, critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory; that is, it should help eliminate the cause of alienation and domination (Myers and Avison, 2002).

According to Bryman and Bell (2007), critical realism implies two things: first, the scientist's conceptualisation is simply a way of knowing that reality (whereas positivist takes the view that the scientist's conceptualisation of reality actually directly reflects that reality). Second, critical realists are perfectly content to admit into their explanations theoretical terms that are not directly amenable to observation. Therefore, hypothetical entities to account for regularities in the natural or social orders are perfectly admissible for realists (but not for positivists).

The critical epistemology was considered to be less appropriate for undertaking this research. This is because the purpose of this research was to gather evidence in a quantitative manner, which critical epistemology does not facilitate. Another reason is that, the purpose of the current research is not to focus upon the oppositions, conflicts and contradictions, instead it investigates the factors that are affecting the adoption of B2B e-commerce.

5.2.4 Research methods

A research method can be distinguished into two categories: qualitative and quantitative (Figure 5.2). Qualitative research method is defined as research that involves the meaning, concepts, definitions, characteristics, metaphors, symbols, and description of things (Almogbil, 2005). Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions (Myers and Avison, 2002). In fact, qualitative research was

developed in the social and behavioural sciences to allow researchers to study social, behavioural, and cultural phenomena (Almogbil, 2005).

| Figure 5.2 | Epistemological considerations for qualitative and quantitative research |
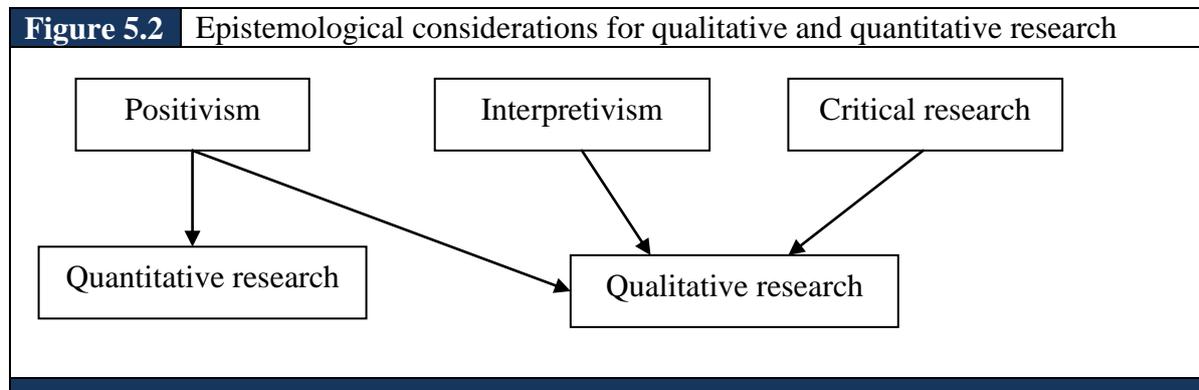
Source: Adapted from Myers and Avison, 2002

Quantitative research method is defined as research that involves measuring traits, characteristics, or attributes of things (Almogbil, 2005). Examples of quantitative methods now well accepted in the social science include survey methods, laboratory experiments, formal methods (econometrics) and numerical methods such as mathematical modeling (Myers and Avison, 2002). In fact, the quantitative research approach was developed in the natural sciences to enable researchers to study natural phenomena. Straub el al (2005) argued that the numbers come to represent values and levels of theoretical constructs and concepts and the interpretation of the numbers is viewed as strong scientific evidence of how a phenomenon works (Straub et al, 2005).

It is noteworthy that the main instrument used to collect data for this study was the survey methods which represent values and levels of theoretical constructs such as relative advantage, compatibility, adoption costs, security concern; language concern, IT readiness, management team support, learning orientation, receptivity toward change, strategic orientation, decentralization level, formalisation level, customer pressure, trading partner pressure, competitive pressure, regulatory environment, national e-readiness, technology consultants' participation and economic downturn. However, although the methodology for this research is quantitative in nature, the initial data collection conducted through semi-structured interviews provided valuable qualitative information. According to Sarantakos (1998), in many instances, qualitative researchers employ qualitative methods in their studies to meet the criteria of quantitative research. In addition, qualitative methods such as

interviews are used in addition to quantitative methods as a preparation step to a quantitative study, or to refine conclusions reached by means of qualitative research (Sarantakos, 1998).

5.2.5 Adopted research paradigm for this study

Making a choice of appropriate paradigm for research is never an easy task, as it depends on a number of issues such as: ontological assumptions; belief; and the way to investigate reality; different approaches; answers to questions; issues related to methodology; methods and techniques for data collection; the role of values and ethics; and perspectives and standpoint to do with research (Sattabusaya, 2008).

After considering all the three epistemologies, this research adopted positivist epistemology to examine B2B e-commerce adoption among Saudi Arabian organisations. This is because technology adoption is well defined and considered to be one of most mature areas within IS research. Moreover, because of its long tradition of research, a number of theories and models have been developed and validated for examining a variety of technological objects. In addition, a variety of constructs (dependent and independent variables) are available which can be adapted to examine the adoption and diffusion of new technologies (Venkatesh et al, 2003). This was the basis for developing a conceptual model of e-commerce adoption and fonnulating the research hypotheses presented in Chapter 4. Following Straub et al's (2005) description of positivism, this research will employ statistics, such as discriminant analysis to determine if this data supports the research hypotheses (Straub et al, 2005).

The aim of this research was to determine the factors that influence and inhibit B2B e-commerce adoption by Saudi Arabian firms in the private sector. Thus, in order to get an overall picture of the research issue, collecting data from a large number of organisations is required. This means employing any other approach such as ethnography that utilises an interview or observation, as data collection tools demand huge amounts of financial resources, manpower and time. In fact, the principal criteria for choosing a research design is to ensure using the best approach for answering the research problem within the constraints of time, manpower and budget. As this is a student research project, all three factors limited the ability of the researcher when investigating this research issue. Selection of the approach in this case was also influenced by the type of theory and models employed to examine e-commerce adoption and diffusion research (Chapter 3).

The conceptual model proposed in Chapter 4 includes a number of research hypotheses that need to be tested. In fact, the hypotheses were formulated by applying logical reasoning to the findings of prior studies in which previous research was used as a rich source of concepts, theories and evidence about the phenomena. These hypotheses will be tested using data collect from a survey and subsequently statistical analysis will be used in order to test these hypotheses.

A questionnaire survey was deemed the most appropriate method to collect data. In fact, the questionnaire survey enables researchers to examine and explain relationships between constructs, in particular cause-and-effect relationships (Saunders et al., 2007). Generally, it is important to note here that his study does not attempt to demonstrate cause and effect relationships, but, rather, it attempts to determine which variables are related to other variables pertaining to the adoption of e-commerce among private sector organisations in Saudi Arabia

A questionnaire survey was chosen for the following reasons: first, the survey method is the most widely used methodology in previous MIS literature in general (Palvia et al., 2004) and in studies related to organisational e-commerce adoption in particular (see, for example, Aleid et al., 2009; Azam and Quadddus, 2009). Second, it is considered one of the best possible choices of research instrument when attempting to collect detailed information and meaningful data on populations too large to observe directly (Nachmias and Nachmias, 2008; Babbie, 1998). In fact, the collection of larger amounts of data is recommended to assuage concerns over study generalisability (Churchill, 1999). Moreover, this method is also economical as it allows the collection of a large amount of data with relatively less labour and resource intensity. Finally, a questionnaire survey is the most effective and efficient method to collect primary data from the research respondents (managers) who are very busy most of the time and cannot share much time to provide primary data by other methods.

On the basis of the aforementioned reasoning, it was decided that the survey is one of the most appropriate and feasible research approaches to conduct this research. The next section provides details on the strategy that was used to execute this research.

5.3 Planning and data collection

This section describes the research strategy and the data collection process used to carry out the research.

5.3.1 Research strategy and design

Research designs are "about organising research activity, including the collection of data in ways that are most likely to achieve research aims" (Easterby-Smith et al., 1991:33). In fact, research design provides an overall framework or plan for the collection and analysis of the data of a study (Iacobucci and Churchill, 2010; Churchill, 1979). The importance of research design stems from its role as a critical link between the theory and argument that informed the research and the empirical data collected (Nachmias and Nachmias 2008).

Different research designs have different strengths and weaknesses depending on the researcher's knowledge about the phenomena to be focused on and on existing knowledge about the phenomena. A choice of research design "reflects decisions about the priority being given to a range of dimensions of the research process" (Bryman and Bell, 2007: 40), and this of course will have a considerable influence on lower-level methodological procedures such as sampling and statistical packages (Limpanitgul, 2009). It is, therefore, a blueprint that enables researchers to find answers to the questions being studied and to increase the reliability, validity and generalizability of the findings on the one hand and the overall philosophical position of the research on the other hand (Chua, 1986; Galliers and Land, 1987; Mingers, 2001; Chen and Hirschheim, 2004).

Figure 5.3 illustrates the research strategy and design. Two stages are shown in which both exploratory and descriptive research approaches were undertaken using a cross sectional design. The first stage, which was intended for theory generation, adopted an exploratory research design where qualitative data were collected to clarify problems, to elicit information about firms' views regarding e-commerce applications and to construct research hypotheses for the following stage. The second stage adopted a descriptive research design to describe and measure phenomena of interest. Empirical data in the form of survey research were gathered and used in the second stage to validate and determine the direction of the hypothesised relationships. The following paragraphs explain the advantages and

disadvantages of each data collection method and conclude by stating the reason for choosing the stated method.

| Figure 5.3 | Visual model for the research strategy and methodology used in the study |
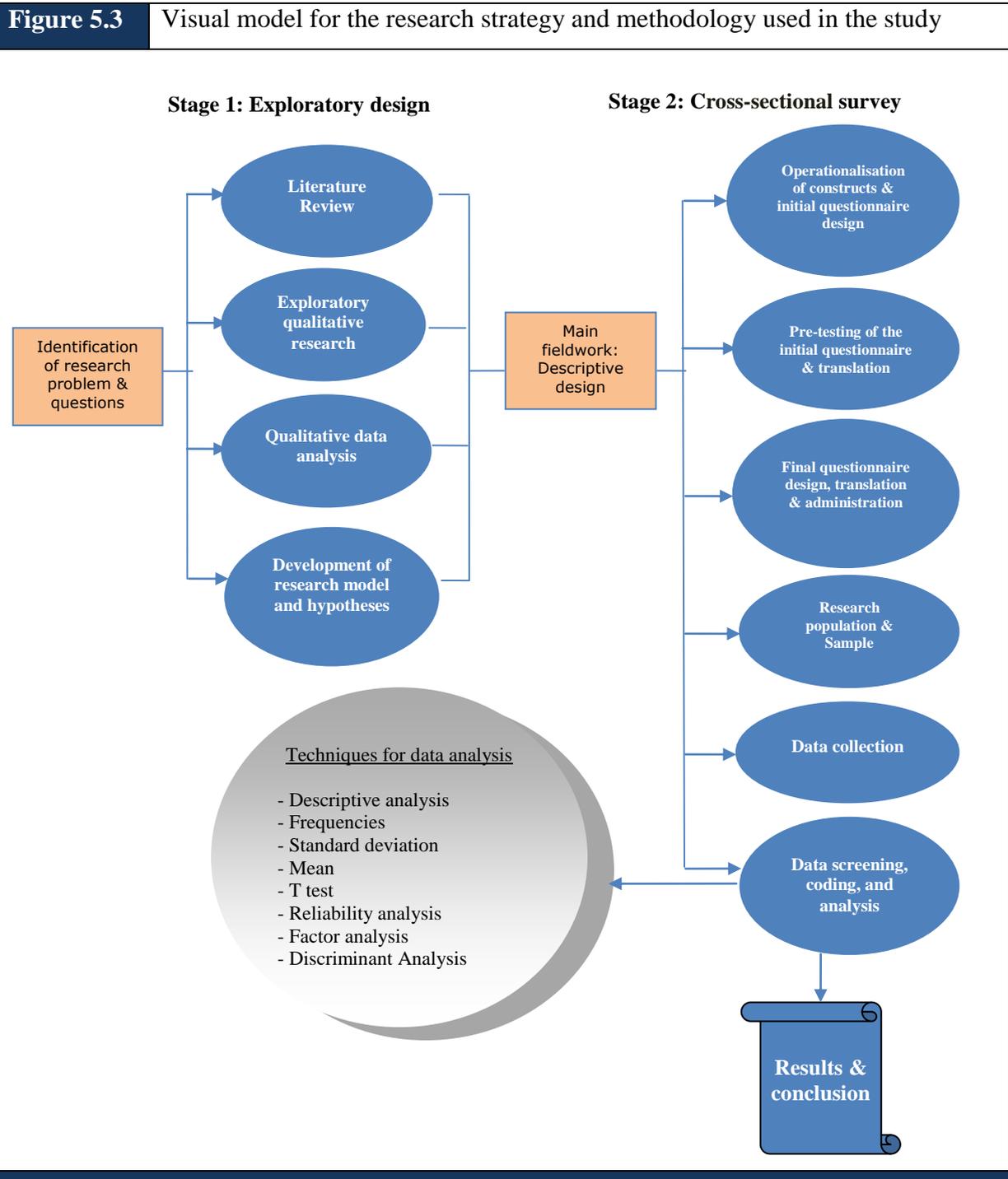
Source: current study

5.3.1.1 Stage 1: The initial data collection –Think aloud with seven companies

The research problem was well defined, but, to the best of the researcher's knowledge, little or no research had been carried out in the area of organisational e-commerce adoption by Saudi manufacturing and service organisations which could have guided this study. Therefore, an exploratory qualitative research design was considered appropriate to develop a preliminary understanding of how these organisations think and feel about e-commerce technology and its influence on their business practices. In fact, exploratory research provides a tentative understanding of a research problem, and should be used as input to further research (Malhorta, 1999). It focuses on the investigation of a previously unexplored topic or an idea where little is known about the topic under investigation (McGivern, 2006; Churchill, 1999; Deshpande, 1983).

The goal of the initial exploratory phase is to gain insights about the research problem, discover the most effective factors in relation to e-commerce use by organisations in Saudi Arabia and identify whether other possible factors not explored in previous research are significant in the context under investigation. In fact, exploring new phenomenon or ideas is not a simple task and not easy to master because it requires that the researcher gain a wide understanding of the various broader philosophical assumptions that shape his or her perspectives (Creswell, 2007). Findings from the exploratory investigation enabled the researcher to articulate and clarify the research propositions generated from the literature. Additionally, findings from the exploratory study aided in the structure and the development of the questionnaire in the main study.

The principal data collection technique selected was semi-structured interviews; this technique was chosen in order to obtain more information about specific variables of interest and to explore in detail issues related to the motivations and benefits of e-commerce adoption. It also helped the researcher to understand directly from the interviewed specialists the current situation and future perspective of e-commerce.

In fact, the use of semi-structured interviews has become the principal means by which researchers have sought to achieve the active involvement of their respondents in the construction of information about their experiences (Punch, 2005). Moreover, semi-structured interviews offer the freedom to explore, probe and ask questions in order to cover all

particular subject areas. In general, semi-structured interviews often have an initial question followed by probes and, in this type of interview, the situation has often been analysed before the interview (Gubrium and Holstein, 2002). However, interviews are much more expensive than mail questionnaires because it requires additional cost such as interviewer wages, call-backs and travel costs (Bynner, 1979).

Setting and participants for the exploratory interviews

Before the interviews took place, arrangements were made by phone and an e-mail was sent to the selected firms informing them of the goals of the study and the purpose of conducting the interviews. It is noteworthy that all firms interviewed were located in the city of Jeddah and these firms were from a wide range of business sectors, such as retailers, manufacturers and services, because it was reasoned that investigating firms from different sectors would lead to a richer data set than companies belonging to the same sectors (Scupola, 2003), and would help to understand the substantive research problem (Shaw, 1999; Marshall and Rossman, 1995).

Companies were selected from the directory of companies distributed by the Saudi Chamber of Commerce and Industry. Interviewed companies were located in the city of Jeddah. It is to be noted that collecting research data using interviews in Saudi Arabia is seen to be costly in both time and money because Saudi Arabia is a large country and researchers will be required to travel to many provinces to collect data (AL-Shoaibi, 1998). Purposive (or judgemental) sampling techniques were used to select the respondents. Purposive sampling is useful when the desired sample needs to be reached quickly and sampling for proportionality is not a concern (Trochim, 2006).

Companies were contacted at least two weeks before the interview and a follow up call was then given to confirm acceptance in order to ensure the correct individual had received it. In addition, a time and a place convenient for both the researcher and the participants to do the interviews were discussed and identified and, in total, ten interviews were audio recorded.

From the initial thirty companies that were contacted for interview, ten organisations agreed to participate. Three companies later dropped out and their reason for not participating was because the key informants were too busy. Al-Shoaibi (1998) mentioned that interviewing

top managers in Saudi Arabia is relatively hard because those managers are always busy. Moreover, it is very difficult to arrange a meeting with them for an hour or so without delay or interruption. Therefore, this could limit the data that could be collected by this method (Al-Shoaibi, 1998).

It is important to note that research suggests that responses from the most knowledgeable respondent can be more accurate than taking an average of several informants in an organisation (Day and Nedungadi, 1994). Therefore, the people interviewed consisted of general managers or chief executives within the individual companies. Table 5.1 summarises the profile of the seven companies who agreed to participate.

Table 5.1	Company profiles				
Company	Business Type	Years in business	Informant's educational background	Numbers of employees	E-commerce Platforms & capabilities
S1	Food and beverage business	Two years	Bachelor	12	Internet connection, e-mail, no website
S2	Retail Clothing Store	Six years	Master	10	Homepage (under construction). Internet connection, e-mail, no website
S3	Women's Clothing Manufacturer	Five years	Bachelor	33	No online capabilities: no Internet connection and no webpage.
S4	Architecture & Engineering Design Specialists	Five years	Master	30	Homepage, e-mail, and online selling and online catalogue
S5	IT Support Services: Computer Sales & maintenance	Five years	High school	27	Basic homepage, e-mail and Internet connection using DSL
S6	Service Company: IT/IS training & ICT solutions	Six years	Bachelor	10	Homepage, e-mail and permanent Internet connection
S7	Advertising, Graphic Design & Printing *Services*	Eighteen years	Diploma	65	Basic homepage, e-mail and Internet connection using DSL

This study focuses on business-to-business (B2B) e-commerce or automating the transactions between businesses. For example, inventory is checked automatically or even by the supplier to ensure enough parts are on hand to meet forecasted needs. If there are not enough parts, an automated order for the necessary parts is sent to the approved suppliers. The parts are shipped in time to meet the demand. Later, invoices and payments are transacted

electronically. In fact, B2B e-commerce has many benefits. Reductions in inventory, manufacturing cycle time, and overhead costs can be realized. Indeed, buyers and sellers benefit from the productivity and profitability improvements associated with e-commerce (Deeter-Schmelz et al., 2001). In addition B2B allows a business to expand its reach globally. Customer and partner loyalty can also be increased through ease of use, greater efficiency of transactions, and personalization (Cassidy, 2002).

The significance of B2B e-commerce makes it imperative to study it for three reasons: (1) it is becoming a viable alternative to traditional markets; (2) its commercial potential is enormous; and (3) little is known about the factors that influence the nature of firm participation (Claycomb et al., 2005). Hence, the purpose of the study is to examine organisational, environmental context, and innovation characteristics related to B2B e-commerce practices in Saudi Arabia. Figure 5.4 presents the used B2B e-commerce applications among the firms that participated in the preliminary study and detailed descriptions of the firms are provided in appendix F.

Figure 5.4 Participants' level of B2B e-commerce technologies
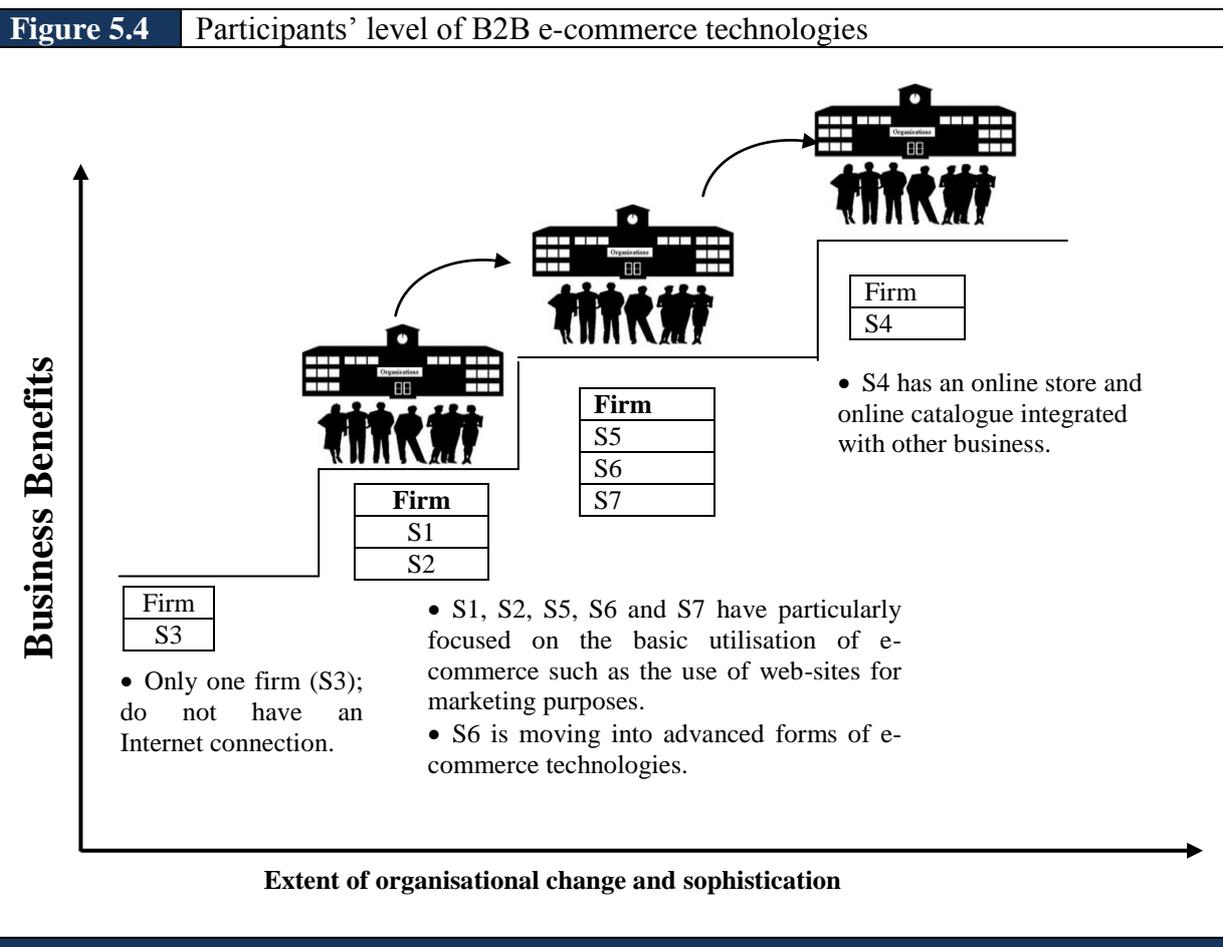
Source: Current study

Interviewees were assured of data confidentiality before the interview began, and their permission to record the interview was requested. They were also assured that they might withdraw their consent to participate at any stage of the study without repercussion. It is to be noted that, due to the non-disclosure agreements with these firms, pseudonyms were used to protect the anonymity of the companies' identities. A list of the interview questions was prepared in advance and was at hand for the researcher at the time of the interview. However, participants were not given the questions in advance in order to avoid any possibility that they might prejudge the interview.

Each interview lasted from 60 to 90 minutes and no other person was present during the interviews. Interviews were mostly conducted in Arabic and tapes were transcribed. Then, the entire data set was translated into English and the researcher carefully verified each translation to ensure contextual and semantic accuracy. A qualitative data analysis technique was used to identify and categorise themes/concepts of interest through close examination of data in the field notes (Kurnia, 2008).

This exploratory phase with managers was characterized by open discussions and all participants welcomed the opportunity to examine issues related to their experiences and practices more deeply. Among the issues covered were e-commerce benefits and its impediments, the role of top management in implementing e-commerce, the influence of national context on the adoption of e-commerce, evaluation of the macro environment and e-commerce governmental policies, competitiveness and the e-commerce future in Saudi Arabia. The interviews for this phase took place during April 2007.

It is noteworthy that, in the current study, it could be argued that the literature review conducted and reported in chapter two and chapter three (i.e. literature about e-commerce adoption in Saudi Arabia and in the world at large and about the theoretical innovation adoption models) also represents the exploratory stage of this study as it was used as an input to the planning of this stage and as a rich source of concepts, theories and evidence about the phenomena (Punch, 1998; Sarantakos, 1998). The first step of the literature review was a library search using recent and previous related journal articles, books, archives and management abstracts. The following step involved a search of computerised databases such as Business Source Premier, emerald and ABI inform. Searches were also conducted of

conference papers, electronic sources available over the Web, general business magazines and any related material in other libraries.

It has been suggested that researchers could or should use other secondary resources such as annual reports, web sites and information leaflets (Lofland et al., 2006; Walsham, 2006; Kosso, 1998; Orlikowski, 1989). In fact, the aim behind using these supporting materials is to obtain as clear an understanding as possible of, and as much necessary information as possible for, the research problem. Annual reports of the Ministry of Commerce in Saudi Arabia, Ministry of Communications and Information Technology, the Saudi Arabian development plan reports and electronic newsletters were used as secondary data collection methods to support the information obtained in the interview. Reports related to Saudi Arabia, especially those related to the e-commerce adoption situation, were obtained from the King Abd-Ulaziz City for Science and Technology Library and the Saudi Chamber of Commerce and Industry

In summary, the essential objective of the exploratory phase was to determine relevant issues and possible factors that are significant in the context under investigation. Findings from the exploratory investigation enriched the articulation of the research hypotheses and, more importantly, findings were used for the development of the survey questionnaire. In summary, the exploratory study contributed strongly to the identification of important factors in relation to e-commerce adoption by organisations in Saudi Arabia, and helped ground the research. This exploratory study forms the basis for the main study and a series of more compelling and sound questions were developed from it for a questionnaire to be administrated.

5.3.1.2 Stage 2: Main study - Cross-sectional descriptive design

It was stated above that the research would be undertaken in two stages. The second phase employed descriptive research with a cross sectional study in order to validate and test the developed theory. Descriptive research is often used to discover the relationship between certain variables (McGivern, 2006; Kravitz, 2000). According to Johnson and Christensen (2000), descriptive research focused on providing an accurate description or picture of the status or characteristics of a situation or phenomenon. Best and Kahn (1986) stated that descriptive research is concerned with the analysis of the relationships between non-

manipulate variables and the development of generalization. In addition, descriptive research aims to build a picture of a social phenomenon and it is marked by the prior formulation of specific hypotheses and a pre-planned and structured design. A questionnaire survey is a common method of conducting descriptive research in order to gather and analyze data in conjunction with questions and hypotheses (Johnson and Christensen, 2000).

It is noteworthy that there are two main types of descriptive survey research designs: cross-sectional and longitudinal surveys. In a cross-sectional survey, research may be likened to a snapshot of the phenomenon of interest and data are collected at one point in time from a sample selected to describe some larger population (Pedhazur and Pedhazur-Schmelkin, 1991). Such a survey can be used not only for the purpose of description, but also for determination of the relationship between variables at the time of the study (Babbie, 1998).

Conversely, in a longitudinal survey, data are collected from the same sample at several different times, with the main purpose being to study changes in the elements over time (McGivern, 2006). Longitudinal research tends to be somewhat weaker in terms of the small sample size and cost (Pedhazur and Pedhazur-Schmelkin, 1991). In fact, a longitudinal survey requires follow-up on respondents which makes the ability to capture a large sample size difficult if not, in certain instances, impossible (Weiss and Heide, 1993; Pedhazur and Pedhazur-Schmelkin, 1991). Moreover, longitudinal surveys often lack control samples, and they tend to suffer from case losses which can become a serious problem, since they will almost certainly introduce a bias in the result. Because of limited time available and cost constraints imposed upon the study, longitudinal research was not considered. Instead, it was decided that a cross-sectional survey with self-completion questionnaires administered to participants would be utilised as the main data collection instrument because it can obtain data in a shorter period of time and achieve a higher response rate. Moreover, this method was deemed to be the most appropriate option as the primary concern was to understand B2B e-commerce phenomenon in Saudi Arabia and detect the effects of the independent variables and their hypothesised relationships on firms' e-commerce adoption in order to provide general statements about the study.

5.3.1.3 The Use of the Questionnaire survey

The main instrument used to collect data for this study was the questionnaire. The questionnaire survey is an important instrument consisting of a set of predefined and structured questions that the respondent has to answer in a set format. In fact, the questionnaire has been very useful in social science research in the past and is likely to continue to be so in the future (Goode and Hatt, 1952). The questionnaire can be carried out either by mailing it to respondents or by personal administration (Oppenheim, 1996). The main advantages of the questionnaire survey are listed below.

- **Low cost of data collection and processing**: the cost of a questionnaire survey is low compared to other methods, not only because there are no interview wages, no travel costs and costs related to the training of interviewers but also because usually most of the questions will be closed (pre-coded) ones, which reduces the expense of data processing analysis (Nachmias and Nachmias, 2008; Bynner, 1979). In fact, data entry and tabulation for nearly all surveys can be easily done with many computer software packages.

- **Ability to cover a wide geographical area at low cost:** This is especially true for studies involving the collection of data from large sample sizes and when the respondents live at widely dispersed addresses or abroad; then, in such cases, the questionnaire may be very useful and relevant for making contact (Oppenheim, 1996; Bynner, 1979).

- **Questionnaires are less intrusive than telephone or face-to-face surveys:** Unlike other research methods, respondents are not interrupted by the research instrument and are free to complete the questionnaire in their own time schedule and at their own convenience. In fact, respondents have freedom to express their point of view, have time to think about their answers and/or consult other sources.

- **Questionnaires offer a high degree of anonymity:** It generally provides the anonymity that may lead participants to be more open, truthful and provide more honest answers. This is especially important when sensitive issues are involved.

Limitations of questionnaire surveys are as follows:

- Questionnaires require simple and easily understood questions and instructions.

- A reasonable sample size is needed before the responses can be used to represent the population as a whole.

- Response rates can be poor and people may lack the motivation to complete or return the questionnaire. Consequently, some sort of upfront incentive to respondents may have to be included where appropriate. Inexpensive items such as pens, key chains, magnets, or feedback reports have been shown to increase response rates.

- Questionnaires do not offer researchers the opportunity to probe for additional information or to clarify answers.

- Researchers cannot control who fills out the questionnaire.

- The complexity of designing, producing, distributing, and analysing the questionnaires may make them expensive and time consuming.

It is noteworthy that the above advantages and disadvantages of questionnaires in determining how to write the questions were taken into account.

5.4 The research population

One of the most important qualities of quantitative research is the requirement that the sample employed reflects the attributes of the target population, the findings it produces relates to the whole population, and the conclusions drawn through the study are pertinent to the whole population. These attributes of social research are referred to as representativeness (Sarantakos, 1998).

It is commonly believed that researchers try to achieve representativeness in their studies, not only for its own sake but also because such studies allow generalisation, indicating that their findings can be thought to be applicable to the whole population being sampled. The higher the representativeness, the higher the generalisability of the findings and, therefore, the higher the quality of the study (Sarantakos, 1998). In fact, several methods have been devised for this purpose, such as probability sampling methods. In addition, statistical techniques have been developed to assist in this process, such as those that can assist in achieving a sample size that will allow the study to claim representativeness.

Deciding whom and what to study is of immense importance because it determines the feasibility of the whole study. According to Czaja and Blair (2005), the population for a study refers to the group or aggregation of elements that we wish to study, the group about whom we want to make some inferences, and the group to which we want to generalise the results of our study. It is impossible in some cases to study the whole population because of resources and time limitations. In fact, time is often of the essence. A lengthy period of data collection would render some data, such as attitudes about current issues over voter preferences, obsolete by the time the information was completely in hand (Singleton and Straits, 2005).

This research project aims to study firms' adoption of e-commerce in the Western region in Saudi Arabia. The population of interest are not all firms in the Western region, but manufacturing and service companies from the private sector in the city of Jeddah. Many studies on organisational innovation adoption (e. g. Lal, 2002; Wu et al., 2003; Swamidass and Kotha, 1998) have used manufacturing and services firms as samples in their studies and it is believed that manufacturing and service firms are found to have greater dependence on IS innovations (Goode and Stevens, 2000). Therefore, regardless of their size, manufacturing and service organisations located in the city of Jeddah were chosen as the population from which the samples would be selected. Among the firms making up the population sample include those from sectors such as food and beverages, building materials and construction, health and pharmaceuticals, financial services, and electrical equipment and engineering.

Among all industrial regions in Saudi Arabia, the Western region shows the greatest degree of industrial development in terms of technological and economic development (El Gammal and El-Bushra, 1986). This region consists of 11 major cities, with the most important ones being the city of Makkah Al-Mukarrama (the centre of the province and the holy capital of Saudi Arabia which has the Qeblah of Muslims all over the world) and Jeddah.

Jeddah is a diverse and rapidly growing commercial city, located by the Red Sea. *It is* considered to be an important gateway to the Islamic holy cities of Makkah and Madinah. In fact, Jeddah is a cosmopolitan city with a rich cultural heritage and many of its residents are pilgrims who settled in the Arabian Peninsula hundreds of years before the formation of the Saudi Arabian Kingdom. As the largest port on the western coast of Saudi Arabia, Jeddah has become a centre for the provision of services, as well as of commerce, industry and culture.

Moreover, Jeddah is seen as Saudi Arabia's most liberal city (Technology integration division, 2007).

The city of Jeddah was chosen as a location for conducting this research for two reasons. First of all, as a citizen of Jeddah, the researcher had already acquired some knowledge of the city and an understanding of its people, business and culture. Secondly, the researcher served as an IT specialist in the private sector in Jeddah for several years which made it possible to use personal connections and a network of contacts to best serve this research.

Subsequently, the private sector was selected to be the target population, as many of the government-owned companies are going through different stages of privatization. Sectors open to privatization include: telecommunications, civil aviation, railways, education services, agricultural services and construction. As shown in Table 5.2, the initial concrete steps toward privatization took place in 2002, and the first sectors to witness privatization transactions have been the telecommunication sector and postal services. As a result, the contribution of the government sector to GDP is anticipated to decline by 44.4 percent by 2020 (The 7th development plan, 1999, 2004).

The Saudi private sector has become the true engine of the economic growth in Saudi Arabia and the government wants to move beyond exports of oil to increase employment opportunities, diversify its income base and become an economic heavy weight. The private sector has made praiseworthy achievements and its contribution to the non-oil Gross Domestic Product (GDP) reached about 76.3% in 2008, up from 54.6% in 2004. Moreover, in the same year, total employment in private sector activities reached 6.8 million workers, that is, about 85.4% of the total labour force (Eighth Development Plan, 2005, 2009). The private sector and the efficient functioning of markets are keys to technological progress (Anonymous, 2008).

The current Saudi development plan places special emphasis on expanding private sector participation in all economic activities, such as production, investment, exports, and creation of jobs for citizens, with the aim of increasing the scope of this sector's participation in production and service activities and, hence, boosting the sector's development role. In fact, Saudi Arabia has placed great emphasis on the acquisition of new technology to enhance their capabilities in setting forth a new age of manufacturing products for local and export markets,

with quality matching that of developed nations (Al-Thawwad, 2008). Moreover, the government's general objectives for the private sector stem from a vision, which envisages an efficient and diversified private sector with world-class competitive advantages, paying significant attention to research, development and innovation in its various activities, increasing the sector's contribution to socio-economic development, diversification of the economic base, improving global competitiveness of domestic products and providing infrastructure and expanding IT applications in private sectors (The Ninth Development Plan, 2010).

| **Table 5.2:** | The Privatization Program |

Aston University

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Source: Akoum (2009); Royal Embassy of Saudi Arabia, (2006, 2008)

5.4.1 Selection of sampling frame

Once the scope of the population was established, an attempt was made to specify a sampling frame that would provide the basis for sampling. The sampling frame is the list(s) or resource(s) that contains the elements of the defined population (Czaja and Blair, 2005; De Vaus, 2002). Because the accuracy of a sample depends mostly on the sampling frame, the researcher must ensure that there is a high degree of correspondence between a sampling frame and the entire population.

The Saudi Chamber of Commerce and Industry directory for private organisations in Jeddah was used as the sampling frame for this study. The directory lists 2485 organisations from different sectors (i.e. retailing, manufacturing, service, oil and oil related). Only 1035 companies were identified from which 326 are manufacturing organisations and 709 service organisations.

This also contains valuable information about the background of the firms, such as business activity, telephone number, fax number and the names of the president, CEO or managing director. The directory is used by several researchers in Saudi Arabia as a representative list and is found to be the most appropriate sampling frame from which firms could be drawn (Al-Motrafi, 2008). Once a researcher has made a decision about a sample frame or approach to getting a sample, the next question is specifically how to select the individual units to be included.

5.4.2 Consideration of sample size

Various sample sizes have been recommended in the past and different theories for reaching an ample sample size have been suggested (Hulland et al., 1996). There is little united theoretical guidance as to what constitutes an adequate sample size (Baumgartner and Homburg, 1996) in which sample size recommendations differ from 50 plus the number of parameters to be estimated (Bagozzi, 1980), to 100 (Bollen, 1989), to 150 (Anderson and Gerbing, 1988), to 200 or more (Kelloway, 1998; Boomsma,1982). Moreover, Tabachnick and Fidell (2007: 117) suggested a sample size of $N >= 104 + m$, where m = number of independent variables. Subsequently, Bentler and Chou (1987) framed the issue in a slightly

different way and they provide a rule of thumb that the ratio of sample size to estimated parameters should be between 5:1 and 10:1 (i.e. ten cases to every one estimated parameter).

In addition, Nunnally (1978) recommends a sample size equivalent to 10 observations per model variable. Moreover, Hinkin (1995) and Rummel (1970) suggest an item-to-response ratio range of 1:4 while Hair et al. (2006) recommend a 5:1 ratio as a minimum and 10:1 as the highest. For example, if a researcher has 20 items for analysis, then the sample size should be anywhere from 80 to 200 respondents. In fact, it is generally agreed, however, that a larger sample size is better, with at least 200 observations representing an appropriate minimum and being recommended for a more complex model (Sharma, et al., 2005; Hulland et al., 1996). The Number of variables in the study is nineteen in total.

5.4.3 Sampling method and sample elements

The sampling for the hand delivered survey was based on systematic random sampling (SYMRS). SYMRS is a probability sampling technique and it requires having an acceptable frame of the target population elements. Researchers regard it as a close approximation of a simple random sample (Singleton and Straits, 2005). To obtain a systematic sampling, De Vaus (2002) suggested the following procedure:

1. The sample is chosen by selecting a random starting point and then taking every k^{th} element (e.g. fifteenth or twentieth) case from the sampling frame, starting with a randomly chosen case from the first k cases in the sampling frame or list. Such a procedure has two requirements: a sampling fraction (k) and a random start (Sudman, 1976).

2. The sampling fraction, k, is calculated by dividing the population size by the sample size and rounding to the nearest integer. A random start refers to the process of a randomly selected initial case between 1 and k (Singleton and Straits, 2005).

By using this procedure, the sampling fraction was 2 as the total population of 1035 companies was divided by 450 (the required sample size). Subsequently, the companies selected in this study were taken from an order of 1, 3, 5, 7, 9, 11, ……., 1035. The sampling frame of the Chamber of Commerce and Industry year 2008 directory was used and the list is ordered by membership number. The systematic random sampling (SYMRS) is a less time-

consuming sampling method, less costly and it is a relatively easy way to draw a sample while ensuring randomness. The availability of lists and the shorter time required to draw a sample versus simple random sampling makes systematic sampling an attractive, economical method for researchers (Hair et al., 2006). Therefore, SYMRS was used to meet the PhD deadline.

5.5 Questionnaire design and development process

A major part of the questionnaire planning phase requires the researcher to spend time composing, designing, checking and revising the questionnaire. Vaus (2002) notes that non-response needs to be minimized, both because of the loss of information and the data analysis difficulties. Non-response rate is affected by question content, question construction, method of administration and questionnaire length. Sensitive, irrelevant or repetitive questions, as well as those that are poorly worded, difficult to understand, difficult to answer or have insufficient response categories can frustrate respondents and produce a non-response rate.

Subsequently, important issues to address when developing the questionnaire include the length of the survey questionnaire, the interpretation of wording in the survey instrument, minimising respondent bias and enhancing reliability (Aldosary, 2003). Researchers such as Davies (2007) and Vaus (2002) have provided general guidelines to be taken into consideration when designing a questionnaire. These researchers suggested that a questionnaire should:

- Avoid jargon and technical terms. Instead, simple words must be used.
- Avoid using double-barrelled questions or questions with two parts that ask more than one question.
- Avoid questions that are too long.
- Ask only simple questions which respondents can answer easily.
- In multiple choice questions, ensure that all the possibilities are covered.
- Follow a natural logic and order to help respondents complete the questions step by step through thought and action, with the minimum of time and effort.

All these principles were taken into consideration when constructing the questionnaire for this study and the researcher paid considerable attention to developing clear, unambiguous

and useful questions. Churchill and Iacobucci (2002) recommended the process of questionnaire development adopted in this type of research.

This research study utilized the closed question style in which respondents are encouraged to select the answer which best fits their opinion. This type of question was selected as a result of four key advantages summarised by Foddy (1994). Firstly, the provision of predetermined answers enables the researcher to collect standardised responses that can be meaningfully compared. Secondly, closed-end questions are quick to answer and produce answers that are much easier to code, computerise and analyse. Thirdly, they do not discriminate against the less talkative and less articulate respondents. Finally, another advantage of closed-end questions is that they present a recognition task rather than a recall task and, for this reason, respondents find them much easier (Foddy, 1994). The questionnaire was divided into two parts and clear instructions for each section were typed individually with boldface letters and with a border around them. They were placed on the top centre of each section. The two parts are described below.

Part one

This part contains the questions used for studying the factors concerning the adoption of e-commerce, and the current status of the e-commerce which the organisation has implemented. It contains 19 questions addressing the currently used e-commerce application, IT readiness, management team support, learning orientation, organisational attitude toward the innovation, strategic posture, organisational design and structure, advantages and disadvantages of e-commerce, perceived external pressure from stakeholders, awareness of legal environment, assessments of the national infrastructure, the role of technology consultants in supporting the adoption of e-commerce and the influence of the economic environment.

Part two

This part contains the questions eliciting the basic information of the participants and the organisation. It consists of nine questions related to industry, size of organisation, number of years in business, gender, age, level of education, country of study for last degree, and position. The absence of race or ethnicity items is due to the cultural norm that under Saudi Arabian law forbids the recognition of ethnic differences (Aldosari, 2003)

All scales in this study were adapted from previous literature and based on the exploratory interviews. All items (with the exception of the demographic/firm characteristic data) were measured using interval scaling in the form of a numerical scale to measure research constructs. The interval scale is probably the most widely used in research (Bagozzi and Heatherton, 1994), and it is considered very suitable to test the hypothesis (DeVellies, 1991). In this scale, numbers are assigned to indicate order and also measure distance in units of equal intervals (Zikmund, 2003).

The most common and easily used scaled question involves the use of the Likert answer scale. Hair et al. (2006) recommend that Likert scales are the best designs when using self-administered surveys or online survey methods to collect the data. By definition, the Likert scale is an interval scale that is used to ask respondents to indicate whether they agree or disagree about a given subject by rating a series of mental belief or behavioural belief statements (Hair et al., 2006).

In this research study, a 5-point Likert-type scale ranging from 1 "Strongly Disagree" to 5 "Strongly Agree" was used throughout the questionnaire for the collection of most of the data for three reasons. Firstly, a five point scale has been widely used in related research (Premkumar and Ramamurthy, 1995; Morgan and Hunt, 1994). Secondly, it provides a level of intensity and feeling to be expressed. In fact, it is believed that more scale points are better for allowing respondents to answer questions with more specificity (Brady et al., 2005). Finally, a Likert-type scale makes the responses easy to manage and code and is appropriate to different statistical techniques (Luck and Rubin, 1987).

Evidence exists that questionnaire cover designs can improve and influence response rate. In fact, the way the questionnaire is presented and introduced and the type of assurances given to the respondents determine to a large extent whether the respondent will complete the questionnaire or not, and whether he or she will answer the entire question (Dillman, 1999; Sarantakos, 1998). As a result, a cover page was used to introduce the respondents to the research topic and to motivate them to participate in the study. Moreover, in the cover letter, the researcher was introduced to the respondent and the promise of confidentiality was included in which respondents were assured that the information they provided would be used for the purpose of the study only. The researcher's postal address and e-mail address were clearly stated in the covering letter in a further attempt to increase authenticity.

The section requiring demographic and firm information from the respondent was placed at the end of the questionnaire. This was done to assist the respondent to move straight to responding to questions related to the main purpose of the survey after reading the cover letter (Babbie, 1998; Dillman, 2000; Wiersma, 2000). On the very last page of the questionnaire the respondent was thanked for their valuable contribution and, as an incentive to respond, participating organisations were offered a free copy of a summary report presenting the findings of the study if they indicated their interest. They were asked to provide their company name, e-mail address and fax number.

The questionnaire was written in English and translated into Arabic. The English and Arabic version of the questionnaire was used and there were two reasons for this decision: (1) the official language in Saudi Arabia is Arabic; (2) there are a large number of expatriate top managers in Saudi Arabia who are non Arabic-speakers. Moreover, the researcher sought to make certain that two versions would match as closely as possible by consulting two bilingual translators. In addition, the cover letter was included with both the Arabic and English versions. The following section discusses in more detail the translation process of the questionnaire.

5.6 Operationalisation of constructs

Operationalisation is the process wherein the researcher explains a construct's meaning in measurement terms by specifying the activities or operations necessary to measure it (Hair et al., 2006). It helps to establish an accurate definition of the variables to be considered in the study. In fact, each construct under investigation needs to be operationalised through the selection of scale items and scale type (Hinkin, 1995). In this research project, each construct was created based on the results from the initial exploratory study and also by reviewing literature in related areas such as information technology adoption (e. g. Wang et al., 2003; Karahanna et al., 1999) and e-commerce and e-business adoption (e.g. Zhu et al., 2004; Tan et al., 2007). Moreover, each construct was measured using multi-item scales. Furthermore, the questions to measure each construct were borrowed from previous research. In fact, care was taken in constructing measurement and scaling procedures in the questionnaire design process in this research study. Sets of questions for each construct are summarised in Table 5.3. Moreover, Table 5.4 illustrates independent variables in this study and some major studies.

Table 5.3		Operationalisation of the constructs used in the research	
Construct		**Measures**	**Source**
		E-commerce Adoption	
Non-interactive e-commerce adoption	IA	- Connected to the Internet with e-mail but no website. - Static Web: that is, publishing basic organisation information on the web without any interactivity.	- Molla and Licker (2005a) - Molla and Licker (2005b)
interactive e-commerce adoption	PA	Interactive web presence: that is, accepting queries, e-mail, and form entry from users.	
Stabilization	ST	- Transactive web: that is, online selling and purchasing of products and services including customer service. - Integrated web: that is, a website connecting your computer systems with online systems allowing most of the business transactions to be conducted electronically, such as to record all sales transactions, update inventory records and generate all appropriate paperwork – i.e. invoices and receipts.	
		E-commerce technology characteristics	
Relative Advantage	RAD1 RAD2 RAD3 RAD4 RAD5 RAD6 RAD7 RAD8 RAD9	- E-commerce use will increase business profitability. - E-commerce is useful to expand the market share for existing products/services. - E-commerce is useful to increase international sales. - E-commerce is useful to improve coordination with suppliers and trading partners. - E-commerce is useful to provide a better relationship with our suppliers and trading partners. - E-commerce is useful to improve internal communications and processes. - E-commerce is useful to communicate better with customers. - E-commerce is useful to increase customer satisfaction. - E-commerce is useful to improve customer service.	- Acosta and Meroño (2009) - Lee and Kim (2007) - Ghaunor and Fotoh (2006) - Al-Qirim (2005) - Ramsey and McCole (2005) - Zhu and Kraemer (2005) - Wu et al. (2003) - Zhu et al.(2003) - Kuan and Chau (2000) - Zeithaml et al.(1996) - Iacovou et al. (1995) - Morgan and Hunt (1994) - Sethi and King (1994) - Venkatraman and Ramanujam (1986)

Construct		Measures	Source
Table 5.3 (Cont.)			
Compatibility	COM1	- The implementation of e-commerce is/will be incompatible with the firm's IT infrastructure (R).	- Al-Qirim (2005)
	COM2	- The implementation of e-commerce is/will be incompatible with existing hardware (R).	- Teo and Ranganathan (2004).
	COM3	- Web applications used in e-commerce are/will be incompatible with existing software and applications (R).	- Schneider and Perry (2000).
Security Concern	SEC1	- E-commerce is associated with insufficient security safeguards and authentication issues (R).	Field interviews along with:
			- Ursa (2008)
	SEC2	- Internet protocols are inadequate to support secure electronic ordering and payments (R).	- MacGregor, and Vrazalic (2006a)
	SEC3	- Our firm is concerned about cybercrime such as hacking.	- MacGregor, and Vrazalic (2006b)
	SEC4	- E-commerce environment is secure enough.	- Teo and Ranganathan (2004)
			- Soliman and Janz (2004)
			- Kendall et al. (2001a)
			- Palmer (2000)
			- Schneider and Perry (2000)
			- Honeycutt et al. (1998)
Adoption cost	COS1	- The costs of e-commerce applications and systems are acceptable.	- Alam (2009)
	COS2	- The cost of access to the Internet is acceptable.	- MacGregor and Vrazalic (2006a)
	COS3	- The hosting charge for websites with sufficient bandwidth is acceptable.	- MacGregor, and Vrazalic (2006b)
	COS4	- E-commerce requires a substantial investment in training for employees to maintain a multi-skilled workforce.	- Stockdale and Standing (2006)
			- Vatanasakdakul et al. (2004)
			- Al-Qirim (2005)
			- Andam (2003)
			- Schneider and Perry (2000)
Language concern	LAC1	- More Arabic language websites would encourage our workforce to use more e-commerce technologies.	Field interviews along with:
			- Alam (2009)
	LAC2	- We face difficulties in accessing English content websites.	- Salman (2004)
	LAC3	-Greater English language proficiencies among our staff would be advantageous.	- Vatanasakdakul et al. (2004)
			- Palmer (2000)
			- De Boer and Walbeek (1999)
			- Goodman et al. (1994)

Table 5.3 (Cont.)			
Construct		**Measures**	**Source**
		Organisational domain	
IT readiness	ITR1	- Our organisation is highly computerized with internal and external network connections that connect the firm with its branches (i.e. Local Area Network (LAN) and Wide area network (WAN).	- Davis et al. (2009) - Lin and Lin (2008) - Tan et al. (2007) - Ghaunor and Fotoh (2006) - Al-Qirim (2005) - Molla and Licker (2005a) - Molla and Licker, (2005b) - Doolin et al. (2003) - Zhu et al. (2003) - Chwelos et al. (2001) - Kuan and Chau (2001) - Mehrtens et al. (2001) - Iacovou et al. (1995) - Premkumar and Ramamurthy (1995) - Harrison et al. (1997)
	ITR2	- We have connectivity to the Internet.	
	ITR3	- Our firm has individual(s) with 'expert' knowledge of information technology (IT) and e-commerce technologies.	
	ITR4	- We have sufficient financial resources to implement e-commerce.	
	ITR5	- Our firm has individual(s) who could plan and carry out various parts of the evaluation procedure of e-commerce implementation.	
	ITR6	- Most of our employees have unrestricted access to computers.	
	ITR7	- Most of our employees are computer literate.	
Management team support	MTS1	- Top managers are willing to try to provide the necessary resources for implementing e-commerce practices.	-Soliman and Janz (2004) - Wu et al. (2003)
	MTS2	- Top managers often advise employees to keep track of the latest developments in Internet technologies and Internet-related business practices.	
	MTS3	- Our top management is likely to consider the implementation of e-commerce applications as strategically important.	
	MTS4	- Top managers in our firm keep telling people that they must bring more of their business practices online in order to meet customers' future needs.	
	MTS5	- According to top managers in our firm, incorporating e-commerce practices is a very important way to gain competitive advantage.	
Learning orientation	LRO1	- Our firm is quick to learn about new technologies.	- Liu et al. (2008) - Salavou *et al. (2004)* - Wu et al. (2003)
	LRO2	- Supervisors are actively engaged in the learning process and development of their employees.	
	LRO3	- People in our organisation exchange and share information freely and frequently.	
	LRO4	- Learning and continuous improvement of the personnel is considered to be a major priority.	
	LRO5	- Success or failure is always discussed as part of the learning process and as an opportunity for learning and improvement.	

Construct		Measures	Source
Receptivity toward change	RTC1	- We respond well to competitors and other changes in the business environment.	- Francalanci and Morabito (2008) - Molla and Licker (2005a) - Molla and Licker (2005b)
	RTC2	- In our organisation, people can easily accept a change in their organisational roles.	
	RTC3	- In my organisation, people can easily accept a change in the software applications that they use.	
	RTC4	- In our organisation, people are proactive in requesting changes in the software applications that they use in order to exploit new technologies.	
	RTC5	- Our organisation is capable of dealing with the rapid technological changes.	
	RTC6	- Attempts to create change usually meet with resistance.	
Decentralization level	DEC1	- Only major strategic decisions need to be approved by top management.	- Caruana et al. (1998) - Subramanian and Nilakanta (1996) - Grover (1993) - Grover and Goslar (1993) - Damanpour (1991) - Alexander (1989) - Kanter, (1983) - Dewar et al. (1980) - Hage and Aiken (1967)
	DEC2	- Small matters can be dealt with by operational level staff.	
	DEC3	- Employees who want to make their own decision would be encouraged here.	
Formalisation level	FOR1	- Whatever situation arises, we have procedures to follow in dealing with the situation.	
	FOR2	- Every employee has a specific job to do.	
	FOR3	- When rules and procedures exist here, they are usually well defined in written form.	
Strategic orientation	STO1	- Our business objectives are driven by customer satisfaction.	- Salavou *et* al. (2004) - Wu et al. (2003) - Gray et al. (1999) - Kohli and Jaworski (1990)
	STO2	- We measure customer satisfaction systematically and frequently.	
	STO3	- We give close attention to after-sales service.	
	STO4	- We keep promises made to customers.	
	STO5	- Top management regularly discusses competitors' strengths and strategies.	
	STO6	- We respond rapidly to competitive actions.	
	STO7	- The policy of the firm has been to always consider the most up-to-date available technologies.	
	STO8	- We have a long tradition and reputation in our industry of attempting to be first to try out new systems, applications, methods and equipment.	
	STO9	- We devote extra resources (i.e. time, money) to technological forecasting.	

Table 5.3 (Cont.)

Construct		Measures	Source
Table 5.3 (Cont.)			
Construct		*Measures*	*Source*
Environmental domain			
Customer Pressure	EPR-CUST1	- A majority of our customers recommended that we establish strong e-commerce relationships with them.	
	EPR-CUST2	- A majority of our customers requested that we implement e-commerce.	
	EPR-CUST3	- Our relationship with our major customers would have suffered if we had not implemented e-commerce practices (R).	
Competitive pressure	EPR-COMP1	- Competition in our industry is not very intense (R).	
	EPR-COMP2	- Our firm does not experience competitive pressure forcing us to implement e-commerce solutions (R).	- Lin and Lin (2008)
	EPR-COMP3	- New technology is slow to emerge in our industry.	- Al-Qirim (2005)
	EPR-COMP4	- Our competitors are relatively weak.	- Salavou et al. (2004) - Soliman and Janz (2004)
	EPR-COMP5	- Firms that readily implement new technologies will be competitive.	- Wu et al. (2003) - Iacovou et al. (1995)
Business partner Pressure	EPR-SUPP1	- A large number of our suppliers and business partners have already adopted e-commerce practices.	
	EPR-SUPP2	- The majority of supplier and business partners recommend the implementation of e-commerce.	
	EPR-SUPP3	- Our business partners and suppliers usually set the mode of communication (e.g., fax, e-mail, etc.)	
	EPR-SUPP4	- Supplier and business partners are generally very knowledgeable regarding technical matters.	
Regulatory & legal environment	REG1	- Information about electronic commerce laws and regulations is sufficient.	Field interviews along with: Ramsey and McCole (2005)
	REG2	- There is adequate legal protection for Internet buying and selling.	
	REG3	- Information about e-commerce privacy and data protection law are sufficient.	
	REG4	- Information about consumer protection and conflict resolution is sufficient.	
	REG5	- In general, we receive enough information about e-commerce laws and regulations from the government and chamber of commerce.	

Table 5.3 (Cont.)			
Construct		**Measures**	**Source**
National e-readiness	NRE1	- The telecommunication infrastructure is reliable and efficient to support e-commerce.	<u>Field interviews</u> along with: - Alsomali et al. (2009) - Molla and Licker (2005a) - Molla and Licker (2005b) - Soliman and Janz (2004) - Palmer (2000)
	NRE2	- The technology infrastructure of commercial and financial institutions is capable of supporting e-commerce transactions.	
	NRE3	- The postal service is reliable in its support of e-commerce and e-commerce practices.	
	NRE4	- The electronic payment facilities are sufficient.	
	NRE5	- High quality e-commerce applications and services are available at increasingly affordable rates.	
	NRE6	- Wireless lines and wireless communication services are reliable and available at affordable rates.	
	NRE7	- The current Internet connection speed is sufficient for e-commerce transactions.	
	NRE8	- The Internet connection is available 24/7.	
	NRE9	- There are sufficient individual(s) with 'expert' knowledge of IT and e-commerce technologies in the labour market.	
Technology consultants' orientation	TCO1	- Our IT consultant/technology vendor solves our firm's problems quickly.	- Lancastre and Lages (2006) - Thong et al. (1996) - Thong et al. (1994) - Gable (1994) - Gable (1991) - Gable (1989)
	TCO2	- Our IT consultant/technology vendor provides relevant information to our firm.	
	TCO3	- Our IT consultant/technology vendor provides on-time information.	
	TCO4	- We are confident in the support we receive from our IT consultant/technology vendor.	
	TCO5	- Our IT consultant/technology vendor has high integrity.	
	TCO6	- Our IT consultant/technology vendor gives us reliable information and advice.	
	TCO7	- In general, there is efficient support from our IT consultant/technology vendor to support our move to the Internet.	
Economic downturn	ECO1	- The global economic downturn did not put significant pressure on the firm to cut ICT and e-commerce applications' costs or budget (R).	<u>Field interviews along with:</u> - MacGregor and Vrazalic (2006a) - MacGregor and Vrazalic (2006b)
	ECO2	- The global economic downturn did not put significant pressure on the firm to cut the training budget to learn and adopt innovations like e-commerce (R).	
	ECO3	- The global economic crisis did not affect the purchasing power of our organisation (R).	

Table 5.3 (Cont.)			
Construct		**Measures**	**Source**
Firm characteristics			
Geographical scope	GSC1	Multiple establishments or branches inside Saudi Arabia (Y/N)	- Hsu et al. (2006) - Zhu et al. (2006a) - Zhu and Kraemer (2005) - Xu et al. (2004)
	GSC2	Establishments or branches outside Saudi Arabia (Y/N).	
	GSC3	Headquarters located outside Saudi Arabia (Y/N).	
Size	Number of employees at the establishment.		- Thong (1999) - Thong et al. (1996) - Zahra et al.(2000)
Industry	Branch of industry (manufacturer, service).		- MacGregor (2004) - Pontikakis et al. (2006)
Firm Age	Age was measured by the years since establishment.		- Liao et al. (2003)

Studies/ Independent variables	Scupola (2003)	Wu et al. (2003)	Molla and Licker (2005a, 2005b)	Zhu and Kraemer (2005)	*Ramdani and Kawalek (2008)*	Alam (2009)
Relative advantage	✓	✗	✗	✗	✓	✓
Compatibility	✗	✗	✗	✗	✓	✓
Security concern	✗	✗	✗	✗	✗	✗
Adoption cost	✗	✗	✗	✗	✗	✓
Language concern	✗	✗	✗	✗	✗	✓
IT readiness	✓	✗	✓	✓	✓	✗
Management team support	✗	✓	✓	✗	✓	✗
Learning orientation	✗	✓	✗	✗	✗	✗
Receptivity toward change	✗	✗	✗	✗	✗	✗
Decentralization level	✗	✗	✗	✗	✗	✗
Formalisation level	✗	✗	✗	✗	✗	✗
Strategic orientation	✗	✓	✗	✗	✗	✗
Competitive pressure	✓	✓	✗	✓	✓	✗
Supplier pressure	✓	✗	✗	✗	✗	✗
Customer pressure	✓	✓	✗	✗	✗	✗
Regulatory and legal environment	✓	✗	✓	✓	✗	✗
National e-readiness	✗	✗	✓	✗	✗	✗
Technology consultant support	✗	✗	✗	✗	✓	✗
Economic downturn influence	✗	✗	✗	✗	✗	✗

Table 5.4   Comparison between independent variables in this study and some major studies

5.7 Translation of the Questionnaire

Translation has been considered quite extensively in academic studies and commercial research (Sin et al., 2001; Reynolds, 2000; Nord, 1997). It is recommended that the research instrument has to be translated such that respondents involved in the study understand it. The instrument should also contain equivalent meaning in each research context (Craig and Douglas, 2000). Translation equivalence refers to "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: 353). Translation equivalence requires that both verbal and non-verbal stimuli retain their meaning across multiple cultural milieus (Reynolds, 2000; Sechrest and Fay, 1972).

To achieve equivalent translations, Usunier (1998) suggests that when translating the source questionnaire attention should be paid to the following:

- the precise or exact meaning of individual words;
- the grammar and syntax, including the ordering of the words and phrases to create well-formed sentences;
- the equivalence of meanings of words, sentences and terms that are familiar to people in their everyday experience in the target questionnaire's context.

According to Malhotra and Birks (2000), a frequently used translation method is 'direct translation' in which a bilingual translator translates the questionnaire directly from the source language to the respondent's language. Subsequently, direct translation was used to achieve equivalent translation with the original English-version and to avoid any ambiguity and potential confusion in the translated version.

First, the questionnaire was written in English and the contents were checked for wording and grammar several times by an academic who is a native English speaker and has had years of experience in this study's research topic area. Second, the entire questionnaire was translated into Arabic by a certified English-Arabic translator and was verified by three bilingual lecturers who each hold a PhD in English linguistics. After that, the final version of the questionnaire was examined by an experienced, professional Arabic language lecturer who reviewed it, checked the appropriateness of the questionnaires and approved the Arabic grammar and syntax in terms of how words were ordered, sentences were constructed and meaning was expressed. Consequently, all comments and feedback were considered and were incorporated into the final Arabic version of the questionnaire to ensure that the meaning of each aspect of the research instrument was maintained in the Arabic language before it was piloted among a sample from the target population. A translated cover letter in Arabic with some changes in wording was produced and attached to each questionnaire. The Arabic version of the questionnaire is shown in Appendix B and the English version of the questionnaire is shown in Appendix A. The English questionnaire was used for those managers who speak English.

5.8 Ethical considerations

The research study followed the four agreed standards of good practice in conducting research laid down in Helsinki: (1) to do positive good, (2) non-malfeasance, (3) informed consent, and (4) confidentiality and anonymity assurance (Bošnjak, 2001). Moreover, an application was submitted to Aston Business School Research Ethical Committee and approval was granted for the research project. Each survey contained a cover letter explaining the purpose of the study, indicating that participation was voluntary and that anonymity and confidentiality would be maintained. Thus, respondents were not asked for their names or requested to sign their questionnaires. Participants were informed that they are free to withdraw at any time; furthermore, in case respondents had any concerns, the contact details of the researcher were given in the cover letter. The researcher also honoured any commitments made to the participants, such as the provision of the results of the research, if requested. The researcher indicated the duration of the subject's participation in the survey by stating that filling the survey should take no longer than 15 minutes.

It is to be noted that Saudi Arabia is a country that has a cultural infrastructure based on religious views which are quite different from the western world and that it has a strong religious belief which uses Shari'ah (Islamic Law) as its base constitution. The researcher considered this when designing the questionnaire and those interview questions that were related to demographic information. As a result, the race or ethnicity item was absent due to the cultural norm that, under Saudi Arabian law, forbids the recognition of ethnic differences. Burton (2000) claims that "ethical concerns are present in all research designs and go beyond data collection to include analysis and publication" (Burton, 2000: 299). Thus, these issues were in the forefront of the researcher's mind throughout the research process.

5.9 Pre-test and Pilot test of the questionnaire

It is commonly believed that an important step in developing a survey is the preliminary trying out of the research instrument to associated participants to observe, validate and determine the effectiveness of the questionnaire and to make sure that it will work as intended. In fact, a well-organised pilot test will help to improve the efficiency of the main research, and it gives an initial warning about any areas in which the main research could possibly fail or where suggested instruments are inappropriate or too complicated (Teijlingen

and Hudley, 2001). Moreover, Teijlingen and Hudley (2001) list nine reasons for conducting pilot tests:

1. To develop and test the adequacy of research instruments.
2. To assess the feasibility of a (full-scale) study/survey.
3. To establish whether the sampling frame and technique are effective.
4. To identify logistical problems that might occur when using proposed methods.
5. To estimate variability in outcomes to help in determining sample size.
6. To determine what resources (finance, staff) are needed for a planned study.
7. To assess the proposed data analysis techniques to uncover potential problems.
8. To develop a research question and research plan.
9. To train the researcher in as many elements of the research process as possible.

The aims of testing the questions and questionnaire were to test the questionnaire to ensure that it was coherent and comprehensible, that the data collected would be accurate and that meaningful data analysis could be subsequently carried out (Kometa, 1995; Ling, 1998). Hussey and Hussey (1997) suggested that, at the very least, a questionnaire should be tested among friends or colleagues, but as far as possible on the people who are similar to the people in the sample. Similarly, Fink (2003) notes that for pilot testing to be effective, researchers should use respondents who are similar to those who will be asked to participate in the survey.

In order to confirm that the questionnaire for gathering the data was valid, three techniques were followed in this research. Firstly, after the development of the questionnaire and writing of the final version, the research supervisors and two academics at Aston Business School who were knowledgeable in instrument development and in the field of Internet technology adoption reviewed the questionnaire. They were asked to comment on the questionnaire and identify any gaps or inconsistencies. For example, they suggested some changes to the categorization of size and age in order to avoid any overlapping categories. Moreover, the proposed questionnaire was sent to two business consultants and was pre-tested with four top level executives of four companies located in Jeddah for review and feed-back. The feedback resulted in minor changes in wording but, in general, the feedback was positive.

Secondly, a survey refinement through pre-testing was conducted in the Arabic language using 25 respondents from the sample frame and aimed to ensure that there were no

unanticipated difficulties (Alreck and Settle, 2004) and to further enhance content validity. Hunt et al. (1982) noted that there is considerable inconsistency around the issue of pre-testing. Some authors suggest a pre-test sample of 12 and others of 30.

Participating companies in the pre-test were told that they had been chosen to take part in a trial study and that they were required to be critical, to ask about things they did not understand and to help the researcher design better questions. Moreover, participants were asked to comment on the length of the questionnaire, the time required for completing the questionnaire, the content and question layout, the clarity of question wording, and the order and sequence of questions; finally, they were asked to identify any factors not on the questionnaire that they considered important in their usage of e-commerce.

The pre-test was useful in identifying problems with question wording, layout, sequence, grammar, punctuation of the questions and survey length.   In addition, some questions had to be reworded to improve their clarity because the scales had been developed and tested in the USA and the language was unclear. For example, many participants suggested that the word "B2B e-commerce" is ambiguous and does not translate well into the Arabic language. Accordingly, we provided a definition for it as the process of deploying the Internet and ICTs to support the entire value chain, from suppliers through to the firm and finally to the customers. Thus, "electronic business" in Arabic was used. In fact, this is supported by Chaffey (2004) who notes that e-business and e-commerce are synonymous and are broadly used as interchangeable terms (i.e. e-commerce = e-business). Moreover, he asserts that "what is important within any given company is that managers involved with the implementation of e-commerce/e-business are agreed on the scope of what they are trying to achieve" (Chaffey, 2004: 10). More detail about the definitions of e-commerce and e-business is discussed in Chapter 1. Many respondents also suggested that the layout of the questionnaire should be rearranged to make it shorter and more appealing. In fact, the pre-test results supported the need for mostly close-ended questions in the survey.

Finally, a pilot test was carried out in June 2009 in order to confirm the reliability of the items. The researcher delivered 50 questionnaires to managers drawn randomly from the sample frame. Only 30 questionnaires were collected, giving a response rate of 60%. The data obtained from the pilot study was examined for reliability, completeness of responses and construct validity through use of SPSS version 16. The time taken for the respondents to

complete the questionnaire was approximately 10-15 minutes. The pilot study raised no major questions and no other changes were made. The final questionnaire (see Appendix A and B) was more easily read, had a better flow of questions, avoided leading or ambiguous questions and, more importantly, respondents did not have any difficulty in understanding and answering the questions. Subsequently, data collection was initiated using the final questionnaire.

5.10 Administration and distribution of the questionnaire

After piloting the questionnaire and making amendments to the layout and ordering, the field work started in July 2009 and continued for three months. Organisations were contacted asking for their agreement to participate in this survey, and asking for the name of the decision maker who normally participates in IT adoption decisions in each organisation. Of the 450 potential respondents, 306 organisations agreed to take part in the survey, which represents a response rate of 68 percent. A common reason offered for refusal to participate was the unavailability of informants during the research period. Explanations for this unavailability included: (1) not interested; (2) key informants on holiday or travelling abroad; (3) organisation in restructuring or merger process; and (4) due to company policy and unwillingness of the firms to provide sensitive information about their strategy and traits to outsiders.

A total of 306 survey packets containing a cover letter and a supporting letter from the sponsor — the Saudi Cultural Bureau in the UK — were hand delivered to the most senior manager of the firm, such as the managing director, general manager or senior manager. In most cases, the questionnaire was handed to an appropriate contact person or a coordinator who was requested to forward the questionnaire through their internal mailing systems to the senior manager or decision maker of the firm, such as the managing director or general manager, to then complete and return his or her response. The reason for using a contact person or a coordinator was because of Saudi Arabia's principles of gender-segregation, in which some organisations have some restrictions for a female to enter their organisations[15].

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[15] The city of Jeddah is seen as the most liberal city in Saudi Arabia and to some extent this enabled the researcher to move freely as a female in most male dominated work environments to collect data.

Therefore, during the initial contact with companies, the researcher asked for the name of a contact person in order to ensure cooperation.

The cover letter explained the purpose of the study and contained an introduction which illustrated the definition of e-commerce. In addition, adoptors of e-commerce were instructed to answer the survey questions based on their experience of e-commerce adoption and usage, whilst non-adopters were instructed to answer the items based on their future expectations of e-commerce adoption. A summarized report of the research findings were offered to the respondents as an incentive for them to give a response.

A 24-hour facsimile number was provided for subjects who preferred to respond by facsimile and, in most cases, making an appointment to collect the questionnaire at a time convenient to respondents only required about a minute. The rationale for using personal delivery was because the postal service in Saudi Arabia is unreliable (Al-Somali et al., 2009; Robertson et al., 2001). In addition, the advantages of personal delivery of the surveys include the availability of the researcher to answer general questions, explain the meaning of items which might be unclear and, more importantly, to spur interest in participating and completing the questionnaire. According to Stover and Stone (1974), the advantage of personal delivery over mailing is that the questionnaire can be checked instantly to ensure all the questions have been answered and nothing has been forgotten or missed. Other advantages as noted by Alqahtani et al. (2000) are: (a) there is an average to high percentage return of questionnaires from respondents, and (b) the researcher is in full control of how long the data collection exercise will last. Therefore, the personal delivery followed by a later pick up methodology suggested by Robertson et al. (2001) and Tuncalp (1988) was adopted to ensure that the questionnaire reached respondents.

Of the 306 distributed questionnaires, a total of 224 were collected by the agreed pick-up time. Some of the non-respondents were contacted and were requested to explain the reasons for non-participation. In most of the cases, they said that it was because of lack of time to complete the questionnaire

In some cases, when the researcher returned to collect questionnaires, some respondents had not completed them, citing work commitments, and others had lost them. They were asked politely if they would kindly complete them and the researcher asked for their e-mail address

to set up a time to come and collect completed questionnaires at a later date. This policy worked in most cases. In fact, the researcher had to make several calls to guarantee the return of completed questionnaires. If the questionnaire had been lost, another copy was given to the participant as the researcher carried extra copies. Twenty-three organisations were located far from the city and, because it was difficult to reach them in person, the researcher mailed questionnaires to the IT departments of these organisations after contacting them by phone. Then, e-mail and phone calls were used to remind them and make sure that questionnaires had been received and would be completed. Moreover, 22 questionnaires were discarded and could not be used in the analysis because large sections of the questionnaires were incomplete (i. e. left blank in some questions or some parts) or had only one number on all Likert scale items, such as all 1's or all 5's. The final usable sample contained 202 responses.

In fact, a high response rate is viewed as an important criterion by which the quality of a survey is judged (Hox and DeLeeuw, 1994) because a higher response rate implies less potential non-response bias (Shih and Fan, 2008). On the other hand, the computation of response rate can be very tricky because each study may use its own definition of response rate. As suggested by Shih and Fan (2008), this study adopted the computation of response rate, which is calculated using the formula below:

$$RR1 = \frac{I}{(I + P) + (R + O)}$$

For this formula, the response rate (RR1) is the number of complete surveys (I) divided by the number of complete surveys plus partial surveys (P) plus the number of refusals and break-offs (R) plus others (O). In this study, the response rate was 44.9% [202/ (202+22) + (144+82)]. As noted by Saunders et al. (2007), a response rate between 30% and 50% is acceptable for a deliver and collection questionnaire. In fact, the study's response rate compares favourably with other studies and is even better in some cases than previous studies (e.g. Grandon and Pearson, 2004; Thong et al., 1996; Premkumar and Potter, 1995). It is worth noting that, the letter from the Saudi Cultural Bureau in the UK (the sponsor) endorsed the legitimacy of the research, encouraged firms to collaborate with the researcher and informed participants about the benefits and importance of conducting the study. Table 5.5 illustrates the response rate statistics.

Table 5.5	Survey response rate statistics		
Classification of responses	**Number**	**Percentage**
Potential respondents	450	100.00%
Refused to participate	144	32%
Unreturned	82	18.2%
Total returned	224	49.8%
Unusable (incomplete/ partially answered)	22	4.9%
Total questionnaires used for analysis	202	44.9%

Previous research suggested the key informant approach for survey research and this has been used by several researchers (e.g. Bhuian, 1998; Pennkumar and King, 1992). So that the researcher, in the end, can build a common understanding (Creswell, 2007; Gilchrist, 1999; Bowman and Ambrosini, 1997; Day and Nedungadi, 1994), it is commonly believed that key informants in a study have to be carefully chosen and need to be individuals who are likely to be involved with the strategic activities of the companies, have had a particular experience they can elaborate upon, and are credible sources of information about an organisation's functions, activities and operating environment (Hillman and Keim, 2001; Frost et al., 2002). In fact, senior managers as key informants are adequate for reliable and valid data (Tan and Litschert, 1994) Therefore, the data for this study were collected using the key informant approach, in which all the questionnaires were addressed personally to those key decision makers who had a high management status, such as managing director or direct manager, as they are seen as having a wide breadth of knowledge of all of the organisation's activities, are involved in decisions leading to the adoption of technology in their business settings, and can provide an overall assessment of the key challenges and concerns of using e-commerce technologies in their organisations.

5.11 Difficulties and problems during the data collection for this study

It is difficult for a researcher to cover all aspects related to a topic, despite conscientious efforts to do so (Alqahtani et al., 2000). Several difficulties were confronted during the data collection for this study in Saudi Arabia. First, the large distances involved and the possibility of lost mail forced the researcher to use personal trips to respondents' work places and avoid using the post for distributing questionnaires. In some cases, the researcher had to embark on several rounds of questionnaire distribution to those who had not completed or had simply disregarded questionnaires. Second, managers in Saudi Arabia have little trust in the benefits and importance of conducting research and do not develop a sense of the inherent value of

research because they are not often exposed to these kinds of experiences. Part of the reason for this distrust may come from the fact that the private sector in Saudi Arabia seldom contributes to education or research funding unless the research emanates from inside their companies. Finally, the time period of the fieldwork unfortunately coincided with the holy month of Ramadan (i.e. the month of fasting) in which the working day is shorter and all organisations are required by law to reduce their working time. In some cases, this necessitated that the researcher wait until the end of the vacation[16] period and until managers have cleared the backlog of work which has accumulated in their absence before being able to present questionnaires to them.

5.12 Estimating non-response bias

Non-response error, also known as non-response bias, occurs when "the portion of the defined target population not represented or underrepresented in the response pool is systematically and significantly different from those that did respond" (Hair et al., 2006: 677). There have been many discussions exploring how to increase response rates (e.g., Czaja and Blair, 2005; Dillman, 1999; Yu and Cooper, 1983) and how to estimate and/or correct for non-response bias (e.g., Armstrong and Overton, 1977; McBroom, 1988; Bickart and Schmittlein, 1999). The overall goal is the same, that is, to increase response rates, which, in turn, reduces potential non-response bias. However, according to Malhotra and Birks (2000), non-response bias is not necessarily reduced or eliminated by increased response rates. Furthermore, it is recommended to address non-response bias when less than an 85 percent response rate and/or more than a 50 percent response rate is achieved in order to generalize results from a sample to a population (Dooley and Lindner, 2003; Lindner et al., 2001; Fowler, 2002; Babbie, 1998; Miller and Smith, 1983). Therefore, it is very important to undertake some form of non-response analysis because when non-response error occurs, conclusions drawn and recommendations made that are based on participants' responses are not valid (Dooley and Lindner, 2003).

Lambert and Herrington (1990) recommend testing non-response bias by assuming that later respondents who responded only after one or more follow-ups are more similar to non-respondents. In fact, by comparing early with late respondents, the researcher can create an

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[16] The end of Ramadan is marked by a three-day period known as Eid ul-Fitr, or Little Eid.

indication of the difference between respondents and non-respondents (Armstrong and Overton, 1977). Lindner et al. (2001) and Churchill (1999) note that early and late comparison is a valid, reliable, and generally well-accepted procedure for handling non-response bias.

For the present study, it was difficult to implement the method suggested by Lindner et al. (2001) and Churchill (1999) because most of the questionnaires were distributed through the coordinator; the researcher was hence unable to determine the exact day that the questionnaire was distributed or whether responses were as a result of follow-ups. In fact, the complete collection rate actually depended on them and their ability and willingness to follow up, distribute and to push for a response from non-respondents.

5.13 Data analysis techniques

Research literature identifies three main types of statistical analysis, namely:

1) Univariate analysis

This involves the examination of a single measure or several measures of objects, but each variable is to be considered in isolation. There are three major characteristics which dominate univariate analysis, namely: the distribution, the central tendency and the dispersion. In most situations, researchers would describe all these characteristics for each of the variables in their study. The distribution is a summary of the frequency of individual values or ranges of values for a variable. The central tendency is mainly used to identify where most of the data points are concentrated. The two major types of estimates of central tendency are mean and median. Finally, dispersion refers to the spread of the values around the central tendency. There are two common measures of dispersion: the range and the standard deviation (Bryman and Cramer, 2005; Huck and Cormier, 1996).

2) Bivariate analysis

This focuses on the simple correlation based on two variables. It shows whether two variables have a tendency to move in the same or opposite directions, that is, whether they are positively or negatively correlated (Whitfield, 1998). One of the most popular bivariate techniques is correlation analysis.

3) Multivariate analysis

This is a generic term that is applied to many different methods of analysis applicable to complicated data sets (Everitt, 2002). The multivariable method of analysis may be used to explore the interrelationships among three or more variables simultaneously (Blaxter et al., 2002). In fact, most multivariate analyses use a variant of the least square technique, which is based on the principle of minimizing the sum of the squares of the vertical distances between a set of observations and a regression line (Whitfield, 1998). The hypothesis-testing component of the present study will use multivariate analysis techniques in order to test the hypothesised model. The most popular multivariate techniques are principal components analysis and multiple regression.

All statistical tests were carried out using SPSS 16 (Statistical Package for Social Science, Version 16). Various forms of statistical analysis were utilized, such as descriptive statistics which was used to summarise the data and present the study findings in a comprehensible, manageable form. Frequency counts and percentages were produced for categorical variables. Ranges and medians were used for the continuous variables. Scale reliability and exploratory factor analysis were reported to clarify the validity and reliability of instrument design. First order correlation was sometimes used to test that two variables were independent. A significance level of 0.05 was arbitrarily established for concluding that the null hypothesis of independence could be rejected and a statistically significant relationship between variables existed. Discriminant function analysis was used to examine what combination of variables best predicts membership in a categorical grouping variable. The procedures of data analysis were as follows:

1) Summated scales

A summated scale is formed by combining several individual variables that measure the same concept into a single variable. Then, their total or mean score is used in the analysis in an attempt to increase the reliability of the measurement (Hair et al., 1995). A summated scale has an ability to represent multiple aspects of a construct in a single variable (Forslund, 2007). In fact, the literature supports the use of summated scales (e.g. Behrman and Perreault, 1982; Piercy, 1989). However, summated scales should be created after assessing the unidimensionality of the scale using exploratory or confirmatory factor analysis (Hair et al., 1995). Values entered in analysis for each of the study variables was the mean score. The mean score of a variable was calculated by adding the score of each individual item,

measuring that variable and then dividing the total by the number of items added. The correlation test and multiple regression analysis were carried out using the aggregated or summated scales.

2) Descriptive statistics

Univariate descriptive statistics were used to check for errors in the data set described and descriptive statistics were also used to describe the characteristics of the sample. The most used was percentages, mean and standard deviation. Most univariate descriptors of items did not reveal any aberrations.

3) Scale reliability testing

Most variables in the study were composed of Likert-type items. Hence, Cronbach's coefficient alpha was used to measure consistency of the multiple-item scale. Although researchers suggest 0.7 as the accepted value for Cronbach's alpha (Hair et al, 1995; Nunnally, 1978), a value of more than 0.6 is considered as a satisfactory level (Dinev and Hart, 2002; Hair et al., 1995; Malhotra, 1999; Nunnally, 1978; Van de Ven and Ferry, 1980).

4) Factor analysis

Factor analysis was conducted to assess the underlying structure for the multiple items of the research variables.

5) Correlation

Basic forms of correlation coefficients (e. g., Spearman rho, Pearson) were calculated to examine the strength and direction of the relationship between each set of variables. Correlation analysis is used to describe the strength and direction of the linear relationship between two variables (Pallant, 2005). The Pearson correlation coefficient (r) is a widely used correlation method that measures the strength of the relationship between two variables. It can take on only values from -1.00 to +1.00. A correlation of +1.00 indicates a perfect positive correlation (i.e. as one variable increases, so too does the other) and a value of -1.00 indicates a perfect negative correlation (i.e. as one variable increases, the other decreases). Conversely, a correlation of 0 indicates no relationship at all (Pallant, 2005).

6) Discriminant Analysis (DA)

DA is a common multivariate statistical technique in social science investigation. In fact, DA allows the researcher to study the differences between two or more groups of objects with respect to several variables simultaneously (Klecka, 1980). Moreover, it is designed to assess how well (or how poorly) a set of continuous independent variables (IVs) predicts membership in a categorical grouping variable, usually dichotomous in nature. If more than two groups are represented by the dependent variable (DV), the procedure is called multiple discriminant analysis (MDA).

Discriminant analysis creates a composite variate called a discriminant function that represents a linear combination of the IVs to distinguish between two or more of the pre-defined groups that are categorized by the DV. Therefore, it provides a much clearer picture of the research objects (Chou, 1995). A linear combination of discriminant analysis is the sum of one or more independent variables which may have been weighted by constant terms (Klecka, 1980), and it can be represented in the following form:

$$D = a + \sum_{n=1}^{\infty} B_n X_n$$

Where D = Discriminant Score for a subject or case

a = Constant

B = Discriminant function coefficients (weights) for each independent variable

X = Independent variables

In addition to it being used for predicting group membership, discriminant analysis also can be used to:

- investigate IV mean differences between groups formed by the dependent variable.
- determine the percent of variance in the DV explained by the IVs.
- assess the relative importance of the IVs in classifying the dependent variable.
- identify variables which are not helpful in classifying subjects.
- test theory by observing whether cases are classified as predicted.

In this research study, discriminant analysis was used to measure the extent to which e-commerce adopters differ from each other based on the (factors) determinants which differentiate them.

5.14 Data screening prior to analysis

It is essential to conduct a data screening before the analysis process (Pallant, 2005). The original data was prepared and screened for missing data, normality and multicollinearity. Moreover, data screening was conducted using SPSS to ensure that no undesirable conditions were evident which may have made the data unsuitable for analysis. Descriptive statistics in SPSS were used to detect miscoded data, outliers (i.e. extreme values as compared to the rest of the data) and missing data. The distribution of a variable's score or normality was also examined. The two statistics that describe distributional shape or normality of data are skewness and kurtosis. Skewness relates to the clustering of data points at one end of the distribution, while kurtosis reflects the extent to which the density of observation differs from the probability of the normal curve (DeCarlo, 1997). All these problems and issues were corrected before applying statistical procedures. In fact, it is believed that these preparations are necessary for survival analysis and meeting them often results in greater power and better prediction (Tabachnick and Fidell, 2007). The results are discussed in the following subsections.

5.14.1 Treatment of missing data

Missing data is defined as "a statistical difficulty (i.e. partially incomplete data matrix) resulting from the decision by one or more sampled individuals to not respond to a survey or a survey item (Newman, 2009: 8). Missing data are a pervasive problem in almost all areas of empirical research (Jamshidian, 2004; Downey and King, 1998; Huisman et al., 1998; Lepkowski et al., 1987), especially in survey research because it usually involves a larger number of responses and a larger number of respondents (Kim and Curry, 1977; Quinten and Raaijmakers, 1999). Missing data can lead to incorrect conclusions, less efficient findings and, more importantly, the generalizability of research results can be seriously affected by the presence of missing data. It is important, therefore, to handle the missing data carefully.

Missing data may arise for several reasons, such as the respondents do not know the answer, do not have sufficient information to answer the question, think the question is inapplicable, feel uncomfortable to answer certain sensitive questions (e.g., about their income level), forget to answer the question and fail to finish some sections due to lack of time (Tsikriktsis, 2005; Allison, 2001). Davey and Savla (2010) and Little and Schenker (1995) emphasise that

researchers should be concerned with missing data because failing to adequately address issues of missing data can lead to two major negative effects: firstly, they have a negative impact on statistical power, and, secondly, missing data may result in biased estimates.

According to Newman (2009), the missing data concept subsumes three levels of non-response, as shown in Figure 5.5: (1) item-Level non-response or missingness (i.e. respondent leaves a few items blank); (2) scale-Level non-response (i.e. omitting an entire scale or an entire construct); and (3) person or survey-Level non-response (i.e. failure to return the entire survey). Missing data levels are nested, in which item-level missingness can be aggregated into scale-level non-response and, subsequently, scale-level non-response can aggregate into survey-level non-response or missingness (Newman, 2010).

Figure 5.5	Missing Data Levels
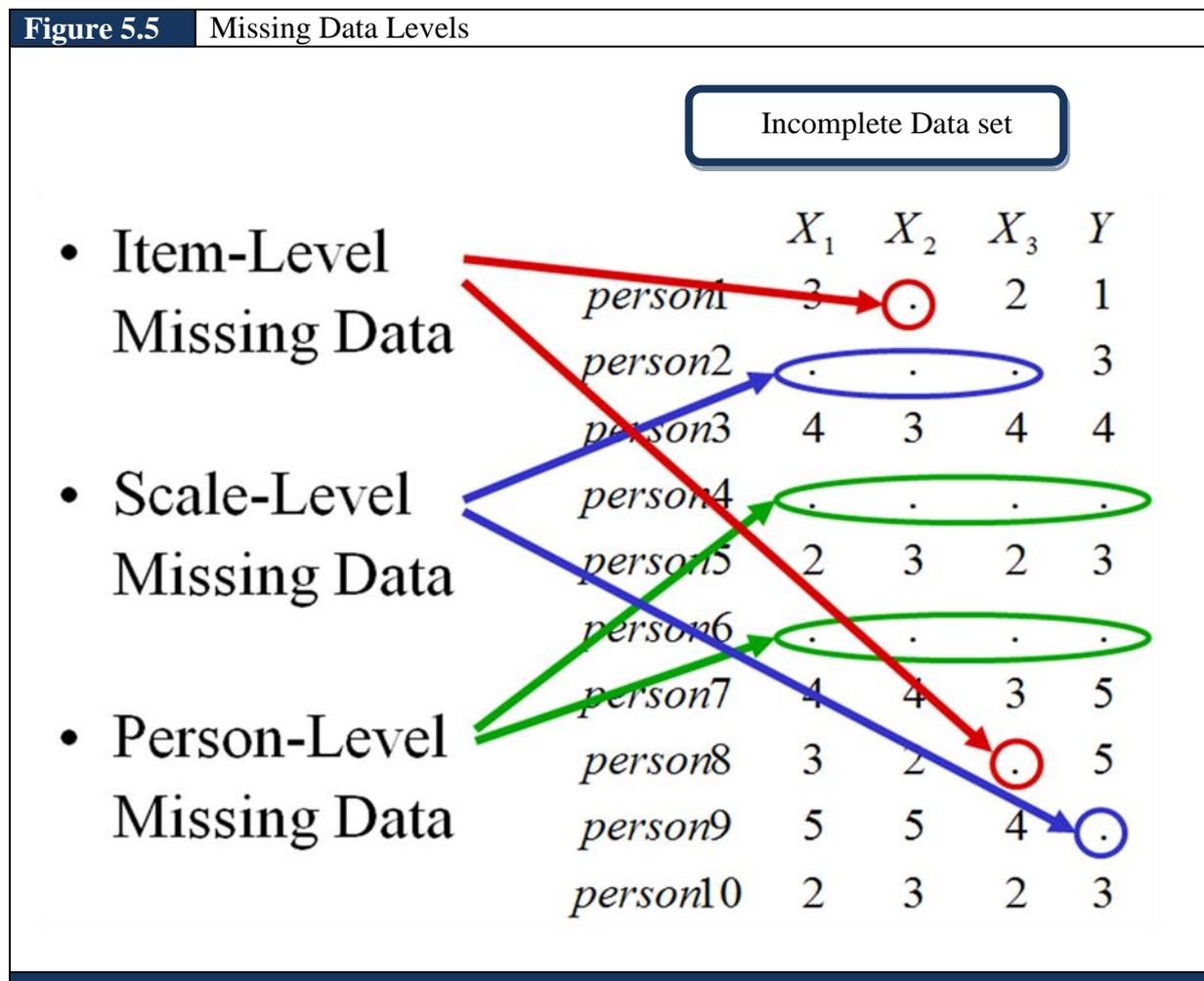
Source: Adapted from Newman, 2010

In their seminal work on the analysis of missing data, Little and Rubin (1987) distinguished between three types of missing data patterns based on randomness. Data missing at random is called missing completely at random (MCAR), while missing data at non-random patterns are of two different varieties: Missing at Random (MAR) and Missing Not at Random (MNAR). Table 5.6 shows the missing data patterns based on their randomness.

Table 5.6	Missing data patterns
Pattern	Description
1) Random	
Missing Completely at Random (MCAR) $MCAR - R_{miss\_Y}$ is not related to X or Y X | Y R_{missY}	MCA means that the missing values for a variable X are unrelated to both all observed as well as the values of X itself (Enders, 2001).
2) Non-random/systematic	
Missing at Random (MAR) $MAR - R_{miss\_Y}$ is related to X, but is not related to Y X | Y R_{missY}	MAR means that the probability of a missing value on some variables is independent of the respondents' true status on that variable. In other words, respondents with missing observations differ only by chance from those who have scores on that variable (Little and Rubin, 1987).
Missing Not at Random (MNAR) $MNAR - R_{miss\_Y}$ is related to Y X | Y —— R_{missY}	MNAR shows a relationship between the variables with missing data and those for which the values are present. In fact, if missing data are MNAR, valuable information is lost from the data and there is no universal statistical method to alleviate the problem of missing data (Little and Rubin, 1987; Rubin, 1987).

Source: based on original work of Little and Rubin (1987)

Many different methods and strategies have been proposed for handling for missing data and each haswith its own strengths and limitations. All techniques are summarised and shown in Appendix D. However, only a few methods have gained widespread popularity (Allison, 2001). According to Little and Rubin (1987), the most used techniques to treat the missing data can be categorised into the following groups:

1) List-wise deletion

List-wise deletion is accomplished by deleting from the sample any observations that have missing data and running analyses on what remains (Allison, 2001). In addition to its simplicity, the advantage of list-wise deletion is that it produces consistent estimates of the predicted covariance matrix as all analyses are conducted with the same cases (Bollen, 1989). The main disadvantage is that it can exclude a large fraction of the original sample even if there is only a small number of missing observations (Nulland, Chow and Lam, 1996). This procedure converts item-level and scale-level missingness into person-level missingness (Newman, 2010). Researchers have suggested that the large loss of data decreases power (Gilley and Leone, 1991) and may introduce bias in parameter estimation (Donner, 1982; Little and Rubin, 1987).

2) Pair-wise deletion (also known as available case analysis)

In pair-wise deletion, summary estimates (e.g., means, SDs, correlations) are calculated using all available cases that provided data relevant to each estimate, then proceeding with analysis based on these summary estimates (Newman, 2010; Allison, 2001). Thus, it preserves a great deal of information that would be lost when using list-wise deletion (Roth, 1994). The main disadvantage of this method is that different calculations in an analysis might be based on differing sample sizes (Malhotra and Birks, 2000). The differing number of observations to cases in the sample size can also result in problems with interpretation of the chi-square statistic (Bollen, 1989). Another problem that occasionally arises with pair-wise deletion, especially in small samples, is that the constructed correlation matrix may not be "positive definite", which implies that the regression computations can not be carried out at all (Allison, 2001).

3) Imputation procedure

In this procedure, the basic idea is to substitute some reasonable guess (imputation) for each missing value and then proceed to the analysis as if there were no missing data. The procedure for imputation of missing data on a variable involves replacing that missing item

by a value that is drawn from an estimate of the distribution of this variable (Donders et al., 2006). There are two types of imputation: single and multiple imputations. Single imputation is used when data are MAR, while multiple imputation (MI) is used with MAR and MCAR data. The simplest way to estimate or impute missing values is using marginal mean imputation (Allison, 2001). A disadvantage of this method is that it can be difficult to define suitably similar cases for imputation purposes (Hair et al., 2006), and the technique is therefore more suited to very large data sets (Cohen et al., 2003).

4) Expectation Maximization Algorithm (EM)

It is called EM because it consists of two steps: an expectation step and a maximization step. It is used in order to estimate sample moments such as means, variances, and covariances (Davey and Savla, 2010; Hair et al., 2006; Dempster et al., 1977). In step one - the "E" step (expectation) - missing values are replaced with their expected values conditional on the other variables in the model (Dempster et al., 1977). In step two - the "M" step (maximization) - maximum likelihood (ML) estimates of covariance matrix and means are obtained just as if there were no missing data using statistics calculated during step one (Enders, 2001). These estimates (i.e. means and covariances) are then recycled through step one and step two until the difference between subsequent covariance matrices falls below some specified convergence criterion (i.e., the difference in estimates between successive iterations is sufficiently small).

The EM approach has been found to produce efficient and consistent estimates of missing values regardless of sample size (N = 100 or N= 500) and percentage of data missing (4%, 8%, 12% and 16%) (Farrell,2008). However, when accounting for missing data, it is important to be aware of the percentage of the missing data (Cohen et al., 2003). Kline (1998) suggests that percentage of missing variables should probably constitute less than 10% of the data. Cohen and Cohen (1975) point out that 5% or even 10% missing data on a particular variable is not large. Bryman and Cramer (2005) and Hair et al. (2006) claim that if more than 10% of the data is missing, it is defined as missing for that participant and any treatment of this high amount of missing responses poses problems. Farrell (2008) notes that for cases with more than 3% of data missing, list-wise deletion can be used to remove the case from the dataset.

Table 5.7 illustrates the strength and weakness of each of the discussed techniques for handling missing data. In fact, the superiority of the EM over other forms of imputation has been noted in the literature (Gold and Bentler, 2000; Schafer and Graham, 2002). However, because the EM algorithm is model based, the results still depend in part on which variables are included in the model (Dempster et al., 1977)

According to Little and Rubin (1987) and Jamshidian (2004), when there is evidence that data are missing at random (MAR - missingness may depend on the independent variables but not the dependent), a preferred method of imputation is to use the expectation maximization (EM) algorithm to obtain maximum likelihood (ML) estimates. Following the recommendation of Jamshidian (2004) and Little and Rubin (1987), missing data in this study were treated using the EM algorithm because the type of missing data is MAR and the percentage of missing variables in the current research remained low (i.e., less than 3%, as per Farrell (2008) and Cohen et al. (2003). A version of EM algorithm is included in the SPSS computer application. SPSS is helpful for assessing patterns of missing data and providing a t test to predict missingness from other variables in the data set (Tabachnick and Fidell, 2007).

Table 5.7	Suggested strategies for dealing with missing data

Aston University

Information on this page has been removed for data protection purposes

Source: Newman, 2009

In the current study, the percentage of the missing data was diagnosed before performing further analysis, and the maximum percentage of missing data was two percent (2%); only six items had more than one percent of missing observations. These were considered to be acceptable[17]. Table 5.8 shows the results of the evaluation of the amount of missing data.

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[17] Farrell (2008) and Cohen et al. (2003) point out that less than 3% missing data on a particular variable is not large.

Table 5.8 Statistic of the missing data

Variable		N	Missing	
			Count	Percent
Relative advantage	RAD1	200	2	1.0
	RAD 2	200	2	1.0
	RAD 3	199	3	1.5
	RAD 4	200	2	1.0
	RAD 5	200	2	1.0
	RAD 6	200	2	1.0
	RAD 7	198	4	2.0
	RAD 8	200	2	1.0
	RAD 9	200	2	1.0
compatibility	COM1	201	1	0.5
	COM2	201	1	0.5
	COM3	201	1	0.5
security concern	SEC1	201	1	0.5
	SEC2	201	1	0.5
	SEC3	200	2	1.0
	SEC4	200	2	1.0
Adoption cost	COS1	201	1	.5
	COS 2	200	2	1.0
	COS3	200	2	1.0
	COS 4	201	1	0.5
Language concern	LAC1	201	1	0.5
	LAC2	201	1	0.5
	LAC3	201	1	0.5
IT readiness	ITR1	202	0	0
	ITR2	202	0	0
	ITR3	202	0	0
	ITR4	201	1	0.5
	ITR5	200	2	1.0
	ITR6	202	0	0
	ITR7	202	0	0
management team support	MTS1	201	1	0.5
	MTS2	201	1	0.5
	MTS3	200	2	1.0
	MTS4	201	1	0.5
	MTS5	201	1	0.5
Learning orientation	LRO1	202	0	0
	LRO2	201	1	0.5
	LRO3	201	1	0.5
	LRO4	200	2	1.0
	LRO5	200	2	1.0

Variable		N	Missing	
			Count	Percent
Receptivity toward change	RTC1	202	0	0
	RTC2	202	0	0
	RTC3	202	0	0
	RTC4	202	0	0
	RTC5	200	2	1.0
	RTC6	202	0	0
Decentralization Level	DEC1	201	1	0.5
	DEC2	200	2	1.0
	DEC3	201	1	0.5
Formalisation Level	FOR1	200	2	1.0
	FOR2	201	1	0.5
	FOR3	200	2	1.0
strategic orientation	STO1	201	1	0.5
	STO2	202	0	0
	STO3	201	1	0.5
	STO4	201	1	0.5
	STO5	200	2	1.0
	STO6	200	2	1.0
	STO7	201	1	0.5
	STO8	201	1	0.5
	STO9	201	1	0.5
Regulatory & legal Environment	REG1	200	2	1.0
	REG2	200	2	1.0
	REG3	198	4	2.0
	REG4	199	3	1.5
	REG5	199	3	1.5

Table 5.8 (Cont.)

Variable		N	Missing	
			Count	Percent
External Pressure				
Customer influence	EPR-CUST1	202	0	0
	EPR-CUST2	201	1	0.5
	EPR-CUST3	202	0	0
Competitive pressure	EPR-COMP1	201	1	0.5
	EPR-COMP2	201	1	0.5
	EPR-COMP3	201	1	0.5
	EPR-COMP4	202	0	0
	EPR-COMP5	200	2	1.0
Business partner influence	EPR-SUPP1	202	0	0
	EPR-SUPP2	202	0	0
	EPR-SUPP3	201	1	0.5
	EPR-SUPP4	202	0	0
National e-readiness	NRE1	201	1	0.5
	NRE2	201	1	0.5
	NRE3	201	1	0.5
	NRE4	199	3	1.5
	NRE5	200	2	1.0
	NRE6	201	1	0.5
	NRE7	201	1	0.5
	NRE8	201	1	0.5
	NRE9	200	2	1.0
Economic downturn	ECO1	202	0	0
	ECO2	202	0	0
	ECO3	202	0	0
Technology Consultants' orientation	TCO1	202	0	0
	TCO2	202	0	0
	TCO3	201	1	0.5
	TCO4	202	0	0
	TCO5	202	0	0
	TCO6	200	2	1.0
	TCO7	202	0	0

Variable		N	Missing	
			Count	Percent
demographic profile & Firm Statistics	Gender	201	1	0.5
	Age	200	2	1.0
	EDU	202	0	0
	Place	202	0	0
	Position	202	0	0
	Org.Age	200	0	0
	Size	201	0	0
	Industry	201	0	0
Geographical scope	GSC1	202	0	0
	GSC2	202	0	0
	GSC3	202	0	0

Subsequently, following the method suggested by Sattabusaya (2008) and Little and Rubin(1987), the patterns of missing data were assessed in which variables with missing data

above one percent (i.e RAD3, RAD7, REG3, REG4, REG5, NRE4) were diagnosed by evaluating the correlations between the missing data on each variable pair. The statistical results shown in Table 5.9 indicate that significant correlations exist between some variables such as REG4 and REG3 (0.778) or REG5 and REG4 (0.756). Thus, it can he safely concluded that the missing data are Missing at Random (MAR) (Sattabusaya, 2008; Tsikritsis, 2005).

Table 5.9	The Pearson correlation of missing data for any pair of variables					
	RAD3	RAD7	REG3	REG4	REG5	NRE4
RAD3	1					
RAD7	0.492**	1				
REG3	0.124	0.044	1			
REG4	0.157*	-0.035	0.778**	1		
REG5	0.077	-0.110	0.632**	0.756**	1	
NRE4	.298**	0.214**	0.308**	0.265**	0.207**	1
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).						

To summarise, the EM algorithm method was used to impute missing data points. As recommended by Newman (2009), Farrell (2008) and Cohen et al. (2003), this method is appropriate when the percentage of missing variables in the particular case is less than 3% with MAR (see Table 5.7). In fact, Table 5.9 shows that the amount of missing data is less than 3%. Moreover, the evaluation of' randomness of' missing data reveals that the type of missing data is MAR (see Table 5.10). As a result, the EM algorithm method is the most appropriate method for the current study.

5.14.2 Assessing normality

Screening variables for normality is an important early step in almost every multivariate analysis (Tabachnick and Fidell, 2007). Normality refers to the degree to which the distribution of the sample data corresponds to a normal distribution (Hair et al., 1995). Hair et al. (1995) highlight the fact that "the most fundamental assumption in multivariate analysis is the normality of the data, referring to the shape of the data distribution for an individual

metric variable and its correspondence to the normal distribution, the benchmark for statistical methods. If the variation from the normal distribution is sufficiently large, all resulting statistical tests are invalid." Under this assumption, it is assumed that all the univariate distributions or the distributions of the individual variables are normal.

Normality of variables is assessed by either statistical or graphical methods. Two components of normality are skewness and kurtosis. Skewness describes the degree of symmetry in a distribution, where symmetry refers to the balance between the number of observations that are above the mean and the number of observations below the mean (Hardy, 2004); a skewed variable is a variable whose mean is not in the centre of the distribution (Tabachnick and Fidell, 2007). Positive skew indicates that most of the cases are below the mean whereas negative skew are above (Kline, 2005; Tabachnich and Fidell, 2007). Kurtosis shows whether the distribution is very peaked around the mean, or whether it is relatively flat (Hardy, 2004); a distribution is either too peaked or too flat. A variable can have significant skewness, kurtosis, or both.

Positive kurtosis indicates heavier tails and a higher peak, and negative kurtosis indicates just the opposite. A value of 0 corresponds to perfect normality in the data distribution. This, of course, is rarely achieved in the social sciences area (West et al., 1995). Kline (2005) and West et al. (1995) point out that variables with absolute values of the skew index greater than 3.0 are described as 'extremely' skewed; whereas, absolute values of the kurtosis index from about 8.0 to over 20.0 indicate 'extreme' kurtosis. A conservative rule of thumb is, however, that absolute values of kurtosis index greater than 10.0 may suggest a problem, and values greater than 20.0 may indicate a more serious problem. The guidelines to detect non normality distribution in this study are skewness above 3.0 or kurtosis above 10.0 (Kline, 2005; West et al., 1995). Normality test was carried out on all independent variables and the results of both skewness and kurtosis are shown in Table 5.10.

As can be seen, all items are skewed, with scores for skewness ranging from (-1.46) for STO1 to (0.22) for EPR-COMP4. Kurtosis values listed in Table 5.10 pose no problem in the sample for this study. Kurtosis values range from (-1.2) for EPR-COMP1 to (1.93) for RAD7.

Table 5.10 — Assessment of normality - Skewness and kurtosis statistics

Variable		skew	kurtosis
Relative advantage	RAD1	-1.00	0.643
	RAD 2	-0.972	0.805
	RAD 3	-0.722	0.216
	RAD 4	-1.42	1.78
	RAD 5	-1.22	1.33
	RAD 6	-1.09	1.18
	RAD 7	-1.43	1.93
	RAD 8	-0.959	0.475
	RAD 9	-1.35	1.92
compatibility	COM1	0.18	-1.00
	COM2	0.03	-1.08
	COM3	0.12	-1.02
security concern	SEC1	-0.30	-0.52
	SEC2	-0.25	-0.54
	SEC3	-0.41	-0.61
	SEC4	-0.42	-0.27
Adoption cost	COS1	-0.28	-0.23
	COS 2	-0.45	-0.65
	COS3	-0.46	0.02
	COS 4	-0.78	0.11
Language concern	LAC1	-1.02	0.07
	LAC2	-0.41	-0.96
	LAC3	-1.22	0.88
IT readiness	ITR1	-0.87	-0.32
	ITR2	-1.16	0.59
	ITR3	-0.75	-0.03
	ITR4	-0.80	0.04
	ITR5	-0.73	-0.10
	ITR6	-0.86	-0.62
	ITR7	-1.01	0.18
Learning orientation	LRO1	-0.97	-0.02
	LRO2	-0.65	-0.17
	LRO3	-0.70	-0.08
	LRO4	-0.56	-0.67
	LRO5	-0.78	-0.12
management team support	MTS1	-0.67	-0.44
	MTS2	-0.41	-0.63
	MTS3	-0.42	-0.66
	MTS4	-0.67	-0.23
	MTS5	-0.75	-0.21

Variable		skew	kurtosis
Receptivity toward change	RTC1	-0.69	-0.21
	RTC2	-0.63	-0.25
	RTC3	-0.40	-0.69
	RTC4	-0.40	-0.70
	RTC5	-0.56	-0.46
	RTC6	-0.09	-0.82
Decentralization Level	DEC1	-1.21	0.47
	DEC2	-0.68	-0.38
	DEC3	-0.39	-0.61
Formalisation Level	FOR1	-0.62	-0.60
	FOR2	-0.80	0.09
	FOR3	-0.55	-0.59
strategic orientation	STO1	-1.46	1.56
	STO2	-0.46	-0.63
	STO3	-0.57	-0.57
	STO4	-0.96	0.38
	STO5	-0.84	-0.12
	STO6	-0.80	0.13
	STO7	-0.77	-0.23
	STO8	-0.60	-0.55
	STO9	-0.11	-0.89
Regulatory & legal Environment	REG1	-0.05	-0.87
	REG2	0.01	-0.69
	REG3	-0.07	-0.88
	REG4	0.16	-0.75
	REG5	0.09	-1.01

Table 5.10 (Cont.)

Variable		skew	kurtosis
Customer pressure	EPR-CUST1	-0.49	-0.55
	EPR-CUST2	-0.22	-0.65
	EPR-CUST3	-0.21	-0.77
Competitive pressure	EPR-COMP1	0.04	-1.20
	EPR-COMP2	-0.20	-0.95
	EPR-COMP3	-0.15	-0.96
	EPR-COMP4	0.22	-0.98
	EPR-COMP5	-0.85	0.05
Supplier pressure	EPR-SUPP1	-0.37	-0.24
	EPR-SUPP2	-0.46	-0.24
	EPR-SUPP3	-0.81	0.59
	EPR-SUPP4	-0.60	0.18
National e-readiness	NRE1	-0.45	-0.77
	NRE2	-0.55	-0.44
	NRE3	-0.46	-0.39
	NRE4	-0.23	-0.84
	NRE5	-0.22	-0.55
	NRE6	-0.34	-0.90
	NRE7	-0.41	-0.91
	NRE8	-0.44	-0.58
	NRE9	-0.16	-0.76
Technology Consultants' orientation	TCO1	-0.33	-1.00
	TCO2	-0.41	-0.49
	TCO3	-0.39	-0.37
	TCO4	-0.28	-0.67
	TCO5	-0.16	-0.56
	TCO6	-0.42	-0.38
	TCO7	-0.32	-0.44
Economic downturn	ECO1	-0.09	-0.93
	ECO2	0.06	-0.76
	ECO3	0.16	-0.75

5.14.3 Multicollinearity

Multicollinearity is concerned with whether there is significant dependence or correlation between the independent variables (Pallant, 2005; Kleinbaum et al., 1998). The presence of multicollinearity can hinder assessing the relative importance of the independent variables in explaining the dependent variable and leads to unstable statistical results (Kleinbaum et al., 1998; Cohen and Cohen, 1975). Therefore, it is recommended that the presence of multicollinearity be investigated before a multiple regression is interpreted. Indicators of multicollinearity are identified by reviewing the correlation matrix provided by SPSS to identify if any of the data correlates very highly. Correlations that lie below the threshold value of 0.80 are considered to exhibit no problem of multicollinearity (Malhorta, 1999)[18].

Multicollinearity has also been considered within the context of multiple regression analysis (Cohen and Cohen, 1975; Kleinbaum et al., 1998). Standard diagnostics within this context include tolerance values and VIF proportions (Kleinbaum et al., 1998). Tolerance is an indicator of how much of the variability of the specified independent variable is not explained by the other independent variable in the model and is calculated using formula $1-R^2$ for each variable. A tolerance value of less than 0.10 indicates that the multiple correlation with other variables is high, suggesting the presence of multicollinearity among the independent variables. On the other hand, Variance Inflation Factor (VIF) is just the inverse of the Tolerance value (1 divided by Tolerance). A VIF value above 10 would indicate multicollinearity and would be a concern (Pallant, 2005).

In this study, a pragmatic approach was taken to assess multicollinearity among the independent variables. Specifically, the correlations between the independent variables were assessed. Table 5.11 illustrates the correlation matrix. On viewing this matrix, one can determine that correlations between independent variables are below the threshold value of 0.80, and do not suggest any obvious problem of item multicollinearity.

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[18] A problematic collinearity has been suggested to result from correlations in the range of 0.9 (Sharma, 1996).

Table 5.11   Pearson correlation coefficients matrix - multicollinearity diagnostics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. RAD	1.00																		
2. COM	-0.13	1.00																	
3. SEC	.309**	.192**	1.00																
4. COS	.375**	-0.01	.267**	1.00															
5. LAC	.385**	-0.08	.359**	.256**	1.00														
6. ITR	.542**	-.238**	.268**	.399**	.346**	1.00													
7. LRO	.326**	-.139*	.322**	.436**	.276**	.619**	1.00												
8. RTC	.320**	0.03	.379**	.376**	.269**	.581**	.612**	1.00											
9.DEC	.411**	-0.10	.232**	.416**	.420**	.576**	.563**	.453**	1.00										
10.FOR	.290**	-0.01	.307**	.415**	.266**	.627**	.594**	.658**	.513**	1.00									
11.STO	.371**	-0.08	.332**	.394**	.279**	.630**	.732**	.738**	.506**	.605**	1.00								
12.REG	.305**	-0.06	0.04	.192**	0.10	.249**	.314**	.256**	.152*	.158*	.277**	1.00							
13.EPR-CUST	0.03	-.376**	-.188**	-0.09	0.03	.149*	0.05	-0.10	0.09	0.00	0.03	-0.05	1.00						
14EPR-COMP	.562**	-0.02	.289**	.495**	.213**	.418**	.376**	.336**	.341**	.364**	.343**	.498**	-0.02	1.00					
15.EPR-SUPP	0.11	.176*	.171*	.294**	-0.04	.269**	.377**	.353**	.257**	.396**	.355**	.257**	-0.13	.355**	1.00				
16.NRE	.354**	-0.07	.199**	.712**	.225**	.405**	.450**	.373**	.478**	.418**	.366**	.318**	-.17*	.465**	.354**	1.00			
17.ECO	0.12	0.10	.263**	.361**	-0.05	.194**	.197**	.220**	.230**	.238**	.197**	-0.02	-.299**	.147*	.152*	.355**	1.00		
18.TCO	.302**	-0.09	.245**	.489**	0.09	.525**	.548**	.446**	.420**	.499**	.484**	.161*	-0.10	.348**	.575**	.504**	.285**	1.00	
19. MTS	.388**	-0.13	.312**	.428**	.213**	.643**	.739**	.631**	.566**	.641**	.762**	.397**	-0.06	.454**	.459**	.446**	.308**	.553**	1.00

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

RAD: Relative advantage; COM: compatibility; SEC: security concern; COS: adoption cost; LAC: language concern; ITR:IT readiness; LRO: learning orientation ;RTC: receptivity toward change; DEC: decentralization level; FOR: formalisation level; STO: strategic orientation

EPR-CUST :Customer pressure; EPR-COMP :Competitive pressure; .EPR-SUPP : Supplier pressure; REG: regulatory and legal environment ;NRE: national e-readiness; ECO: economic downturn; TCO: technology consultants' orientation; MTS: management team support

To further assess the potential for multicollinearity and to pick up on problems with multicollinearity that may not be evident in the correlation matrix, the researcher carried out a 'collinearity diagnostics' on all independent variables as part of the multiple regression procedure and obtained a variance inflation factor (VIF) below 4 and tolerance levels above 0.20 for all independent variables. Therefore, multicollinearity should not be a serious concern in this study. The results of tolerance and VIF are presented in Table 5.12.

Table 5.12 Tolerance and Variance Inflation Factor (VIF)		
Variable	**Tolerance**	**VIF**
Relative advantage	0.52	1.92
Compatibility	0.69	1.46
Security concern	0.65	1.54
Adoption cost	0.43	2.34
Language concern	0.61	1.63
IT readiness factor	0.34	2.93
Management team support	0.25	3.99
Learning orientation	0.33	3.03
Receptivity toward change	0.36	2.76
Decentralization level	0.48	2.08
Formalisation level	0.41	2.46
Strategic orientation	0.27	3.70
External pressure	0.42	2.38
Regulatory and legal environment	0.53	1.88
National e-readiness	0.40	2.52
Technology consultants' orientation	0.44	2.30
Economic downturn	0.69	1.45

5.14.4 Checking for outliers

Both Hair et al. (1995) and Kline (2005) define outliers as cases displaying unreasonable characteristics and which are distinctively different from the rest in the dataset. In the current research, since most variables are measured with Likert 5-point scores ranging from strongly agree to strongly disagree, the threat of outliers is not a concern. If respondents answered strongly agree or strongly disagree, these response options became outliers as they are the extreme points of the scale.

5.15 Reliability and validity assessment

The constructs were tested for two psychometric properties, validity and reliability, to ensure that the measurement was accurate and sound. The section below gives details of reliability and validity assessments of research constructs.

5.15.1 Reliability assessment

Fundamentally, reliability assesses the stability of the scale over time and across testing conditions based on an assessment of the internal consistency of the items measuring the construct (Bryman and Cramer, 2005; O'Leary-Kelly and Vokurka, 1998). Internal consistency refers to the mean level of inter-item correlation within a scale (Clark and Watson, 1995). It is an important indicator used in case of multiple item scales to confirm if each scale is measuring the same issue (Bryman and Cramer, 2005; Litwin, 1995). In fact, research suggests calculating internal consistent reliability even when using established measures with long and successful track records (Litwin, 1995). Moreover, according to Litwin (1995), when multicultural issues or language barriers are relevant considerations, it is especially important to conduct reliability testing. Because the questionnaire was translated from English to Arabic, reliability was of the utmost importance and, in fact, this precluded the researcher from assuming that the reliability established for those previous instruments are identical to those adopted for this study.

Cronbach's Coefficient Alpha (α) is used to assess internal consistency reliability and it is found to reflect the homogeneity of the scale (Litwin, 1995; Carmines and Zeller, 1979). The formula for calculating Cronbach's alpha is as follows:

$$\text{Cronbach's alpha } (\alpha) = \frac{NP}{[1+P(N-1)]}$$

Where N = number of questions and P = mean of inter-question correlation.

There is much debate among researchers as to where the appropriate cut-off points are for reliability. Hinton et al (2004) have suggested four cut-off points for reliability, which includes excellent reliability (0.90 and above), high reliability (0.70-0.90), moderate reliability (0.50- 0.70) and low reliability (0.50 and below) (Hinton et al, 2004, pp 364). In

fact, Alpha values as low as 0.50 are acceptable for early stages of research or in exploratory research (O'Leary-Kelly and Vokurka, 1998; Nunnally, 1967). However, as noted by O'Leary-Kelly and Vokurka (1998), higher levels of Alpha engender greater confidence in the measure. SPSS 16.0 for windows was used to calculate Cronbach's coefficient alpha (α) and table 5.13 illustrates the values that were estimated to examine the internal consistency of the measure.

Cronbach's alpha coefficient has been consistently used to assess the internal consistency of a measure. Overall, each item measuring the same dimension demonstrates an acceptable level of internal reliability ranging between 0.494for the security concern construct and 0.945 for the relative advantage construct. Moreover, the reliability results suggest that of the nineteen constructs, five possess excellent reliability, eight illustrate high reliability, four demonstrate moderate reliability and two possess low reliability (security and language concern). Finally, item-total correlation for each construct was computed and the result is illustrated in Table E.1 (Appendix E).

Table 5.13	Reliability of measurements		
Measuring items	**Number of items**	**Coefficient Alpha**	Type
Relative advantage (RAD)	9	0.945	**Excellent Reliability**
Compatibility (COM)	3	0.880	High Reliability
Security Concern (SEC)	4	0.494	Low reliability
Adoption cost (COS)	4	0.762	High Reliability
Language concern (LAC)	3	0.569	Low Reliability
IT readiness (ITR)	7	0.896	High Reliability
Management team support (MTS)	5	0.897	High Reliability
Learning orientation (LRO)	5	0.833	High Reliability
Receptivity toward change (RTC)	6	0.785	High Reliability
Decentralization level (DEC)	3	0.666	Moderate Reliability
Formalisation level (FOR)	3	0.762	High Reliability
Strategic orientation (STO)	9	0.915	**Excellent Reliability**
Regulatory & legal environment (REG)	5	0.924	**Excellent Reliability**
National e-readiness (NER)	9	0.904	**Excellent Reliability**
Economic downturn (ECO)	3	0.861	High Reliability
Customer pressure (EPR-CUST)	3	0.605	Moderate Reliability
Competitive pressure (EPR-COMP)	5	0.673	Moderate Reliability
Supplier pressure (EPR-SUPP)	4	0.779	Moderate Reliability
Technology consultants' orientation (TCO)	7	0.933	**Excellent Reliability**
Total	97		

5.15.2 Validity assessment

Validity is defined as the extent to which any measuring instrument measures what it is intended to measure (Bryman and Cramer, 2004; Carmines and Zeller, 1979). Validity can be broken down into two sub-categories: content and construct validity (Churchill and Iacobucci, 2002).

(1) Content validity: Content of measurements is an important area of validation. Parasuraman et al. (1988) argue that the content validity of a construct depends on the extent to which the construct items represent the construct's theme. Moreover, it involves a rigorous assessment of the wording of the items to be included in a scale and an examination of their correspondence with the theoretical literature on consumption. Moser and Kalton (1983) and others (e.g. Bryman and Cramer, 2004; Hair et al., 1995) indicate that an appropriate way of measuring content validity would be to use the judgement of individuals with expertise in some aspect of the subject under study in order to comment on the wording of the items.

Some items were developed for some constructs (e.g. security concern, language concern, regulatory and legal environment, national e-readiness and economic downturn) based on the exploratory interviews along with previous scales found in the literature. According to Bryman (2001), it is important to establish that new measures should reflect the concepts they are trying to measure.

In this study, a content validity of the research instrument was established through the theoretical literature review and through the extensive process of item selection and refinement in the development of the questionnaire. The items used for measuring the constructs were derived from operationalizations used in prior empirical studies (discussed in Section 5.5), and were adapted to suit this research context. Also, extensive pilot testing of the instrument ensured that the items were relevant from different groups' perspectives.

During the pilot period, the questionnaire was distributed to academics, business consultants, top level executives and companies from the sample frame. Moreover, discussion and comment from supervisors provided a good foundation for designing the survey instrument and a number of adjustments were made to the running order of the questions and their layout. The results showed that the questionnaire covered important aspects identified within the literature review. In sum, the items of the questionnaire were relevant from academics'

and practitioners' perspectives; therefore, the questionnaire could be accepted as possessing content validity.

(2) Construct validity is "concerned with the extent to which a particular measure relates to other measures consistent with theoretically derived hypotheses concerning the concepts (or constructs) that are being measured" (Carmines and Zeller, 1979: 23).   According to Carmines and Zeller (1979), construct validation is a multifaceted process that is comprised of three distinct steps, outlined in figure 5.6. In the first step, it is necessary to demonstrate that the constructs themselves are theoretically connected (O'Leary-Kelly and Vokurka, 1998; Nunnally, 1978). The second step requires a series of empirical tests that examine the measurement properties of the constructs (O'Leary-Kelly and Vokurka, 1998; Nunnally, 1978). The final step involves the interpretation of the empirical evaluation in terms of how it clarifies or predicts the construct validity of the particular measure (Carmines and Zeller, 1979).

Figure 5.6	Construct validation process

Step 1	Step 2	Step 3
Theoretical relationship between the constructs themselves must be determined.	Empirical relationship between the measures of the constructs must be tested.	Empirical assessment must be interpreted in terms of how it clarifies the construct validity of the particular measure.
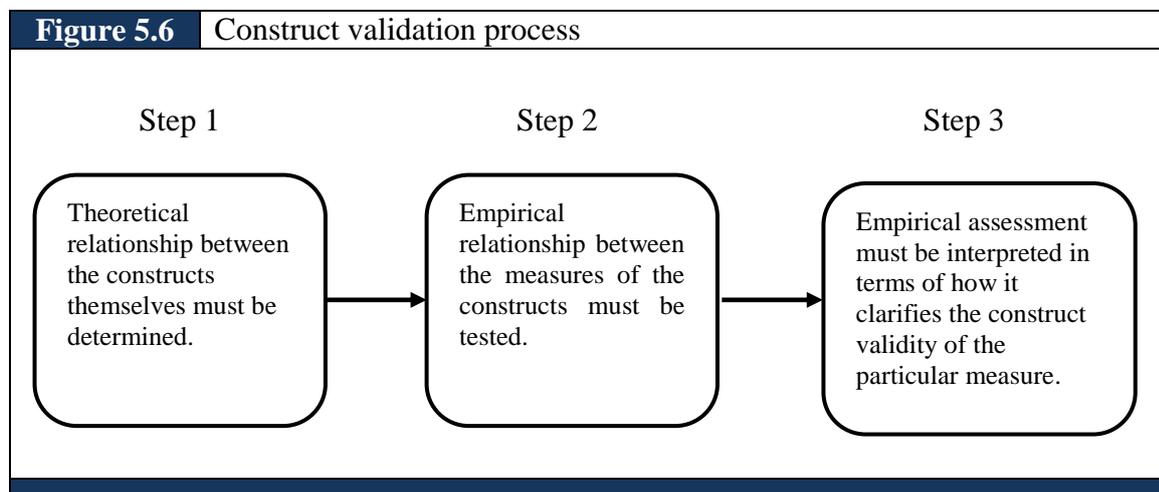
Construct validity is often thought to comprise two other forms of validity: convergent and discriminant validity (Bagozzi, 1980). Convergent validity evaluates whether all the items measuring the construct cluster together to form a single construct. Discriminant validity measures the degree to which a concept differs from other concepts and is indicated by a measure not correlating very highly with other measures from which it should theoretically differ (Bagozzi et al., 1991; Churchill, 1979)

To claim that measures have construct validity, both convergence and discrimination need to be assessed. Convergent and discriminant validity were evaluated using principal component factor analysis (PCA) and Multitrait-Multimethod Matrix. Factor analysis of multi-item indicators can be used to evaluate if the theorized items for a construct converge together for convergent validity. The extent of cross-loading of an item on other factors where it does not theoretically belong can be used to examine discriminant validity (Premkumar and Roberts, 1999).

Discriminant validity was assessed using the Multitrait-Multimethod Matrix (hereafter labelled MTMM). The MTMM matrix approach was originally proposed by Campbell and Fiske (1959) and it is the most widely known and used technique for assessing the convergent and discriminant validity of constructs (Gupta and Somers, 1992; Davis, 1989). Discriminant validity is evaluated by using the pattern and magnitude of correlations between the measures of traits or constructs and the different methods (e.g., different informants or methods) used to measure the constructs, thereby forming the MTMM matrix (O'Leary-Kelly and Vokurka, 1998).

To ensure discriminant validity of items in the various measures, items that measure the same trait should correlate more highly with one another than they correlate with other items measuring different traits (Takey El-Din, 2005; Campbell and Fiske, 1995). Overall, the mono-trait triangle (correlations of the same construct) in the MTMM matrix (Appendix C) suggests good discriminant criterion. Items of the same construct are all highly and significantly correlated amongst themselves compared with other items measuring different constructs, although some of the items that measure different constructs correlate with one another, but not more highly than 0.50.

5.15.3 Factor Analysis

Factor analysis is a statistical procedure that aims to explain the interrelationships among the original variables (i.e. observed variables and underlying latent factors). Factor analysis utilising Principal Component Analysis (PCA) with the eigenvalue rule Varimax rotation method was used to assess convergent validity. PCA is concerned with establishing which components exist within the data and how a particular variable might contribute to that component (Field, 2009). Moreover, it attempts to maximize the dispersion of loadings

within factors and it therefore tries to load a smaller number of variables highly onto each factor, resulting in more interpretable clusters of factors (Field, 2009). In fact, the objective of PCA is to select the components which explain as much of the variance in the sample as possible. The results of the PCA are presented in tables 5.14, 5.15 and 5.16.

5.15.3.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's tests

Before conducting a factor analysis, it is essential to perform a test for sampling adequacy and sphericity before. The Kaiser-Meyer-Olkin (KMO) statistic was used to determine sampling adequacy (Sharma, 1996).

KMO statistics (ranging from 0 to 1) determine the extent to which variables are homogenous (Sharma, 1996). It is generally considered that KMO values greater than 0.5 imply that the data are appropriate for factor analysis (Hair et al., 1995; Sharma, 1996). Furthermore, values between 0.5 and 0.7 are mediocre, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great and values above 0.9 are superb (Hutcheson and Sofroniou, 1999).

The results illustrated in table 5.14 suggest that the KMO is well above the recommended acceptable level of 0.5 as the obtained value is 0.854. Moreover, results confirm that the KMO test supports the sampling adequacy and it is worth conducting a factor analysis.

Table 5.14	KMO and Bartlett's test	
Kaiser-Meyer-Olkin measure of sampling adequacy.		0.854
Bartlett's test of sphericity	Approx.Chi-Square	16659.366
	Df	4656
	Sig.	p= 0.000

Bartlett's test of sphericity is conducted for the purpose of confirming the relationship between the variables. If there is no relationship then it is irrelevant to undertake factor analysis. As a rule of thumb, a p value <0.05 indicates that it is suitable to continue with the factor analysis (Hinton et al, 2004). The results illustrated in Table 5.13 suggest that the calculated p value is <0.001, which means that there are relationships between the variables Therefore, it was considered appropriate to continue with the factor analysis. In summary,

these two tests confinn whether it is worth proceeding with factor analysis (Hinton et al, 2004).

5.15.3.2 Eigenvalues

The eigenvalue of a factor represents the amount of variation explained by a factor and an eigenvalue of 1 represents a substantial amount of variation (Field, 2009; Pallant, 2005). Kaiser (1960) recommended retaining all factors with eigenvalues of 1.0 or more for further investigation. Table 5.15 summarises the eigenvalues and explained total variance for the extracted components. The results presented in table 5.15 suggest that all ninteen constructs included in the factor analysis possess eigenvalues greater than 1.

Table 5.15	Eigenvalues and total variance explained								
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.688	27.514	27.514	26.688	27.514	27.514	13.366	13.780	13.780
2	6.935	7.150	34.664	6.935	7.150	34.664	8.655	8.922	22.702
3	5.852	6.033	40.696	5.852	6.033	40.696	6.964	7.179	29.881
4	4.137	4.264	44.961	4.137	4.264	44.961	5.505	5.675	35.557
5	3.677	3.791	48.752	3.677	3.791	48.752	4.729	4.875	40.432
6	2.813	2.900	51.652	2.813	2.900	51.652	3.334	3.437	43.869
7	2.507	2.584	54.236	2.507	2.584	54.236	3.242	3.342	47.211
8	2.084	2.148	56.385	2.084	2.148	56.385	3.082	3.177	50.388
9	1.968	2.029	58.413	1.968	2.029	58.413	2.841	2.929	53.317
10	1.776	1.831	60.244	1.776	1.831	60.244	2.580	2.660	55.976
11	1.607	1.657	61.901	1.607	1.657	61.901	2.092	2.156	58.133
12	1.564	1.612	63.513	1.564	1.612	63.513	2.027	2.090	60.223
13	1.460	1.505	65.018	1.460	1.505	65.018	1.979	2.041	62.264
14	1.369	1.411	66.429	1.369	1.411	66.429	1.706	1.759	64.022
15	1.308	1.348	67.777	1.308	1.348	67.777	1.664	1.716	65.738
16	1.268	1.307	69.085	1.268	1.307	69.085	1.621	1.671	67.409
17	1.248	1.287	70.372	1.248	1.287	70.372	1.616	1.666	69.075
18	1.218	1.256	71.627	1.218	1.256	71.627	1.587	1.636	70.711
19	1.123	1.158	72.785	1.123	1.158	72.785	1.556	1.604	72.315

5.15.3.3 Factor loadings

Typically, a widely used approach for interpreting factor analysis results is that the absolute value of the factor loading of an item must be at least 0.40 to be important and that there should be no cross loadings on another factor with a value greater than 0.40 (Field, 2009; Straub et al, 2004; Nunnally and Bernstein, 1994).

As criteria for accepting factors, firstly, items with factor loadings less than 0.4 on the selected components were excluded as were those with loadings greater than 0.40 on other components that had Eigenvalues greater than 1.00 (Field, 2009; Kerlinger, 1986; Carmines and Zeller, 1979; Kaiser, 1960).

A principal component analysis (PCA) was conducted on all items in the questionnaire. Without specifying the number of factors to be extracted, an exploratory factor analysis yielded 19 components with Eigen values >1.0. The 19 extracted components accounted for a total of 72.32% variance in data. Factor F1 'Strategic orientation', accounts for 13.37% of the variance. Factor F2 'Relative Advantage' accounts for 8.92% of variance. Factor F3 'National e-readiness' accounts for 7.18% of variance. Factor F4 'Technology Consultant' accounts for 6.68% of variance. Factors F5 to F19 were regulatory & legal environment, it readiness; compatibility; economic downturn, customer pressure, competitive pressure, language concern, security concern, supplier pressure, management support, formalization level, decentralization level, receptivity toward change, learning orientation and adoption cost. The last factor (adoption cost) accounts for 1.60% of the explained variance. The results of the factor analysis are presented in table 5.16.

Strategic orientation (F1) is measured on a nine-item scale. It can be seen that the results of the item analysis provide strong evidence that the scale items are internally consistent and unidimensional. All items loaded significantly and clearly on one factor. Therefore, all items in the strategic orientation construct were retained. Relative Advantage (F2) is measured on a nine-item scale. As can be seen from table 5.16, all items in the relative advantage loaded significantly on its expected factors. In fact, the observed pattern of highly significant factor loading provides evidence of attained validity. Therefore, all of the items in relative advantage were retained for further analysis.

National e-readiness (F3) was measured on a nine-item scale. All items loaded cleanly and significantly on their expected factor. Therefore, all items in the national e-readiness construct were retained for further analysis. Technology consultants' orientation (F4) construct was measured on a seven-item scale and all items loaded cleanly and significantly on one factor. Therefore, all items were retained. For regulatory and legal environment (F5) all five items loaded cleanly on one factor and, as a result of this, all items in this scale were retained (table 5.16).

IT readiness (F6) was measured on a seven-item scale and, through the purification process, two items (ITR6 and ITR7) exhibited poor loadings. ITR6 and ITR7 were excluded as they were not interpretable. Cronbach's alpha for the reduced scale was 0.824, well above the 0.70 criteria. As a result of this, the 5 item scale was retained for future analysis. Compatibility (F7) is measured on a three-item scale and all items of compatibility construct (COM1, COM2, and COM3) were reverse-coded because they were negatively stated. As can be seen from Table 5.16, all items in the compatibility construct loaded significantly on their expected factors. Therefore, all of the items in compatibility were retained for further analysis (table 5.16).

Economic downturn (F8) was measured on a three-item scale and all items loaded significantly on their expected construct. Therefore, all items in the economic downturn were retained. Customer Pressure (F9) was measured with three items. One item (EPR-CUST3) was deleted from the customer pressure measure because this item did not load on any factor. Therefore, this item was excluded from further analysis, resulting in a two-item scale. Cronbach's alpha for the reduced scale was 0.808, well above the 0.70 criteria (table 5.16).

Competitive Pressure (F10) was measured on a five-item scale. One item (EPR-COMP5) did not load on any factor. Therefore, this item was excluded from further analysis and, as a result, the competitive pressure construct had Cronbach's alpha of 0.754 after dropping item number 5 (EPR-COMP5). Language concern (F11) was measured on a three-item scale. As can be seen from Table 5.16, all items in the language concern constructs loaded significantly on their expected factors. Therefore, all of the items in language concern were retained for further analysis.

Security concern (F12) was measured on a four-item scale and two items (SEC1 and SEC2) were reverse-scored items. The security concern construct, as discussed above, is a four-item scale and had a Cronbach's alpha of 0.494, which is just marginally short (by 0.006) of the minimum acceptable level of 0.50 for exploratory research as stated by Nunally (1967). Two items load strongly on one factor (SEC1 and SEC2) while the other two items (SEC3 and SEC4) exhibited poor loadings. The coefficient alpha could be improved to (0.717) if the third and fourth items (SEC3 and SEC4) are dropped, and, in particular, the two items had very low item to total correlation (See MTMM, Appendix C). Furthermore, SEC4 did not load on any factor and SEC3 had cross loadings on another factor with a value greater than

0.40 (i.e. 0.521). Therefore, the two items (SEC3 and SEC4) were excluded from further analysis.

Supplier pressure (F13) was measured with four items. One item (EPR-SUPP2) was deleted from the supplier pressure measure because it exhibited poor loadings. As a result of this, three items of the scale were retained for further analysis. Management support construct (F14) was measured on a five-item scale and all five items loaded cleanly on one factor. As a result of this, the 5 item scale was retained for future analysis. Formalization level (F15) was measured on a three-item scale and all items loaded significantly on their expected construct. Therefore, all items in the formalisation level construct were retained

For the decentralization level (F16), all three items loaded cleanly on one factor. Therefore, all items in the decentralization level construct were retained. The receptivity toward change construct (F17) was originally measured on a six-item scale. Two items (RTC1 and RTC6) were deleted from the receptivity toward change measure in which RTC1 did not load on any factor and RTC6 loaded highly on another factor. Therefore, the two items were excluded from further analysis, resulting in a four-item scale. It is important to note that item number 6 (RTC6) had very low item to total correlation in which the coefficient alpha could be improved to (0.857) if the sixth item, which was negatively worded, was dropped; research participants might have been confused by this negatively worded item, so this item was dropped from further analysis as it did not load on any factor. Cronbach's alpha for the four-item scale was 0.815, well above the 0.70 criteria.

Learning orientation (F18) was measured on a five-item scale. Two items (LRO1 and LOR 2) did not load on any factor. Therefore, we excluded the two items from further analysis and, as a result, the learning orientation construct had Cronbach's alpha of 0.748 after dropping item number 1 and 2 (LRO1 and LOR 2). Finally, adoption cost (F19) was originally measured on a four-item scale. For the adoption cost construct, it can be seen that item 4 (COS4) did not load on any factor to the required level. Therefore, this item was removed and eventually excluded from further analysis.

Table 5.16	The result of factor analysis (Extraction Method: Principal Component Analysis and Rotation Method: Varimax with Kaiser Normalization)																		
Variables	**Factor components[19]**																		
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19
STO1	**.692**																		
STO2	**.698**																		
STO3	**.785**																		
STO4	**.811**																		
STO5	**.699**																		
STO6	**.730**																		
STO7	**.695**																		
STO8	**.678**																		
STO9	**.632**																		
RAD1		**.740**																	
RAD2		**.785**																	
RAD3		**.744**																	
RAD4		**.780**																	
RAD5		**.830**																	
RAD6		**.809**																	
RAD7		**.805**																	
RAD8		**.817**																	
RAD9		**.828**																	
NRE1			**.558**																
NRE2			**.552**																
NRE3			**.581**																
NRE4			**.569**																
NRE5			**.745**																
NRE6			**.786**																
NRE7			**.775**																
NRE8			**.752**																
NRE9			**.606**																

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[19] Displays the absolute value more than 0.40.

Variables	Factor components																		
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19
TCO1				.582															
TCO2				.787															
TCO3				.702															
TCO4				.782															
TCO5				.652															
TCO6				.809															
TCO7				.722															
REG1					.719														
REG2					.782														
REG3					.781														
REG4					.836														
REG5					.805														
ITR1						.603													
ITR2						.583													
ITR3						.558													
ITR4						.617													
ITR5						.730													
ITR6						NS													
ITR7						NS													
COM1							.837												
COM2							.794												
COM3							.843												
ECO1								.798											
ECO2								.850											
ECO3								.744											

Table 5.16 (Cont.)

Table 5.16 (Cont.)																			
Variables	**Factor components**																		
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19
EPR-CUST1									.687										
EPR-CUST2									.693										
EPR-CUST3									NS										
EPR-COMP1										.685									
EPR-COMP2										.698									
EPR-COMP3										.686									
EPR-COMP4										.669									
EPR-COMP5										NS									
LAC1											.501								
LAC2											.699								
LAC3											.548								
SEC1												.793							
SEC2												.745							
SEC3												NS							
SEC4												NS							
EPR-SUPP1													.633						
EPR-SUPP2													NS						
EPR-SUPP3													.540						
EPR-SUPP4													.642						
MTS1														.587					
MTS2														.541					
MTS3														.588					
MTS4														.550					
MTS5														.583					
FOR1															.488				
FOR2															.406				
FOR3															.579				
DEC 1																.401			
DEC2																.640			
DEC3																.454			

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Variables	Factor components																		
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19
RTC1																	NS		
RTC2																	**.711**		
RTC3																	**.642**		
RTC 4																	**.595**		
RTC5																	**.666**		
RTC 6	.782																		
LRO1																		NS	
LRO2																		NS	
LRO3																		**.612**	
LRO4																		**.611**	
LRO5																		**.563**	
COS1																			**.544**
COS2																			**.673**
COS3																			**.640**
COS4																			NS
Factor loading (rotation sums of squared loading)	13.37	8.66	6.96	5.51	4.73	3.33	3.24	3.08	2.84	2.58	2.09	2.03	1.98	1.71	1.66	1.62	1.61	1.59	1.56
% of variance	13.78	8.92	7.18	5.68	4.88	3.44	3.34	3.18	2.93	2.66	2.16	2.09	2.04	1.76	1.72	1.67	1.67	1.64	1.60
Cumulative % of variance	13.78	22.70	29.88	35.56	40.43	43.87	47.21	50.39	53.32	55.98	58.13	60.22	62.26	64.02	65.74	67.41	69.08	70.71	72.32

F1: Strategic orientation;
F2: Relative Advantage;
F3: National e-readiness;
F4: Technology Consultant;
F5: Regulatory & legal environment;
F6: IT readiness

F7: Compatibility;
F8: Economic downturn;
F9: Customer Pressure ;
F10: Competitive Pressure;
F11: Language concern;
F12:Security Concern

F13: Supplier Pressure ;
F14: Management support ;
F15: Formalization level;
F16: Decentralization level;
F17: Receptivity toward change;
F18: Learning orientation;
F19: Adoption Cost

NS: Non-significant(<0.4)

In summary, based on the above discussion, most indicators loaded cleanly into their expected factors except for adoption cost (1 item dropped), security concern (2 items dropped), receptivity toward change (2 items dropped), learning orientation (2 items dropped), customer pressure (1 item dropped), competitive pressure (1 item dropped), and supplier pressure (1 item dropped). In fact, the observed pattern of highly significant factor loadings provides evidence for the validity attained in this study (Anderson and Gerbing, 1988). This result was expected as all constructs used in this research were based on well-established measures with high reliability scores and successful track records (Litwin, 1995). Finally, theoretical considerations were also used to determine whether to eliminate or keep an item from the model in which if all items in the variable were loaded in agreement with prior theoretical grounds, then significant aspects of construct validity have been assessed (Nunnally and Bernstein, 1994). In fact, findings from both the reliability test and factor analysis, which respectively confirms internal consistency of measures and construct validities (i. e. convergent and discriminant validity), suggest that it is appropriate to create summated measures by averaging the means of all items of the retained constructs. Table 5.17 illustrates the Cronbach's alpha values for the retained research constructs.

Table 5.17	Cronbach's alpha for the retained constructs		
Measuring items	**Number of items**	**Retained items**	**Cronbach's alpha**
Relative advantage (RAD)	9	9	0.945
Compatibility (COM)	3	3	0.880
Security Concern (SEC)	4	2	0.717
Adoption cost (COS)	4	3	0.803
Language concern (LAC)	3	3	0.569
IT readiness (ITR)	7	5	0.824
Management team support (MTS)	5	5	0.897
Learning orientation (LRO)	5	3	0.748
Receptivity toward change (RTC)	6	4	0.815
Decentralization level (DEC)	3	3	0.666
Formalisation level (FOR)	3	3	0.762
Strategic orientation (STO)	9	9	0.915
Regulatory & legal environment (REG)	5	5	0.924
National e-readiness (NER)	9	9	0.904
Economic downturn (ECO)	3	3	0.861
Customer pressure (EPR-CUST)	3	2	0.808
Competitive pressure (EPR-COMP)	5	4	0.754
Supplier pressure (EPR-SUPP)	4	3	0.688
Technology consultants' orientation (TCO)	7	7	0.933
Total	97	85	

5.16 Chapter summary

The research design presented in Figure 5.3 is divided into two stages. Stage 1 uses an exploratory research technique to develop a preliminary understanding of how organisations think and feel about e-commerce technology and its influence on their business practices. Stage 2 employs descriptive research with a cross sectional study in order to validate and test the developed theory. The main data collection method is based on a self-administrated questionnaire and it was used to understand the B2B e-commerce phenomenon in Saudi Arabia and detect the effects of the independent variables and their hypothesised relationships on firms' e-commerce adoption in order to provide general statements about the study. All of the measures were shown to be internally consistent, unidimensional, and to demonstrate

sufficient levels of validity which means that the collected data and findings that were obtained from this instrument are reliable. It is noteworthy that, validity was assessed through content, convergent and discriminant validity. Furthermore, the measures appeared to demonstrate adequate levels of normality and multicolleanirity. Therefore, the measures are deemed to be of sufficient quality to be put forward for further analysis and used in hypothesis testing applications. Chapter 6 will present the results of descriptive data analysis, the results of inferential statistical data analysis and the hypotheses testing results.

Figure 6.1	Overview of Chapter Six

6.1 Introduction

⬇

6.2 Overall demographic profile of the responses

⬇

6.3 Analysing multi-item measure

⬇

6.4 Data analysis methods

⬇

6.5 Hypothesis testing

⬇

6.6 Chapter summary
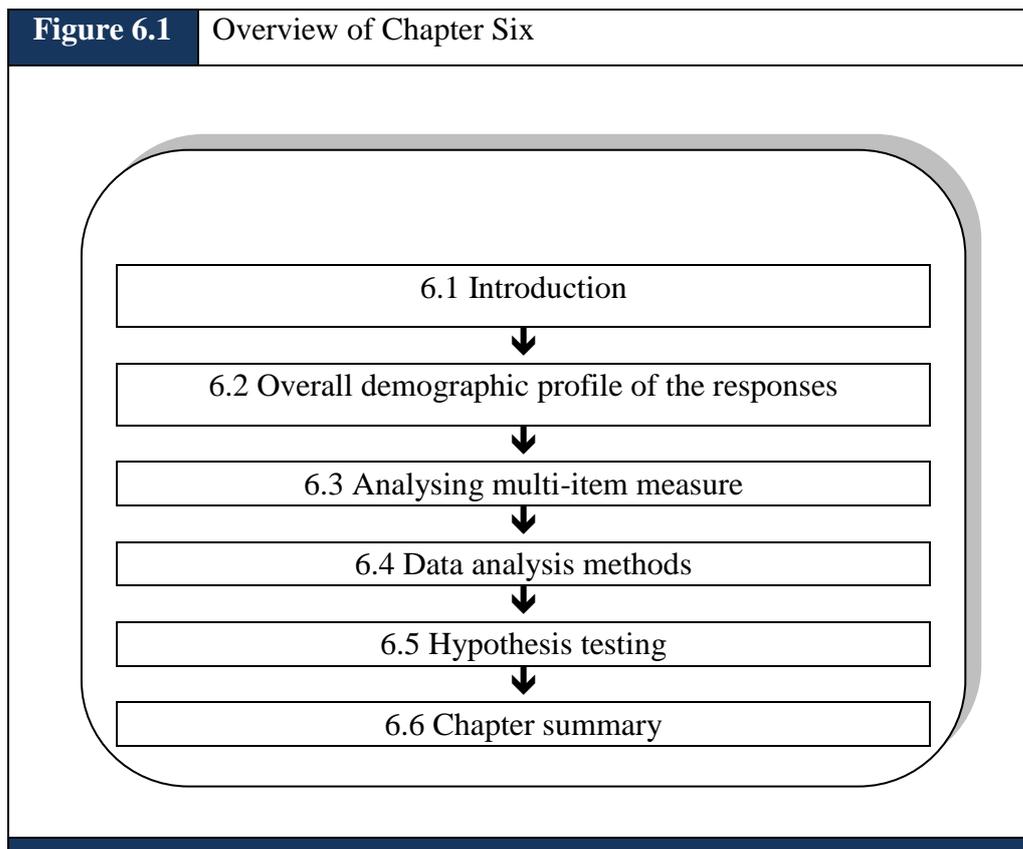
6.1 Introduction

In the previous chapter, details were given of the general methodology used in this study. This chapter describes the details of the statistical procedures used to analyse data and presents the results of the research hypotheses test. Figure 6.1 (previous page) portrays the organisation of the chapter.

The main objective of this chapter is to test the hypotheses developed in Chapter 4. Section 6.2, which follows, will discuss the demographic profile of the managers who participated in the research survey and their organisations. Section 6.3 will illustrate the descriptive results of the reduced multi-item measure including the mean, standard deviation and number of items. Section 6.4 and 6.5 will discuss the data analysis method used to test the research hypothesis and review each hypothesis in light of the results. Initially, the hypotheses were tested using multivariate discriminant analysis via SPSS in order to identify the variables that are most important for distinguishing among the groups. Finally, a conclusion statement is provided in section 6.6.

6.2 Overall demographic profile of the responses

In this section, the responses are profiled on two levels. Firstly, the managers responding are profiled; secondly, the organisations participating are profiled since they are the unit of analysis. Managers are described by the variables of age, gender, education profile in terms of degree and where they studied for the last degree, while organisations are described in terms of number of employees, number of years in business or organisation age and the main industry the organisation operates in. In fact, the characteristics of the sample indicate that an over-whelming majority (65%) of the respondents were managing directors, CEOs or IS managers, were generally well educated with over 62% having a University degree - 43% gained their degree from Saudi Arabia - and 65% belonged to the 30 to 49 year old age group. In general, the profile of the respondents indicates that these respondents are likely to be involved with the strategic decisions of the companies, have information about the organisational traits that are of interest to this study, are capable of answering the questions, and are credible sources of information about the companies. The majority of respondents were from construction, banking, finance and insurance entities, representing 15% of the sample. The next largest group of respondents were from the computer and electronic

industries, representing 14% of the sample. The remaining categories exhibit a modest range of representation from a minimum of 2% (publishing and printing) to a maximum of 9.4% (electrical material and accessories). The sample was split between small and medium-sized enterprises (SMEs) with fewer than 100 employees (32.7%) and large enterprises with greater than 100 employees (67.3%). Finally, the majority of the firms sampled (70.8%) had been established for more than 10 years, while only a mere 16.8% had been established for less than 5 years. Table 6.1 illustrates the demographic characteristics of the respondents and their firms involved in this study.

Table 6.1	Descriptive statistics of respondents and their organisations		
Gender		**Frequency**	**Percentage**
Male		182	90.1
Female		19	9.4
Missing		1	0.5
Total		202	100
Age		**Frequency**	**Percentage**
21-29 yrs		45	22.3
30-39 yrs		68	33.7
40-49 yrs		61	30.2
50- 59 yrs		24	11.9
60 or older		2	1.0
Missing		2	1.0
Total		202	100
Job title of the respondents		**Frequency**	**Percentage**
President, managing director, CEO		83	41.1
Information Services (IS) manager, Director, Planner		49	24.3
Business Operation manager, COO		35	17.3
Administration/Finance manager, CFO		35	17.3
Total		202	100
Educational achievements		**Frequency**	**Percentage**
Less than High School		3	1.5
High School		20	9.9
Trade qualifications		6	3.0
Diploma		6	3.0
Bachelor's		125	61.9
Master's		36	17.8
Doctoral		6	3.0
Total		202	100
Place of study for the highest degree		**Frequency**	**Percentage**
Kingdom of Saudi Arabia		87	43.1
Middle East		39	19.3
USA		28	13.9
Europe		19	9.4
Africa		12	5.9
Asia		10	5
Gulf		7	3.5
Total		202	100

Table 6.1 (Cont.)		
Industry representation	**Frequency**	**Percentage**
Computer and electronic products	28	13.9
Food and beverages	12	5.9
Electrical material and accessories	19	9.4
Construction and building	30	14.9
Marketing and Advertising	7	3.5
Tourism and Hospitality Services	7	3.5
Publishing and Printing	4	2.0
Furniture	6	3.0
Motors and autos	12	5.9
Textiles and clothing	11	5.4
Medical care	12	5.9
Insurance and financial services	30	14.9
Transportations (Air & Ground)	10	5.0
Training & consultancy	5	2.5
Maintenance & Cleaning Services	9	4.5
Total	202	100
Firm's size — number of employees	**Frequency**	**Percentage**
1- 9 employees	19	9.4
10 - 25 employees	19	9.4
26 - 100 employees	28	13.9
101-200 employees	36	17.8
201 - 250 employees	10	5.0
251- 500 employees	15	7.4
501 -1,000 employees	19	9.4
1,001-2,500 employees	16	7.9
More than 2,500 employees	40	19.8
Total	202	100
Age of the responding firms (years)	**Frequency**	**Percentage**
Less than 5 years	34	16.8
5 to 9 years	25	12.4
10-19 years	41	20.3
20 to 49 years	74	36.6
More than 50 years	28	13.9
Total	202	100
Geographic scope	**Frequency**	**Percentage**
One branch	44	21.8
Multiple establishments/branches inside KSA	77	38.1
Establishments/branches outside KSA	35	17.3
Headquarter outside KSA	46	22.8
Total	202	100

6.2.1 Gender

There was one missing value for this item. Table 6.1 (previous page) shows the distribution of gender among the managers who responded to the survey. In fact, the graph gains special significance given Saudi Arabia's principles of gender segregation at educational institutions and in work places (Robertson et al., 2001). It can be seen that males far outnumber females in the sample, with 9.4% and 90.1%, respectively. This is not unusual of the work environment in Saudi Arabia where women are not allowed to work in any job that exposes them to contact with men.

6.2.2 Age

Respondents were requested to give their age, and table 6.1 (previous page) shows the distribution of age, measured in years. There were two missing values for this item. Respondent age varies from 21 to 60 years or above. As can be seen, the largest proportion (33.7%) of respondents by age group were those in the 30-39 years old category, followed by those in the 40-49 year category (30.2%). Slightly more than a fifth of the respondent sample (22.3%) was aged between 21-29 years old. The two minority cases included those falling in the 50-59 and 60 or older age categories at 11.9% and 1%, respectively. Overall, the majority of respondents (64%) were aged between 30 and 49 years of age.

6.2.3 Educational background of the respondents

On the final page of the questionnaire, respondents were asked to indicate the highest level of educational achievements they had attained and where they had studied. Figure 6.2 shows the results of the questions. An overwhelming percentage of the respondents (62%) indicated having a university degree and less than 3% had doctoral or other qualifications such as diplomas and trade qualifications. This could be explained by the change in Saudi culture of late, in that many more young people are achieving university qualifications than previously to attain higher standards of living. With around 22% of the sample under 30, it is likely that this has influenced the high level of degree qualifications observed. Robertson et al. (2001) note that in Saudi Arabia senior executive positions are reserved for well-educated individuals.

| Figure 6.2 | Bar chart of respondents' educational achievements |
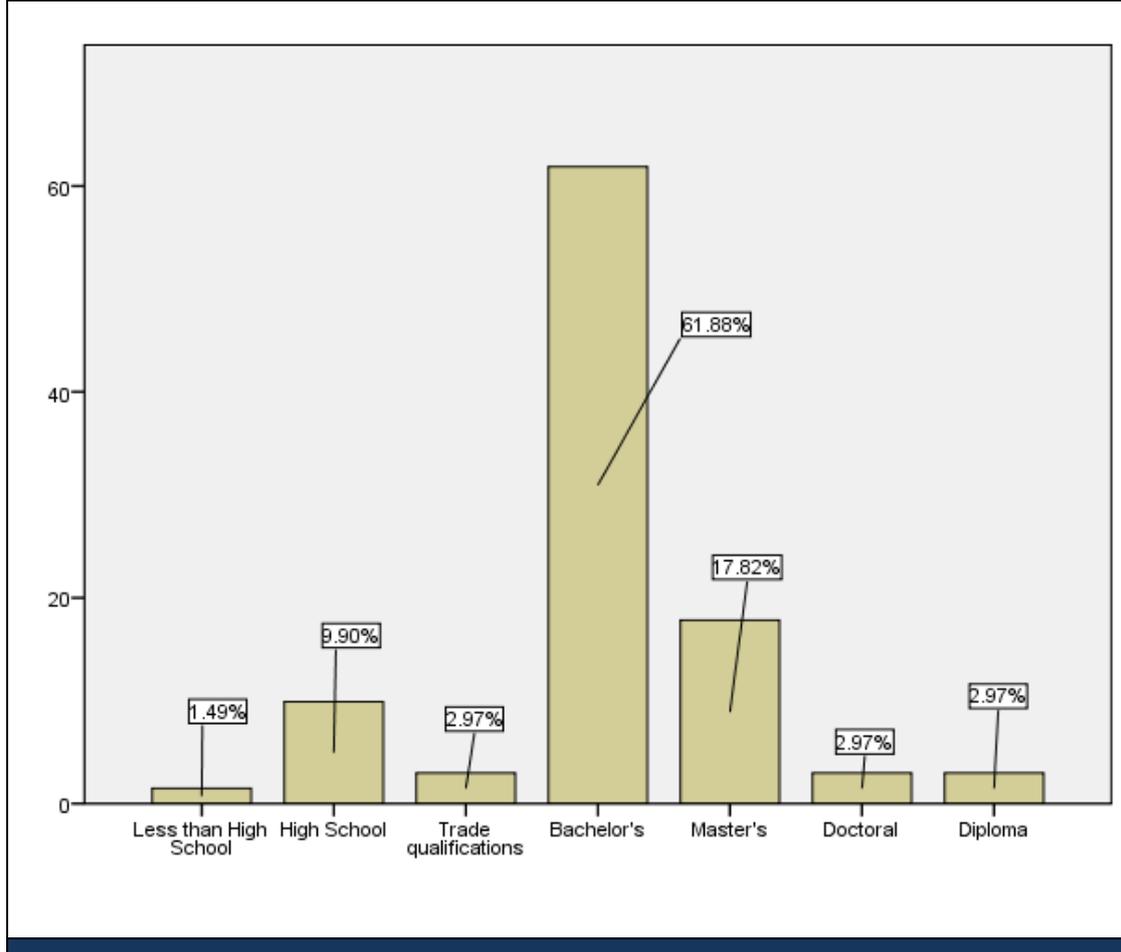
Managers were then asked to specify where they had studied for their highest level of education in order to have a full profile of their characteristics and educational background.

Table 6.2 (next page) shows that the largest proportion (43.1 %) were those who had studied in Saudi Arabia, followed by those who had studied in the Middle East (19.3%). A little over a seventh of the respondents (14%) had studied in the USA for their undergraduate and/or postgraduate qualifications. Less than 10% had studied in Europe and smaller proportions of respondents highlighted that they had obtained their degree from institutions in Africa or Asia (5.9% and 5%, respectively).

Finally, a tiny proportion (3.5%) indicated that they had studied in the Gulf region. A majority of the respondents (66%) were graduates of Gulf and Middle East institutions, and this, in fact, was because most companies prefer managers with excellent skills in Arabic

speaking, reading and writing. The respondents' educational achievements and places of study are presented in Table 6.2

Table 6.2	Tab. Cross tab. between educational qualification and place of study for the highest degree							
	Place of study for the highest level of qualification							
		Inside the kingdom	Gulf	USA	Europe	Middle East	Asia	Africa	Total
Educational achievements	Less than High School	2	0	0	0	0	0	1	3
	High School	8	3	0	1	4	0	4	20
	Trade qualifications	3	0	0	0	2	0	1	6
	Bachelor's	62	2	16	7	27	8	3	125
	Master's	11	1	10	9	2	2	1	36
	Doctoral	0	0	1	2	2	0	1	6
	Diploma	1	1	1	0	2	0	1	6
	Total	87	7	28	19	39	10	12	202
	Percentage%	43.1	3.5	13.9	9.4	19.3	5	5.9	100

6.2.4 Job title of the respondents

All respondents were key informants who were knowledgeable in terms of their firm, industry, business strategy and the phenomenon being studied. This is depicted in the sample composition, which comprised President/CEO (41.1%), IS manager/director (24.3%), and business operation manager and administration/finance manager (34.6%) (Table 6.1)

6.2.5 Industry representation

Figure 6.3 (next page) shows the distribution of industry in the sample. As is obvious from figure 6.3, respondents were from various industries concerned with computers, electronic products, motor and autos, construction, medical care, training and consultancy, insurance and financial services, publishing and printing and electrical material and accessories. The majority of respondents were from construction and building, representing 14.9%, and insurance and financial entities, also representing 14.9% of the sample. It is noteworthy that construction is the largest non-oil economic sector in Saudi Arabia and constitutes a major

share of the Kingdom's domestic economy (Eighth development plan, 2005). Finally, based on the firms' description, the computer and electronic industry was the next highest industry, representing 13.9% of the sample. The remaining categories exhibit a modest range of representation, from a minimum of 2% (publishing and printing) to a maximum of 9.4% (electrical material and accessories).

| Figure 6.3 | The distribution of industry in Saudi Arabia |
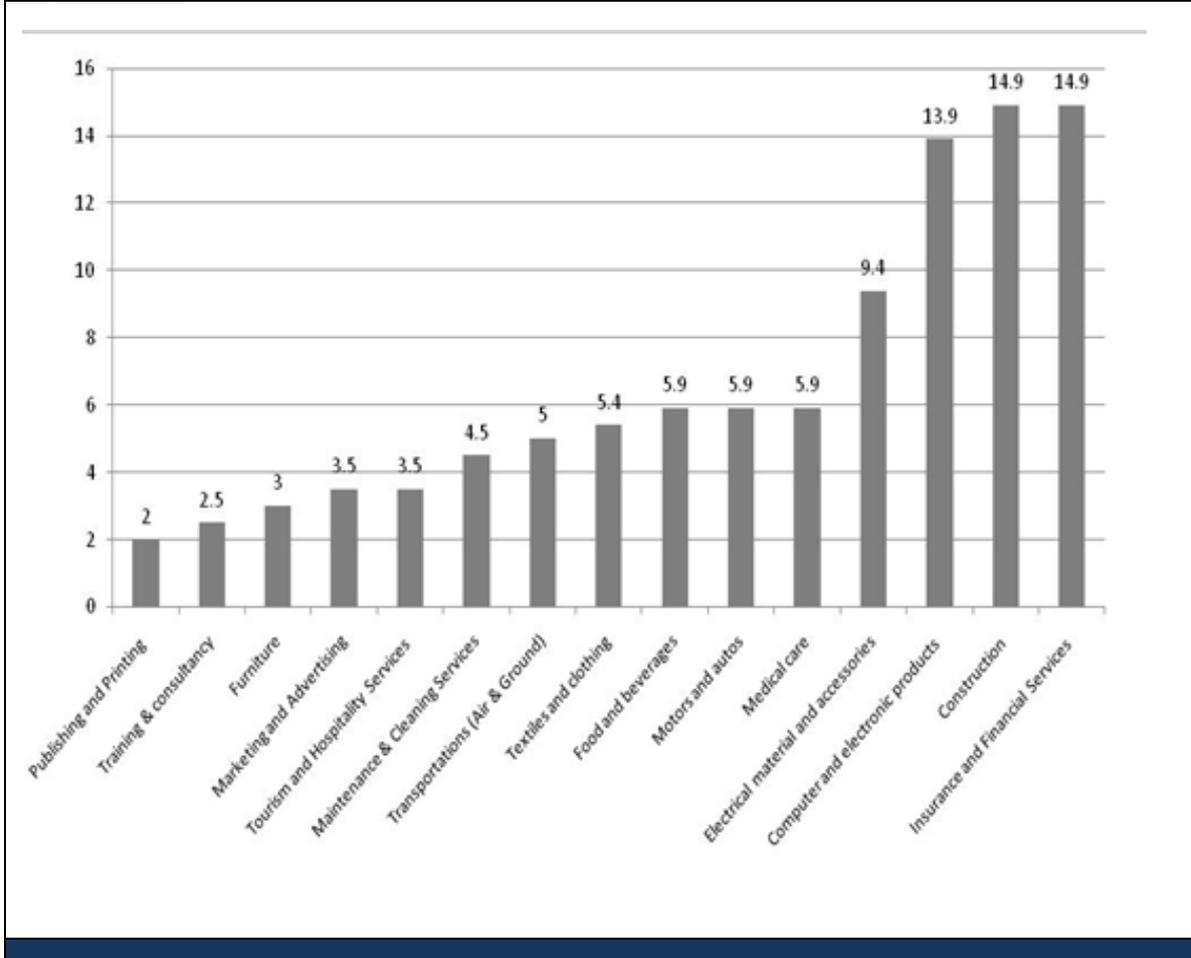
6.2.6 Firm size — number of employees

In this study, firm size was defined as the number of employees of a firm (Pan, 2005). The sample was comprised of small and medium-sized enterprises (SMEs) and large firms. However, majority of the sample, 67.3 percent, were large firms with more than 100 employees, and 32.7% were SMEs with 100 employees and below. In fact, 20% of the firms have more than 2500 employees, followed by 17.8% of the sample who claimed having between 101- 200 employees. Figure 6.4 shows the distribution of firm size in the sample.

Figure 6.4	The distribution of firm size
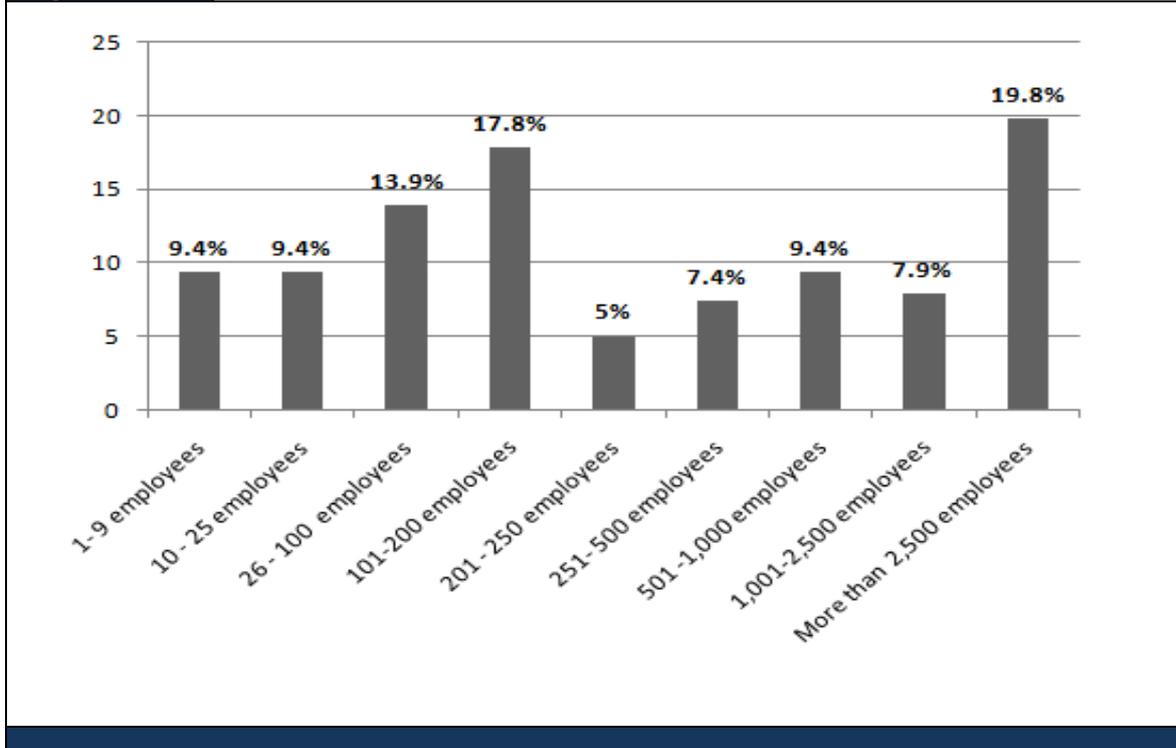
6.2.7 Age of the responding firms

Figure 6.5 shows the distribution of the firms' age, measured in years. The majority of the firms sampled have been established for more than 10 years (70.8%), with only 16.8% having been established for less than 5 years. Being in the market for more than 10 years means that these firms are well established with their own business strategy and organisational traits.

Figure 6.5	The distribution of firms' age
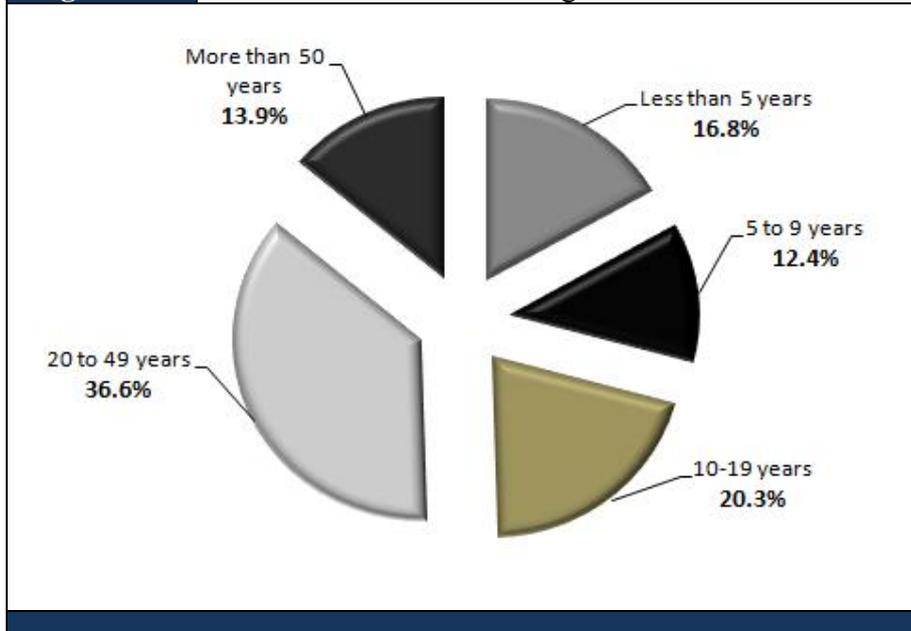
6.2.8 Geographic scope

Figure 6.6 shows the distribution of the firms' geographical scope. The majority of the firms sampled had one or multiple branches inside Saudi Arabia (59.9%). On the other hand, only 40.1% of the firms surveyed had multiple establishments or headquarters outside the Kingdom.

Figure 6.6	Pie chart of firm' geographical scope
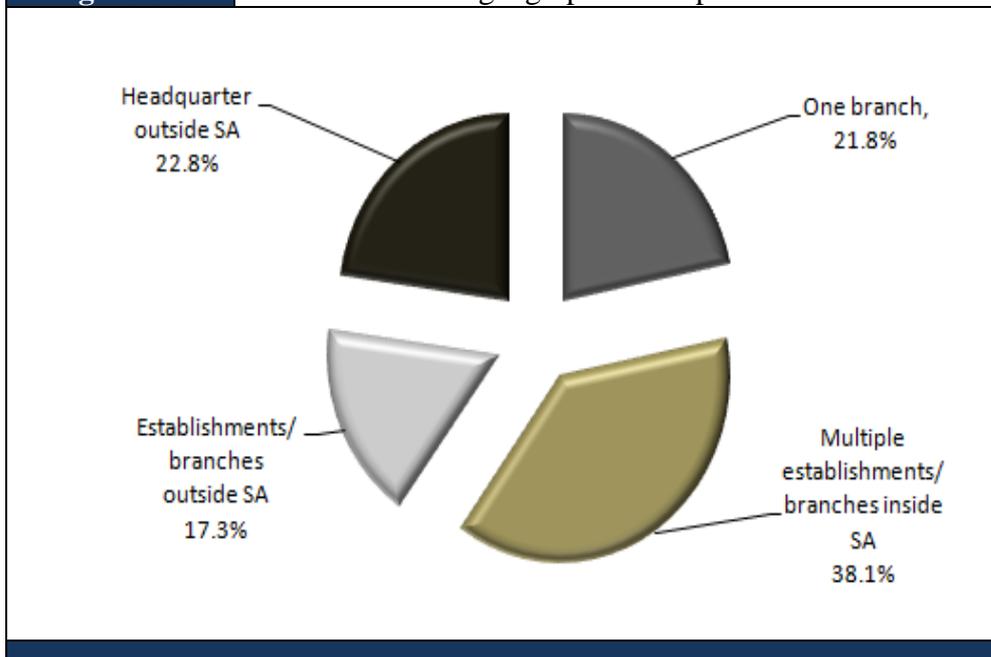
6.2.9 E-commerce applications used by businesses

One of the research questions of the study was to determine the current level of e-commerce technology use in businesses in the private sector. Indeed, as mentioned earlier in Chapter 4, e-commerce development in organisations is a phased process in which firms are found to move from no online presence on the Web, through to a static, informational presence and, ultimately, to more sophisticated applications that enable transactional trading, including online buying and payment, and, more importantly, integrating business processes allowing most business transactions to be conducted electronically.

The first question in part one assesses the used e-commerce applications among Saudi companies. Respondents were asked to choose from six groups of choices that indicated the adopted e-commerce technology. Table 6.3 shows that only 74 Saudi companies (36.6%) out of the 202 companies covered by the random sample claimed to use e-mail and a static web that only provides information about the company. The rest of the companies, 128 (63.3%), used interactive forms of e-commerce which included interacting with customers and buying, selling and conducting most of their business activities electronically. Saudi companies were asked to give information about the used e-commerce application to find out the several dimensions that separate the three groups of e-commerce adopters (adopters of non-interactive e-commerce, adopters of interactive e-commerce and adopters that utilize and continuously use e-commerce).

Table 6.3 E-commerce technologies in businesses		
E-commerce Technology	**Frequency**	**%**
Connected to the Internet with e-mail but no web site.	40	19.8
Static Web without any interactivity.	34	16.8
Interactive web presence.	66	32.7
Transactive web that allows online selling and purchasing of products and services.	13	6.4
Integrated web in which most of the business transactions are conducted electronically (i.e. inventory update, electronic paperwork and receipts).	49	24.3
Total	202	100

It is to be noted that a number of researchers have reported that interactive adoption is the beginning of e-commerce adoption (Kalakota and Whinston, 1996; Molla and Licker, 2005a, 2005b; Treese and Stewart, 1998). In fact, interactive communications require two or more

participants in which the utility of the technology increases as the number of users increase, and is most useful when there is universal access. However, it is believed that a critical mass of users is required in order to enable the technology to reach a threshold level of usefulness that will motivate potential adopters to adopt the technology (Markus, 1987). Moreover, Al-Qirim (2005) noted that e-commerce adopters are those who use e-commerce technologies such as the Intranet, websites and other advanced applications such as online ordering and e-payments.

As can be seen from Table 6.3, 24.3% of the firms use an integrated Web by utilizing the World Wide Web (WWW) as part of their strategy to develop e-business markets and allow business activities to be conducted through the Internet. This is followed by 19.8% of the sample who claimed to be using the Internet and e-mail in their operations but did not have Web access. In fact, Internet access and e-mail usage occur together, because in Saudi Arabia most of the Internet Service Providers (ISPs) provide e-mail accounts to users for free. Although e-mail provides a broad scope for communication, it is normally restricted to text-based messages, and the information has to be transformed to be used in other transaction applications (Premkumar and Roberts, 1999). Furthermore, 16.8% of the firms have a static Web presence that only provides information about the firms and their products or services without any interactivity. Finally, the percentage of firms providing online buying and e-payment was 6.4%. Indeed, adoption of advanced e-commerce technologies, especially those involving online transactions and integration with internal business processes, are costly, complex, and require ICT skills and extensive cooperation. On the other hand, the adoption of simple Internet–based technologies such as simple brochure web sites is found to be relatively inexpensive and easy, which makes the adoption decision less controversial. It is noteworthy that no firms reported not having online capabilities (i.e. Internet access or e-mail).

Figure 6.7 presents firms' level of e-commerce technologies based on this study's conceptualisation of the dependent variable 'e-commerce adoption'. As can be seen, three classification groups were established for the extent of e-commerce adoption: (1) those who used the Internet and had e-mail access or a static website presence were placed in the 'non-interactive' phase; (2) those who had established an interactive web presence were placed in the 'interactive adoption' phase; and (3) those with a transactive web presence and integrated web status were placed in the 'stabilisation' phase.

| Figure 6.7 | Firms' level of e-commerce technologies |

Stabilisation

Interactive Adoption

Non-interactive Adoption

24.3%
- Integrated web

6.4%
-Transactive web presence

32.7%
- Interactive web presence

16.8%
-Static website presence

19.8%
-Internet and E-mail Access

0%
- No online capabilities

Business Benefits

Extent of organisational change and sophistication
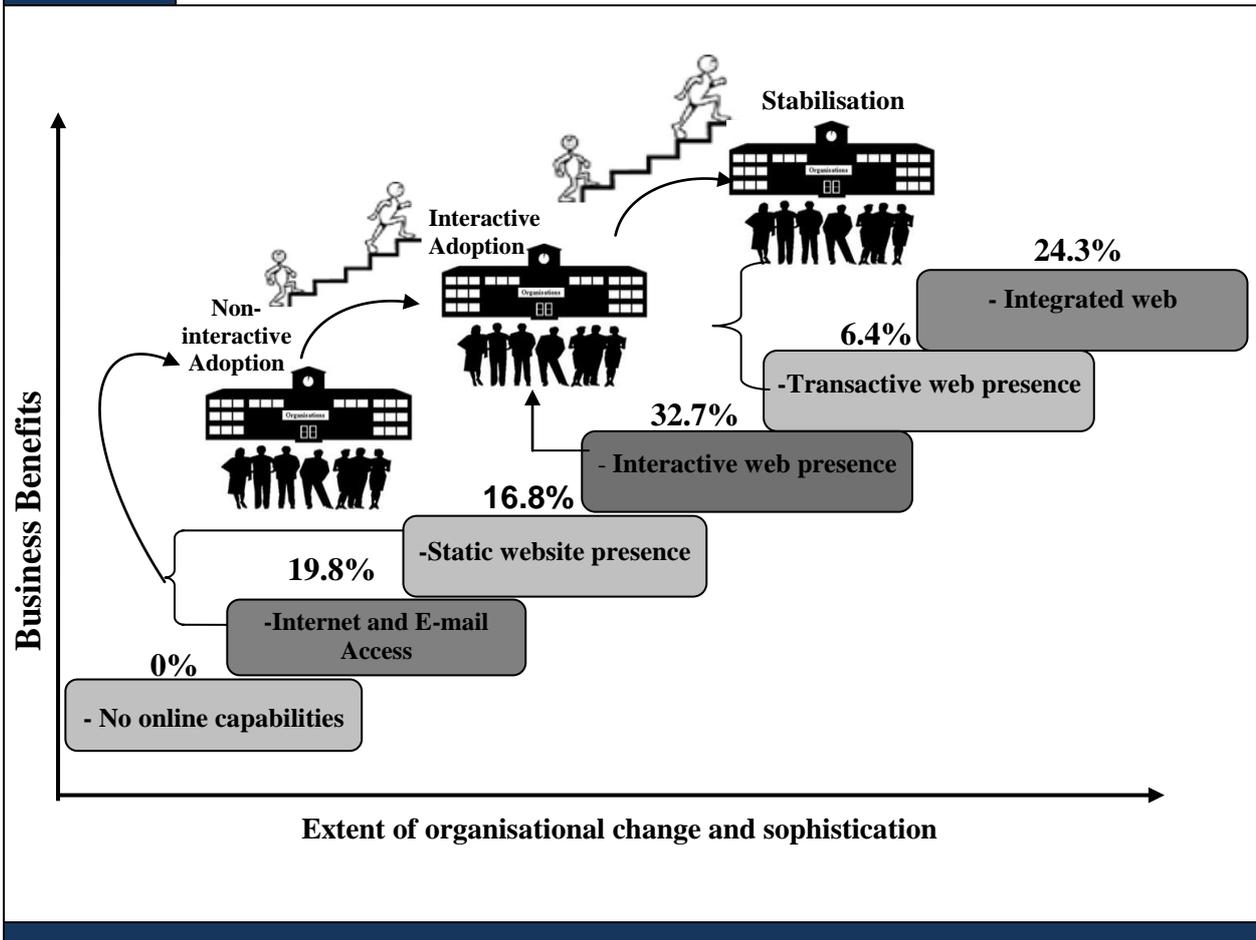
Source: Currecnt study

6.3 Analysing multi-item measure

Operationalization of all measures in the study has been described in Chapter five. This section focuses mainly on providing univariate descriptions for all the multi-dimensional variables in the proposed model (relative advantage, compatibility, security concern, adoption cost, language concern, IT readiness, management team support, learning orientation, receptivity toward change, decentralization level, formalisation level, strategic orientation, customer pressure, business partner pressure, competitive pressure, regulatory and legal environment, national e-readiness, technology consultants' participation, and economic downturn influence) which were used for testing the hypotheses. All constructs were measured by asking respondents questions in the form of a five-point Likert scale ranging from '1 = strongly disagree' to '5= strongly agree'.

It is to be noted that items which were negatively stated were reverse-coded. Lee (2003) suggests to reverse score any negatively worded items to, firstly, ensure that all items are consistently scored and, secondly, to aid in conceptualising the constructs and models. Subsequently, descriptive statistics that include number of items, mean and standard deviation on every dimension of the multi-scaled items were obtained. Mean values for multi-item scales were calculated by taking the mean of the summed score for all items constituting a particular variable (for example, the mean score for the relative advantage of 3.96 is the sum of the average score for the nine items measuring it).Table 6.4 illustrates some descriptive statistics for various variables in the research model.

		Univariate analysis group mean (S.D.)			
Variables	**No. Of Items**	**Non-Interactive adoption N=74**	**Interactive adoption N=66**	**Stabilisation N=62**	**Full Sample N=202**
E-commerce technology characteristics					
Relative advantage	9	3.84(0.765)	3.91(0.852)	4.17(0.931)	3.96(0.855)
Compatibility	3	2.84(1.043)	2.67(1.078)	2.86(1.233)	2.79(1.113)
Adoption cost	3	3.22(0.804)	3.27(0.831)	3.62(0.925)	3.36(0.865)
Security Concern	2	3.06(0.899)	3.29(0.903)	3.31(1.022)	3.21(3.21)
Language concern	3	3.82(0.880)	3.75(0.821)	3.85(0.919)	3.81(0.870)
Organisational context					
IT readiness	5	3.58(0.861)	3.89(0.862)	4.01(0.993)	3.81(0.918)
Management team support	5	3.33(0.876)	3.62(0.970)	3.86(0.964)	3.59(0.956)
Learning orientation	3	3.47(0.948	3.67(0.907)	3.87(0.861)	3.66(0.918)
Receptivity toward change	4	3.40(0.796)	3.54(0.850)	3.71(0.948)	3.54(0.918)
Strategic orientation	9	3.59(0.934)	3.74(0.841)	4.02(0.879)	3.78(0.847)
Decentralization level	3	3.51(0.893)	3.80(0.737)	3.65(0.976)	3.68(0.888)
Formalisation level	3	3.61(0.787)	3.54(0.906)	3.84(1.029)	3.62(0.847)
Environmental context					
Customer pressure	2	3.17(0.904)	3.27(1.078)	3.57(0.983)	3.33(0.997)
Business partner pressure	3	3.43(0.697)	3.60(0.713)	3.75(0.770)	3.58(0.733)
Competitive pressure	5	2.89(0.521)	2.92(0.443)	3.00(0.548)	2.93(0.505)
Regulatory & legal environment	5	2.66(1.074)	3.02(0.873)	3.38(1.026)	3.00(1.035)
National e-readiness	9	3.23(0.725)	3.33(0.813)	3.52(0.979)	3.35(0.843)
Technology consultants' participation	7	2.93(0.846)	3.49(0.786)	3.69(0.930)	3.35(0.911)
Economic downturn influence	3	3.13(0.884)	2.90(1.109)	2.70(1.041)	2.92(1.021)

Note: See the questionnaire in Appendix A and B for the scale used

6.3.1 E-commerce technology characteristics

The data showed that relative advantage has a higher score across all firms in the sample. However, there was a significant difference (at 0.05 level of significance) between two groups in the relative advantage of e-commerce, with 3.84 in the non-interactive adoption of

e-commerce compared to 4.17 in the stabilisation of e-commerce in organisations. Moreover, the lowest mean score was 'compatibility'; in which most respondents disagreed that e-commerce is compatible with the existing systems used in business.

6.3.2 Organisational context

On a 5 point Likert-scale ranging from (1) strongly disagree to (5) strongly agree, the means for the variables IT readiness, management team support, learning orientation, receptivity toward change, strategic orientation, decentralization level and formalisation level are as follows: 3.58, 3.33, 3.47, 3.40, 3.59, 3.51 and 3.61 for the non-interactive adoption group; 3.89, 3.62, 3.67, 3.54, 3.74, 3.80 and 3.54 for the interactive adoption group; and 4.01, 3.86, 3.87, 3.71, 4.02, 3.65, and 3.84 for stabilisation. The three sample t tests show significant difference in the organisational context. In fact, IT readiness has a higher importance score across all firms in the sample, in which most respondents agree that organisational IT readiness is important in e-commerce adoption. Moreover, the data showed significant differences (at 0.05 level of significance) between the three groups, along the degree of decentralization and formalization. In fact, the mean value for formalization construct was higher in the stabilisation group (3.84) than in the non-interactive (3.61) and interactive (3.54) adoption groups. In addition, it can be seen from the mean values of 3.51, 3.80 and 3.65 in the non-interactive, interactive and stabilisation groups, respectively, that the degree of delegation in decision-making is lower in organisations that adopt non-interactive e-commerce than in those organisations that adopt interactive e-commerce or stabilise e-commerce. Receptivity toward change was found to be lowest in importance.

6.3.3 Environmental context

For the environmental context, the data showed statistically significant differences (at 0.05 level of significance) between the three groups on the customer pressure, regulatory environment and technology consultants' participation variables. Regarding vendor support, it showed significant differences of perceived technology consultant participation in the three groups and this might be related to the different e-commerce technology consultants and vendors each group deals with. Competitive pressure and economic downturn influence were found to be lowest in importance in which most companies agree that they do not have any influence on their e-commerce adoption. Figure 6.8 graphically shows the mean levels of

each group of organisations on the independent variables that significantly separated the three groups.

Figure 6.8	Variable means for e-commerce adoption levels

RAD: Relative advantage
COM: Compatibility
COS: Adoption cost
SEC: Security Concern
LAC: Language concern

ITR: Information Technology readiness
MTS: Management team support
LOR: Learning orientation
RTC: Receptivity toward change
STO: Strategic orientation
DEC: Decentralization level
FOR: Formalisation level

EPR-CUST: Customer pressure
EPR-SUPP : Business partner pressure
EPR-CMP: Competitive pressure
REG: Regulatory & legal environment
NER: National e-readiness
TCO: Technology consultants' participation
ECO: Economic downturn influence

6.4 Data analysis methods

The research hypotheses were analyzed using multiple discriminant function analysis (MDFA), an appropriate technique when the dependent variable is categorical (either dichotomous or multichotomous) and the independent variable is interval (Hair et al., 1995; Klecka, 1980). Discriminant function is a multivariate technique that is used primarily to

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predict membership in two or more groups with respect to two or more independent variables simultaneously (Johnson and Wichern, 1998).

The dependent variable is e-commerce adoption, and it was measured on a dichotomous response Yes=1, No =0. On the other hand, the predictor variables in this portion of the analysis are the mean responses to the scale items intended to measure three main groups of variables: e-commerce technology characteristics (relative advantage, compatibility, security concern, adoption cost and language concern); organisational context (IT readiness, management team support, learning orientation, receptivity toward change, strategic orientation, decentralization level and formalisation level); and environmental characteristics (customer pressure, business partner pressuree, competitive pressure , regulatory and legal environment, national e-readiness, technology consultants' participation and economic downturn).

The discriminant analysis carried out on the sample was divided into three groups: non-interactive (including companies that used the Internet with e-mail as well as companies which used a static web without any interactivity), interactive adoption (including companies that used interactive e-commerce) and stabilisation (including companies which used interactive, transactive or integrated e-commerce). Moreover, differences between the three groups on the several dimensions of the model were tested to identify factors that are significant in differentiating between groups and that are likely to influence adoption of e-commerce.

The results of the discriminant function(s) showed that the overall model was useful for predicting the extent of e-commerce adoption and that the several factors are significant in differentiating between the three groups but not to the same level of significance. These analyses and their results are presented in detail below.

6.4.1 Discriminant Function Analysis (DFA)

The analysis described below establishes a predictive model of adoption by identifying the variables that have the strongest power in distinguishing between the three groups of organisational level of e-commerce. The major purpose of discriminant function analysis (DFA) is to (a) test theory by observing whether cases are classified as predicted, (b)

determine the most parsimonious way to distinguish among groups, and (c) determine the percentage of variance in the dependent variable explained by the independent (Tabachnick and Fidell, 2007).

Discriminant analysis can be conceptualised as the inverse of multivariate analysis of variance (MANOVA). In discriminant analysis, the single dependent variable is categorical, and the independent variables are metric. The opposite is true for MANOVA, which involves metric dependent variables and categorical independent variables. If discriminant function analysis is effective for a set of data, the factors used in the classification will yield a high correct percentage of cases allocated to the appropriate categorical dependent. Theoretically, discriminant analysis can handle an unlimited number of categories in the dependent variable (Hair et al., 1995). When three or more classifications are involved, the technique is referred to as multiple discriminant function analysis (MDFA).

Discriminant analysis, like the other multivariate techniques, is affected by the size of the sample being analysed. In fact, very small samples have a great deal of sampling error; on the other hand, very large sample sizes will make all differences statistically significant. In between these extremes, the researcher must consider the impact of sample sizes on discriminant analysis, both at the overall level and on a group-by group basis (i.e. the sample size of each category). At a minimum, the smallest group size of a category must exceed the number of independent variables in order for there to be confidence that the variables selected for interpreting the discrininant functions would again show up in an independent sample from the same population and for reliable results (Stevens, 2002; Hair et al., 1995).

This analysis involves three groups: companies which used the Internet with e-mail as well as companies which used a static web without any interactivity (N=74), companies which used interactive e-commerce (N=66), and those who used transactive and integrated e-commerce (N=62). Thus, there are three group means. A comparison of the group means shows how far apart the groups are along the dimension. The test for the statistical significance of the discriminant function is a generalized measure of the distance between the means. This is done by comparing the distribution of the discriminant scores for the two groups. If the overlap in the distribution is small, the discriminant function separates the groups well (Bala and Cook, 2003).

6.4.2 Assumptions and data considerations

As with all multivariate statistical techniques, the discriminant is based on a number of assumptions (Hair et al., 1995). In fact, these assumptions relate to both the statistical processes involved in the estimation and classification procedures and issues affecting the interpretation of the results. This subsection describes the assumptions and discusses the degree to which these data satisfy the assumptions and the impacts on the proper application of discriminant analysis. Figure 6.9 illustrates the key assumptions that underlie discriminant analysis and it is to be noted that, because of the different sample size, the data were checked to determine the degree to which the assumptions are satisfied.

Figure 6.9	Assumptions of discriminant analysis

Assumptions

- Multivariate normality.
- Equal covariance metrics among groups.
- Independence.
- Absence of multicollinearity among independent variables.
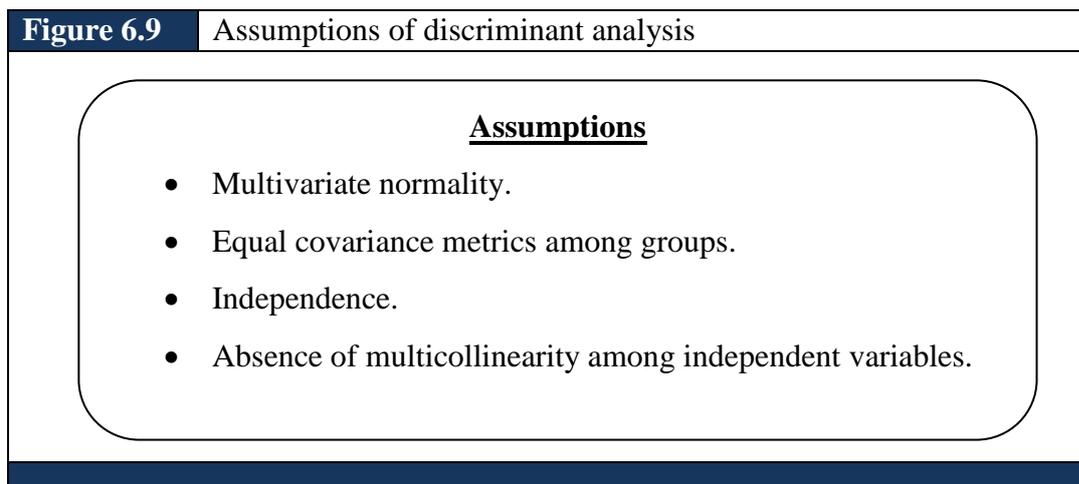
Source: current study

6.4.2.1 Multivariate normality of independent variables

The key assumptions for driving the discriminant function are multivariate normality of the independent variables within each group. In order to achieve a multivariate normality assumption, it is necessary to establish univariate normality of the individual variables. This was done by examining histograms of each independent variable. The test reveals that the data are normal.

6.4.2.2 Equal covariance metrics among groups

Discriminant analysis assumes that the covariance/correlation matrix for the independent variables is similar for each group defined by the dependent variable. In order to test the

assumption of equal covariance matrices across groups, Box's M statistical test, which assesses the significance of differences in the matrices between the groups, was performed. If the *Box's M Test* shows p >0.05, the covariance matrices are equal and the null hypothesis is rejected. The null hypothesis posits that the covariance matrices do not differ between groups (Tabachnick and Fidell, 2007).

In fact, Box's M can be overly sensitive to large data files. Although inference is usually robust with respect to heterogeneity of variance-covariance matrices with decently sized samples, when sample sizes are unequal, results of significance testing may be misleading if there is heterogeneity of the variance-covariance matrices. Moreover, this test is also very sensitive to meeting the assumption of multivariate normality.

Table 6.5 provides the result of the Box's M's test conducted on the analysis subset sample. Analysis of data indicates an insignificant result (p=0.410) and, fortunately, a rejection of the null hypothesis described above. The matrices in the population are equal covariance; thus, using a discriminant analysis is permitted and authenticated.

Table 6.5	Box's M's test of homogeneity of covariance matrix for analysis subsample	
		Statistics
Box's M		1.795
F	Approx.	.892
	df1	2
	Sig.	0.410

6.4.2.3 Independence

This is an important assumption of many linear modes and independence means that one observation bears no relation to the value of the other observation. Discriminant analysis requires that the observations are statically independent of one another and must be mutually exclusive from one another (i.e. no repeated measures or matched pairs data is allowed). As a quick examination of independence, a Durbin-Watson (DW) statistic was run and there was no cause for concern. As a rule of thumb, the *DW statistic* should be between 1.5 and 2.5 to indicate independence of observations (Hutcheson and Sofroniou, 1999). The observed value

of DW for this study is 1.748 (which is within the range 1.5-2.5). Therefore, it can be stated that the subjects are statistically independent of each other.

6.4.2.4 Lack of multicollinearity among independent variables

Multicollinearity among two or more variables is problematic. When high multicollinearity among two or more independent variables is present, the standardized discriminant function coefficients will not reliably portray their relative importance in predicting group membership. The pooled within-groups correlation matrix, given in Table 6.6, which is computed by averaging the separate covariance matrices for all groups, indicates low correlations between the predictors (less than 0.7). Hence, multicollinearity is not a serious problem.

Table 6.6: Pooled Within-Groups correlation matrix

	RAD	COM	SEC	COS	LAC	ITR	MTS	LRO	RTC	STO	DEC	FOR	EPR-CUST	EPR-CMP	EPR-SUPP	REG	NRE	TCO	ECO
RAD	1.00																		
COM	-0.13	1.00																	
SEC	0.14	0.26	1.00																
COS	0.24	0.04	0.08	1.00															
LAC	0.39	-0.09	0.17	0.12	1.00														
ITR	0.56	-0.25	0.05	0.32	0.35	1.00													
MTS	0.37	-0.13	0.15	0.37	0.22	0.60	1.00												
LRO	0.30	-0.12	0.13	0.36	0.24	0.46	0.63	1.00											
RTC	0.34	-0.09	0.25	0.34	0.26	0.56	0.65	0.57	1.00										
STO	0.35	-0.08	0.20	0.33	0.28	0.59	0.75	0.64	0.73	1.00									
DEC	0.42	-0.10	0.07	0.36	0.43	0.56	0.58	0.53	0.48	0.52	1.00								
FOR	0.28	-0.02	0.15	0.39	0.26	0.58	0.63	0.51	0.67	0.59	0.52	1.00							
EPR-CUST	0.33	0.12	0.08	0.27	0.15	0.25	0.48	0.26	0.27	0.34	0.25	0.24	1.00						
EPR-CMP	-0.01	0.02	-0.03	-0.08	-0.01	-0.07	-0.03	0.02	-0.03	0.02	0.02	-0.01	-0.05	1.00					
EPR-SUPP	0.55	-0.09	0.15	0.39	0.24	0.47	0.45	0.33	0.40	0.35	0.36	0.38	0.43	-0.03	1.00				
REG	0.07	0.18	0.04	0.29	-0.05	0.23	0.42	0.31	0.29	0.32	0.26	0.38	0.39	-0.10	0.30	1.00			
NRE	0.34	-0.07	0.02	0.69	0.22	0.39	0.43	0.41	0.37	0.35	0.48	0.41	0.39	0.01	0.43	0.33	1.00		
TCO	0.26	-0.09	0.08	0.44	0.09	0.46	0.52	0.51	0.44	0.46	0.43	0.50	0.26	-0.13	0.34	0.53	0.50	1.00	
ECO	-0.09	-0.10	-0.18	-0.38	0.06	-0.15	-0.28	-0.13	-0.17	-0.17	-0.23	-0.22	-0.13	0.10	-0.14	-0.11	-0.34	-0.24	1.00

As the above discussion indicates, the assumptions underlying discriminant analysis are either met, or when violated, have robust tests available.

6.5 Hypothesis Testing

The thesis aimed at examining the relationships between a number of independent variables and the dependent variable. Discriminant analysis was conducted using SPSS for Windows statistical package. For the purposes of testing the hypotheses, all 19 independent variables were entered simultaneously to determine the strongest predictors of the dependent variable and test each hypothesis. As discussed above, companies were characterised as: (1) non-interactive adopters (N=74); (2) interactive adopters (N=66); and (3) stabilisation of e-commerce (N=62).

In order to test the hypotheses developed in Chapter 4, discriminant loading (also known as structure correlation), measuring the simple linear correlation between each predictor variable and the extracted discriminant function, is used to determine the significance of the variables. Moreover, discriminant loading has the ability to explain how the independent variables affect the dependent variables (Hair et al., 1995). The larger the discriminant loading value, the stronger is the relationship between a factor and the discriminant function. The sign attached to the value shows a positive or negative relationship with the discriminant function. Moreover, while there are no rigid rules about the goodness of these values, the general guidelines are that values greater than or equal to 0.3 are satisfactory and acceptable (Tabachnich and Fidell, 2007; Marcoulides and Hershberger, 1997). On the other hand, any variables exhibiting a discriminant Variables with loadings of less than 0.30 are disregarded as they contributed insignificantly to the discriminant power of a function.

Three separate discriminant models were generated for the three groups of e-commerce adoption - non-interactive adoption, interactive adoption and stabilisation - in order to present the factors that influence or hinder e-commerce in each group. Moreover, independent variables that were likely to influence adoption of e-commerce were grouped together as e-commerce technology characteristics, organisational context and environmental context. The value of Wilks' Lambda, the Chi-square ($\chi^{2)}$) value and the level of significance are shown in Tables 6.7 through 6.12. All the three models were significant at p<0.01.

6.5.1 Hypotheses concerning e-commerce technology characteristics, organisational context and environmental context and their relation to non-interactive adoption of e-commerce

In this section, the results of the analyses relating to the effects of e-commerce technology characteristics, organisational context and environmental context and non-interactive adoption are discussed. Table 6.7 provides information on the discriminant loading of each variable, discriminant coefficient, Wilks' Lambda and the univariate F-value statistics. It is noteworthy that,Wilks' Lambda is significant by the F test for a variable. In fact, the smaller the Wilks' Lambda, the more important the independent variable to the discriminant functions.

As discussed earlier, non-interactive adoption of e-commerce was evaluated only for organisations that used the Internet with e-mail as well as companies that used a static web without any interactivity. Discriminant analysis is used to test the individual hypotheses relating e-commerce technology characteristics, organisational and environmental factors to the non-interactive adoption of e-commerce (a dichotomous dependent variable of Internet, e-mail and static e-commerce status). The result is summarized in Table 6.7.

As can be seen from Table 6.7, the model for 'non-interactive adoption of e-commerce' was statistically significant at $p<0.002$ with a value of Wilks' Lambda (λ) of 0.815 ($\chi^2=39.128$, df=17). The canonical correlation which is associated with the discriminant function is 0.430. This coefficient measures the extent of association between the single discriminant function and the set of dummy variables which define the group membership (Klecka, 1980). The function correctly classifies 64.3 percent of the businesses in the sample (60.8 percent of the non-interactive adopters and 68.2 percent of the interactive adopters).

The independent variables that were most significant to the discriminant function and that were found to have discriminant loadings above the cut-off value are, in descending order, technology consultant's participation, regulatory and legal environment, management team support, IT readiness, trading partner pressure, strategic orientation, learning orientation and economic downturn.

The univariate F statistics also indicate that these variables were significant independently as well. Therefore, the results fully support $H_{6.1}$, $H_{7.1}$, $H_{8.1}$, $H_{10.1}$, $H_{14.1}$, $H_{16.1}$, $H_{18.1}$, and $H_{19.1}$.

Conversely, the remaining factors are found to be poor predictors of the non-interactive adoption of e-commerce adoption and did not show loading above the cut-off point. Research hypotheses are presented in Table 6.8.

Variables	Wilks' Lambda	Univariate F ratio (Sig.)	Sig.	Discriminant loadings	Discriminant Coefficient
E-commerce technology characteristics					
Relative advantage	0.987	2.615	0.107	0.239	0.027
Compatibility	0.999	0.226	0.635	0.070	0.101
Adoption cost	0.985	3.097	0.080	-0.260	-0.019
Security Concern	0.985	2.975	0.086	-0.255	-0.232
Language concern	1.000	0.011	0.917	-0.015	-0.047
Organisational context					
IT readiness	0.963	7.698	0.006	**0.410**	0.373
Management team support	0.957	8.940	0.003	**0.442**	0.190
learning orientation	0.976	4.856	0.029	**0.326**	0.016
Receptivity toward change	0.985	3.024	0.084	0.257	0.043
Strategic orientation	0.976	4.912	0.028	**0.327**	0.118
Decentralization level	0.994	1.107	0.294	0.155	0.247
Formalization level	0.992	1.572	0.211	0.185	0.460
Environmental context					
Customers pressure	0.985	2.952	2.087	0.254	0.011
Trading partner pressure	0.976	4.992	0.027	**0.330**	0.097
Competitive pressure	0.996	0.807	0.370	0.133	0.659
regulatory and legal environment	0.939	12.971	0.000	**0.532**	0.292
National e-readiness	0.988	2.445	0.10	0.231	0.346
Technology consultant's participation	0.880	27.389	0.000	**0.773**	0.965
Economic downturn influence	0.976	4.816	0.029	**-0.324**	-0.244
Wilks' λ= 0.815	df=17	*P*=0.002			
Canonical *R=0.430*	χ^2=39.128	*F* =27.389			

Table 6.7 — Discriminant analysis for **non-interactive** adoption of e-commerce

Note: Percentage of correct classification was 64.3 percent (60.8 percent of the non-interactive adopters and 68.2 percent of the interactive adopters). Discriminant loadings for variables providing significant contributions to non-interactive adoption of e-commerce are in boldface.

Table 6.8	Summary table of significant variables for **non-interactive** e-commerce adoption		
Independent variable	**Hypothesis**	**Loadings**	**Results**
Relative advantage	H $_{1.1}$	0.239	Rejected
Compatibility	H $_{2.1}$	0.070	Rejected
Adoption cost	H 3.1	-0.260	Rejected
Security Concern	H 4.1	-0.255	Rejected
Language concern	H $_{5.1}$	-0.015	Rejected
IT readiness	H $_{6.1}$	**0.410**	Supported
Management team support	H $_{7.1}$	**0.442**	Supported
Learning orientation	H $_{8.1}$	**0.326**	Supported
Receptivity toward change	H $_{9.1}$	0.257	Rejected
Strategic orientation	H $_{10.1}$	**0.327**	Supported
Decentralization level	H $_{11.1}$	0.155	Rejected
Formalisation level	H $_{12.1}$	0.185	Rejected
Customers pressure	H $_{13.1}$	0.254	Rejected
Trading partner pressure	H $_{14.1}$	**0.330**	Supported
Competitive pressure	H $_{15.1}$	0.133	Rejected
Regulatory & legal environment	H $_{16.1}$	**0.532**	Supported
National e-readiness	H $_{17.1}$	0.231	Rejected
Technology consultants' participation	H $_{18.1}$	**0.773**	Supported
Economic downturn	H $_{19.1}$	**-0.324**	Supported

6.5.2 Hypotheses concerning e-commerce technology characteristics, organisational context and environmental context and their relation to interactive adoption of e-commerce

Interactive e-commerce adoption is operationalized as a dichotomy of whether or not an organisation has attained an interactive e-commerce status. The results of the discriminant analysis together with the descriptive statistics are presented in Table 6.9.

The MDFA produces a statistically significant function (Wilks' Lambda (λ) =0.809 (χ^2=27.186; df=19; F=1.093; p<0.100) indicating that the model is satisfactorily significant in discriminating adopters and non-adopters of e-commerce. Hence, the null hypothesis that, in the population, the means of all discriminant functions in all groups are equal, must be

rejected. The function correctly classifies 88.8 percent of the businesses in the sample (98.5 percent of interactive e-commerce adoption and 42.9 percent of the transactive e-commerce adoption).

In order to determine the relative importance of each of the independent variables in discriminating between the groups, the discriminant loadings and the probabilities for the f statistics were examined. On the basis of the analysis, IT readiness, management team support, regulatory and legal environment and technology consultants' participation are identified as significant and positive (the signs of the loadings are in Table 6.9) contributors to interactive e-commerce adoption. Hence, the results fully support four of the 15 hypotheses ($H_{6.2}$, $H_{7.2}$, $H_{16.2}$, $H_{18.2}$) linking technological, organisational and environmental factors to interactive e-commerce adoption. Therefore, interactive e-commerce adoption (having an interactive e-commerce status) is significantly influenced by the participation of technology consultant, information technology readiness, management team support and regulatory and legal environment among the technological, organisational and environmental determinants (see Table 6.9). Conversely, the remaining factors are found to be poor predictors of the interactive adoption of e-commerce adoption and did not show loading above the cut-off point. Research hypotheses are presented in Table 6.10.

Table 6.9	Discriminant analysis for **interactive adoption** of e-commerce				
Variables	**Wilks' Lambda**	**Univariate F ratio (Sig.)**	**Sig.**	**Discriminant loadings**	**Discriminant Coefficient**
E-commerce technology characteristics					
Relative advantage	0.998	0.297	0.587	0.096	0.165
Compatibility	0.993	0.910	0.342	0.167	0.180
Adoption cost	0.999	0.138	0.710	-0.065	-0.137
Security Concern	0.984	2.216	0.139	-0.261	-0.297
Language concern	0.999	0.189	0.664	-0.076	-0.118
Organisational context					
IT readiness	0.969	4.424	0.037	**0.369**	0.427
Management team support	0.975	3.491	0.064	**0.328**	0.142
Learning orientation	0.989	1.598	0.208	0.222	0.007
Receptivity toward change	0.993	1.007	0.317	0.176	0.094
Strategic orientation	0.993	0.971	0.326	0.173	0.030
Decentralization level	0.985	2.102	0.149	0.254	0.694
Formalization level	1.000	0.030	0.863	0.030	0.198
Environmental context					
Customer pressure	0.997	0.384	0.537	0.109	0.042
Trading partner pressure	0.987	1.879	0.173	0.240	0.128
Competitive pressure	0.999	0.130	0.719	0.063	0.169
Regulatory and legal environment	0.969	4.418	0.037	**0.336**	0.179
National e-readiness	0.996	0.579	0.448	0.133	0.184
Technology consultants' participation	0.895	16.119	0.000	**0.704**	0.828
Economic downturn	0.987	1.812	0.180	-0.236	-0.265
Wilks' λ=0.809 Canonical R=0.437	df=19 χ^2=27.186	P=0.100 F=1.093			

Note: Percentage of correct classification was 88.8 percent (98.5 percent of interactive e-commerce adoption and 42.9 percent of the transactive e-commerce adoption). Discriminant loadings for variables providing significant contributions to interactive adoption of e-commerce are in boldface.

Table 6.10	Summary table of significant variables for **interactive** e-commerce		
Independent variable	**Hypothesis**	**Loadings**	**Results**
Relative advantage	H $_{1.2}$	0.096	Rejected
Compatibility	H $_{2.2}$	0.167	Rejected
Adoption cost	H $_{3.2}$**,**	-0.065	Rejected
Security Concern	H $_{4.2}$	-0.261	Rejected
Language concern	H $_{5.2}$	-0.076	Rejected
IT readiness	H $_{6.2}$	**0.369**	Supported
Management team support	H $_{7.2}$	**0.328**	Supported
Learning orientation	H $_{8.2}$	0.222	Rejected
Receptivity toward change	H $_{9.2}$	0.176	Rejected
Strategic orientation	H $_{10.2}$	0.173	Rejected
Decentralization level	H $_{11.2}$	0.254	Rejected
Formalisation level	H $_{12.2}$	0.030	Rejected
Customer pressure	H $_{13.2}$	0.109	Rejected
Trading partner pressure	H $_{14.2}$	0.240	Rejected
Competitive pressure	H $_{15.2}$	0.063	Rejected
Regulatory & legal environment	H $_{16.2}$	**0.336**	Supported
National e-readiness	H $_{17.2}$	0.133	Rejected
Technology consultants' participation	H $_{18.2}$	**0.704**	Supported
Economic downturn	H $_{19.2}$	-0.236	Rejected

6.5.3 Hypotheses concerning e-commerce technology characteristics, organisational context and environmental context and their relation to stabilisation of e-commerce

As discussed earlier, stabilisation of e-commerce was evaluated only for organisations that achieved a transactive web presence and integrated web status. Discriminant analysis is again used to test the individual hypotheses relating e-commerce technology characteristics, organisational and environmental factors to the stabilisation of e-commerce (a multichotomous dependent variable of transactive and integrated e-commerce status). The result is summarized in Table 6.11.

The analysis produces a model that is satisfactorily significant in discriminating the various levels of e-commerce stabilisation: transactive, and integrated (Wilks's $\lambda = 0.876$; $\chi2 = 26.267$; df $= 4$; $F = 1.326$; $p < 0.000$).The canonical correlation which is associated with the discriminant function is 0.418.

With respect to the overall classificatory ability of the discriminating function, the results indicate that the function correctly classified 64.8 percent of the businesses in the sample (80.3 percent of interactive, 42.9 percent of transactive, and 50 percent of integrated). Therefore, the model can be accepted as a valid predictor of the stabilisation of e-commerce adoption.

The independent variables that were most significant to the discriminant function are, in descending order, technology consultants' participation, regulatory and legal environment, adoption cost, strategic orientation, management team support, customer pressure, relative advantage, formalization level, learning orientation, trading partner pressure, economic downtown and IT readiness (Table 6.11). Therefore, it may be concluded that these variables allow discriminating the stabilisation of e-commerce adoption. Subsequently, the results fully support the following hypotheses: $H_{1.3}$, $H_{3.3}$, $H_{6.3}$, $H_{7.3}$, $H_{8.3}$, $H_{10.3}$, $H_{12.3}$, $H_{13.3}$, $H_{14.3}$, $H_{16.3}$, $H_{18.3}$, and $H_{19.3}$. Conversely, the remaining factors are found to be poor predictors of the stabilisation of e-commerce technology and did not show loading above the cut-off point. Research hypotheses are presented in Table 6.12.

Table 6.11	Discriminant analysis for **Stabilisation** of e-commerce				
Variables	**Wilks' Lambda**	**Univariate F ratio (Sig.)**	**Sig.**	**Discriminant loadings**	**Discriminant Coefficient**
E-commerce technology characteristics					
Relative advantage	0.974	5.434	0.021	**0.359**	0.382
Compatibility	0.998	.367	0.545	0.093	0.014
Adoption cost	0.959	8.493	0.004	**-0.448**	-0.346
Security Concern	0.995	0.930	0.336	-0.148	-0.048
Language concern	0.999	0.270	0.604	-0.080	-0.238
Organisational context					
IT readiness	0.980	4.179	0.042	**0.314**	0.040
Management team support	0.963	7.674	0.006	**0.426**	0.078
Learning orientation	0.977	4.638	0.032	**0.331**	0.069
Receptivity toward change	0.984	3.269	0.072	0.278	0.180
Strategic orientation	0.963	7.681	0.006	**0.426**	0.253
Decentralization level	1.000	0.076	0.782	-0.043	0.807
Formalization level	0.976	4.910	0.028	**0.341**	0.060
Environmental context					
Customer pressure	0.973	5.559	0.019	**0.363**	0.049
Trading partner pressure	0.978	4.602	0.033	**0.330**	0.083
Competitive pressure	0.993	1.404	0.237	0.182	0.339
Regulatory and legal environment	0.939	13.040	0.000	**0.556**	0.428
National e-readiness	0.982	3.648	0.058	0.294	0.271
Technology consultant's participation	0.937	13.549	0.000	**0.566**	0.378
Economic downtown	0.979	4.296	0.039	**-0.319**	-0.280
Wilks' λ=0.826	df=19	*P*=0.009			
Canonical *R=0.418*	χ^2=36.513	*F* =1.326			

Note: Percentage of correct classification was 64.8 percent (80.3 percent of interactive, 42.9 percent of transactive, and 50 percent of integrated). Discriminant loadings for variables providing significant contributions to stabilisation of e-commerce are in boldface.

Table 6.12	Summary table of significant variables for stabilisation of e-commerce		
Independent variable	**Hypothesis**	**Loadings**	**Results**
Relative advantage	H $_{1.3}$	**0.359**	Supported
Compatibility	H $_{2.3}$	0.093	Rejected
Adoption cost	H $_{3.3}$	**-0.448**	Supported
Security Concern	H $_{4.3}$	0.148	Rejected
Language concern	H $_{5.3}$	0.080	Rejected
IT readiness	H $_{6.3}$	**0.314**	Supported
Management team support	H $_{7.3}$	**0.426**	Supported
Learning orientation	H $_{8.3}$	**0.331**	Supported
Receptivity toward change	H $_{9.3}$	0.278	Rejected
Strategic orientation	H $_{10.3}$	**0.426**	Supported
Decentralization level	H $_{11.3}$	-0.043	Rejected
Formalisation level	H $_{12.3}$	**0.341**	Supported
Customer pressure	H $_{13.3}$	**0.363**	Supported
Trading partner pressure	H $_{14.3}$	**0.330**	Supported
Competitive pressure	H $_{15.3}$	0.182	Rejected
Regulatory & legal environment	H $_{16.3}$	**0.556**	Supported
National e-readiness	H $_{17.3}$	0.294	Rejected
Technology consultants' participation	H $_{18.3}$	**0.566**	Supported
Economic downturn	H $_{19.3}$	**-0.319**	Supported

Single discriminant analysis (DA) that considers types of e-commerce as a single variable was generated in order to identify the research variables that in general best discriminate between e-commerce adopters. Table 6.13 illustrates the findings from this analysis. The independent variables that were most significant to the discriminant function and that were found to have discriminant loadings above the cut-off value are, in descending order, technology consultant's participation, regulatory and legal environment, management team support, strategic orientation, IT readiness, adoption cost, trading partner pressure, learning orientation, economic downtown, customer pressure and relative advantage.

Variables	Wilks' Lambda	Univariate F ratio (Sig.)	Sig.	Discriminant loadings	Discriminant Coefficient
Table 6.13 Research variables that discriminate between e-commerce adopters					
E-commerce technology characteristics					
Relative advantage	0.972	2.842	0.061	**0.308**	0.167
Compatibility	0.994	0.594	0.553	0.001	-0.055
Adoption cost	0.959	4.292	0.015	**0.363**	0.177
Security Concern	0.985	1.486	0.229	0.220	0.119
Language concern	0.998	.225	0.799	0.028	0.143
Organisational context					
IT readiness	0.960	4.131	0.017	**0.390**	0.246
Management team support	0.947	5.579	0.004	**0.461**	0.152
Learning orientation	0.969	3.161	0.044	**0.347**	0.023
Receptivity toward change	0.979	2.091	0.126	0.281	-0.112
Strategic orientation	0.959	4.301	0.015	**0.393**	0.049
Decentralization level	0.990	0.993	0.372	0.073	-0.536
Formalization level	0.976	2.457	0.088	0.268	-0.250
Environmental context					
Customer pressure	0.971	2.964	0.054	**0.319**	0.030
Trading partner pressure	0.969	3.197	0.043	**0.349**	0.004
Competitive pressure	0.992	0.759	0.469	0.163	0.365
Regulatory and legal environment	0.919	8.780	0.000	**0.578**	0.381
National e-readiness	0.980	2.062	0.130	0.273	-0.306
Technology consultant's participation	0.872	14.64	0.050	**0.731**	0.677
Economic downtown	0.970	3.038	0.000	**-0.340**	-0.284
Wilks' λ=0.716	df=38	P=0.006			
Canonical R=0.457	χ²=63.552	F =1.209			

6.6 Chapter summary

This chapter has reported the results of the analysis used to test the hypotheses developed in Chapter 4 relating to e-commerce adoption. The discriminant analysis supported the finding that e-commerce technology adoption - i.e. consisting of non-interactive adoption, interactive

adoption and stabilisation - was determined by different factors at each stage of organisational e-commerce adoption. The next chapter (Chapter 7) discusses the interpretation of the results and the associations between independent and dependent variables in further detail.

Figure 7.1	Overview of Chapter Seven

7.1 Introduction

7.2 Surveyed companies' profiles

7.3 E-commerce adoption in organisations

7.4 Determinants of e-commerce adoption

7.5 Chapter summary
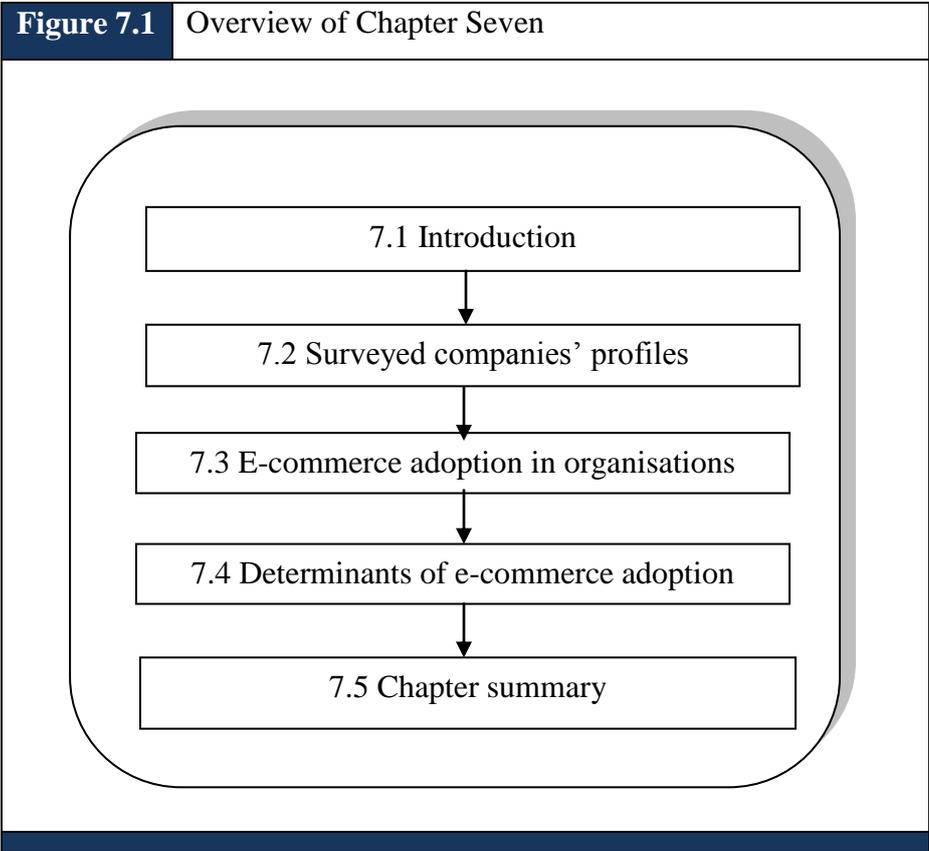
7.1 Introduction

This chapter discusses the results of the hypothesis-testing presented in the previous chapter. The aim of this chapter is to discuss and reflect upon the findings from existing literature using those provided in Chapter 3. Previous studies are drawn on to elaborate and support the empirical observations and significance of this study. In general, the discussion of the results revolves around the conceptual model proposed by the author. Figure 7.1 (previous page) portrays the organisation of the chapter.

This chapter is divided into five sections. It starts by providing a brief recap of surveyed companies' profiles in Section 7.2. Then, Section 7.3 discusses organisational adoption levels of e-commerce. After this, explanation and discussion on research hypotheses included in this study are provided in section 7.4. Finally, the summary and conclusions of the chapter are provided in Section 7.5. Insights and guidance from existing literature is sought to qualify the empirical observations of the study model and explain the results.

7.2 Surveyed companies' profiles

The survey was conducted via questionnaires administered to 1035 selected Saudi manufacturing and service companies in the private sector which had a response rate of 44.9 percent. This research project aims to discover the factors that influence or inhibit the adoption of B2B e-commerce among Saudi Arabian manufacturing and service companies in the private sector.

Among the firms making up the population sample include those from sectors such as food and beverages, building materials and construction, health and pharmaceuticals, financial services, and electrical equipment and engineering. Construction and insurance entities account for 14.9% of the sample. In fact, construction is the largest non-oil economic sector in Saudi Arabia, and it constitutes a major share of the Kingdom's domestic economy. This sector is presently witnessing a major growth driven by the following forces: high liquidity, low-interest financing, high population growth and economic stability (Masood, 2010). Between 2002 and 2007, the real sector growth accelerated from 2.51% to 4.11% per annum. On the other hand, the contribution of the finance and insurance sector to the GDP was about 6.3% in 2009 (Eighth development plan, 2005). The finance and insurance sector consists of private banking services, insurance services and mortgages. The computer and electronic

industry was the next highest industry, representing 13.9% of the sample. It is to be noted that the Saudi Arabian telecommunications and information technology industry is the largest in the Middle East (Rosenthal, 2008).

Firm size is always defined as the number of a firm's employees (Pan, 2005). According to the government's Eighth Development Plan (2005), firms with more than 100 employees are considered to be large, while firms with 100 employees and below are considered SMEs. Another classification of firm size is through a firm's capital. Firms that operate with capital of 5 million SR[20] and above are classified as large, while those with capital between 200,000 SR and below 5 million SR are considered to be SMEs (Radwan, 2001). Based on the number of employees as the determination of firm size, a majority of the sample, 67.3 percent, were large firms, and 32.7% were SMEs. As discussed above, this difference could be explained by the construction sector being the largest non-oil economic sector in Saudi Arabia and most of the businesses in this sector are characterised by having sufficient resources in terms of specialised staff and market share.

In addition to the 41.1% of the informants who were Chief Executive Officers (CEOs) or presidents, another 24.3% of the informants were from the top management level and involved in some sort of decision making at the strategic level for information systems adoption. A majority of the informants were male (90.1%). In fact, this is not unusual of the work environment in Saudi Arabia where women are not allowed to work in any job that exposes them to contact with men. In addition, this is consistent with Robertson et al. (2001) who conducted some research to investigate managers' and employees' attitudes towards work-related beliefs in Saudi Arabia, Kuwait, and Oman. They found that in Saudi Arabia the majority of the respondents were men (69.8%), and the percentage of male executives was much higher than that of women (64% male). In fact, women mainly work in public sector jobs which do not involve mixing with men, such as teaching and administrating girls' schools. They occupied 225,000 positions in 2005, which represent 89% of total female employment and 30.1% of total Saudi labour in the public sector (The Eighth development plan, 2005-2009). On the other hand, female employment in the private sector is low because of constraints imposed on employers in relation to logistical issues, special entrance and separation arrangements, making it harder to hire females. Generally speaking, segregation of

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[20] In practice, it is fixed at 1 U.S. dollar = 3.75 Saudi Arabian Riyals (SAR).

the sexes in public or social venues is yet another Arab cultural norm derived from Islamic tradition that may affect the acceptance of women in management. Therefore, the business world has traditionally been exclusively male in the Middle East (Robertson et al., 2001).

The education profile of the informants indicates that about 62% of the participants had a university degree and 17.8% were educated to postgraduate level. This could be explained by the changing of Saudi culture of late, in that many more young people than previously are achieving university qualifications to attain higher standards of living. With around 22% of the sample under 30, it is likely that this has influenced the high level of degree qualifications observed. Robertson et al. (2001) note that, in Saudi Arabia, senior executive positions are reserved for well-educated individuals. Moreover, the largest proportion of informants (33.7%) was those in the 30-39 years old category. This is consistent with Robertson et al. (2001), who reported on the distribution of respondents' age and found a strong "thirty-something" group in Saudi Arabia (71% between the ages of 30 and 39).

A majority of the informants (43%) gained their degree from Saudi Arabia, indicating that they had an understanding of Saudi business and customs. In fact, what almost everyone intuitively knows is that attitudes, norms, values and customs vary between countries and this has been strongly supported by empirical evidence in a growing body of the literature suggesting significant cultural differences between countries (Dedoussis, 2004). Hence, this has enhanced the reliability and the creditability of the data collected in the study.

7.3 E-commerce adoption in organisations

Numerous enterprises are striving to capture the potential of the Internet by adopting internet technologies such as e-commerce. In fact, it is obvious that e-commerce applications may be used in different ways by different firms with different features to support business activities. Hence, firms may differ in terms of their level of e-commerce technology adoption, varying from the very simple use of e-mail to more complex collaborative platforms that are used to deliver services to employees within the firm and also to its partners and customers.

This study focuses on three stages of e-commerce technology adoption in order to capture the reality and the variance in e-commerce engagement. In fact, through detailed review of innovation adoption literature and e-commerce research, the construct 'e-commerce adoption'

is introduced and conceptualized as the degree to which e-commerce applications are leveraged by a firm to support various business activities along a value chain.

E-commerce adoption was operationalized by asking respondents to specify the used e-commerce applications in order to have a comprehensive understanding of e-commerce engagement in a firm and to guide an organisation's e-commerce initiatives. Three different dimensions of e-commerce adoption were identified (i.e. non-interactive, interactive and stabilisation of e-commerce). In fact, the distinction between the three stages of e-commerce adoption helps to enable deep investigation of their different relationships with the antecedent or independent variables.

These three stages respectively reflect the evaluation, commitment and the full-scale deployment of e-commerce applications to support firm business activities. Such measurement of e-commerce adoption is consistent with Rogers' (1995) description of the innovation process, which starts with knowledge about the existence of the innovation and ends with a confirmation of the decision to adopt and put the innovation into use. Also, the measurement is consistent with the multi-level framework of web technology and e-commerce usage in prior empirical studies (Molla and Licker, 2005a, 2005b; Teo and Pian, 2004).

It is to be noted, however, that previous research on e-commerce considered the interactive stage of e-commerce as the beginning of the e-commerce adoption process and considered organisations that do not establish interactive adoption as non-adopters (Molla and Licker, 2005a, 2005b). Alternatively, this research sees that, at the most basic level, a company can become enabled for electronic commerce simply by adding communication over the Internet such as e-mail to its established forms of communication such as telephone, fax, or the postal service. In fact, this is consistent with the definition of e-commerce adopted in this research which refers to the use of an ICT-based network such as e-mail and websites to share business information, maintain business relationships, and conduct business transactions between stakeholders (Eastin, 2002; Mirchandani and Motwani, 2001; Zwass, 1996). Table 7.1 provides a summary of the various adoption levels of internet technologies identified in the academic literature and in the current study.

Table 7.1	Summary of organisational Internet technologies adoption level	
Source	**Study Object**	**Adoption level**
Zhu et al. (2006d)	E-business Adoption	1. Initiation ⬇ 2. Adoption ⬇ 3. Routinisation
Lin and Lee (2005)	E-business Adoption	1. Initiation ⬇ 2. Propagation ⬇ 3. Networking ⬇ 4. Business integration ⬇ 5. Business transformation
Molla and Licker (2005a, 2005b).	E-commerce Adoption	1. Initial adoption ⬇ 2. Institutionalization
Teo and Pian (2004)	Web adoption	1. Email Adoption ⬇ 2. Web presence ⬇ 3. Prospecting ⬇ 4. business integration ⬇ 5. business transformation

Source: current study

Finally, the analysis of the current study results shows that responding firms were different in their e-commerce levels. Figure 7.2 shows e-commerce technology adoption levels among surveyed companies. Around 63% of the surveyed companies adopted interactive, transactive or integrated web presence and only 36.6% of the firms in the study are non-interactive adopters of e-commerce technology.

Figure 7.2	B2B e-commerce adoption levels among Saudi Arabian firms

Business Benefits

Stabilisation

Interactive adoption

Non-interactive adoption

• **30.7%** of the firms in the study sample adopted online buying, selling and conduct most of their business activities electronically.

• **32.7%** of the surveyed companies established interactive web presence to interact with customers.

• **36.6%** of the surveyed companies claimed using e-mail and static web presence to provide information about the firm and its products and services.

Extent of organisational change and sophistication

Source: current study

7.4 Determinants of e-commerce adoption

Regarding the second research question about the antecedents of e-commerce adoption, literature on innovation adoption and e-commerce were relied upon. This study identified a set of critical and relevant variables based on the Tornatzky and Fleischer's (1990) model that are expected to influence the three levels of e-commerce adoption, represented by non-interactive adoption, interactive adoption and stabilisation of e-commerce. Founded on the TOE framework, the research model investigated in this study is shown in Figure 7.3.

Figure 7.3 — Proposed research model

E-commerce technology characteristics

- Relative Advantage
- Compatibility
- Adoption costs
- Security concern
- Language concern

Organisational context

- Information technology (IT) readiness
- Management team support
- Learning orientation
- Receptivity toward change
- Strategic orientation
- Decentralization level
- Formalisation level

Environmental context

- Customer pressure
- Trading partner pressure
- Competitive pressure
- Regulatory and legal environment
- National e-readiness
- Technology consultants' participation
- Economic downturn

E-commerce Adoption

- Non-interactive Adoption
- If Adopted
- Interactive Adoption
- If Adopted
- Stabilisation

To test the research hypotheses related to the e-commerce adoption, discriminant analysis was used to separately test each of the suggested hypotheses and to accept or reject each hypothesis formulated in the study. Table 7.2 summarises the hypotheses proposed in Chapter 4 and states whether they are supported by the data or not. In fact, according to results from this study, influential factors have different impacts on the three stages of e-commerce.

Based on the results shown from the discriminant analysis (Chapter 6, Tables 6.7, 6.9 and 6.11), 8 out of the 19 proposed research hypotheses that dealt with the non-interactive

adoption were empirically supported. Hypotheses $H_{1.1}$, $H_{2.1}$, $H_{3.1}$, $H_{4.1}$, $H_{5.1}$, $H_{9.1}$, $H_{11.1}$, $H_{12.1}$, $H_{13.1}$, $H_{15.1}$ and $H_{17.1}$ are rejected. Moreover, for the 19 proposed research hypotheses that dealt with interactive adoption, significant empirical support was provided for four hypotheses and 15 hypotheses were not supported. Finally, 12 out of 19 proposed research hypotheses that dealt with the stabilisation of e-commerce were empirically supported. Hypotheses $H_{2.3}$, $H_{4.3}$, $H_{5.3}$, $H_{9.3}$, $H_{11.3}$, $H_{15.3}$ and $H_{17.3}$ were rejected. Further discussions related to each hypothesis are provided below in subsections 7.4.1 to 7.4.3.

Independent variable	E-commerce Adoption		
	Non-interactive Adoption	**Interactive Adoption**	**Stabilisation**
E-commerce technology characteristics			
Relative advantage	$H_{1.1}(+)$ Not Supported	$H_{1.2}(+)$ Not Supported	$H_{1.3}(+)$**Supported**
Compatibility	$H_{2.1}(+)$Not Supported	$H_{2.2}(+)$ Not Supported	$H_{2.3}(+)$ Not Supported
Adoption cost	$H_{3.1}(-)$Not Supported	$H_{3.2}(-)$Not Supported	$H_{3.3}(-)$ **Supported**
Security concern	$H_{4.1}(-)$ Not Supported	$H_{4.2}(-)$ Not Supported	$H_{4.3}(-)$Not Supported
Language concern	$H_{5.1}(-)$ Not Supported	$H_{5.2}(-)$ Not Supported	$H_{5.3}(-)$Not Supported
Organisational context			
Information Technology (IT) readiness	$H_{6.1}(+)$**Supported**	$H_{6.2}(+)$**Supported**	$H_{6.3}(+)$**Supported**
Management team support	$H_{7.1}(+)$**Supported**	$H_{7.2}(+)$**Supported**	$H_{7.3}(+)$**Supported**
Learning orientation	$H_{8.1}(+)$**Supported**	$H_{8.2}(+)$ Not Supported	$H_{8.3}(+)$**Supported**
Receptivity toward change	$H_{9.1}(+)$ Not Supported	$H_{9.2}(+)$ Not Supported	$H_{9.3}(+)$ Not Supported
Strategic orientation	$H_{10.1}(+)$**Supported**	$H_{10.2}(+)$ Not Supported	$H_{10.3}(+)$ **Supported**
Decentralization level	$H_{11.1}(+)$ Not Supported	$H_{11.2}(+)$ Not Supported	$H_{11.3}(+)$ Not Supported
Formalisation level	$H_{12.1}(+)$ Not Supported	$H_{12.2}(+)$ Not Supported	$H_{12.3}(+)$ **Supported**
Environmental context			
Customer pressure	$H_{13.1}(+)$ Not Supported	$H_{13.2}(+)$ Not Supported	$H_{13.3}(+)$ **Supported**
Business partner pressure	$H_{14.1}(+)$ **Supported**	$H_{14.2}(+)$ Not Supported	$H_{14.3}(+)$ **Supported**
Competitive pressure	$H_{15.1}(+)$ Not Supported	$H_{15.2}(+)$ Not Supported	$H_{15.3}(+)$ Not Supported
Regulatory & legal environment	$H_{16.1}(+)$ **Supported**	$H_{16.2}(+)$ **Supported**	$H_{16.3}(+)$ **Supported**
National e-readiness	$H_{17.1}(+)$ Not Supported	$H_{17.2}(+)$ Not Supported	$H_{17.3}(+)$ Not Supported
Technology consultants' participation	$H_{18.1}(+)$ **Supported**	$H_{18.2}(+)$ **Supported**	$H_{18.3}(+)$ **Supported**
Economic downturn influence	$H_{19.1}(-)$ **Supported**	$H_{19.2}(-)$ Not Supported	$H_{19.3}(-)$ **Supported**

Table 7.2 Summary of research findings

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7.4.1 E-commerce technology characteristics

It is suggested that the following hypotheses relate technological characteristics to non-interactive adoption, interactive adoption and stabilisation of e-commerce; each hypothesis will be discussed below in subsections 7.4.1.1 to 7.4.1.5.

Hypotheses H $_{1.1,}$ H $_{1.2,}$ and H $_{1.3}$: Relative advantage contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{2.1}$, H $_{2.2}$ and H $_{2.3}$: Compatibility contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{3.1}$, H $_{3.2}$ and H $_{3.3}$: Adoption cost contributes significantly (and is negatively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{4.1}$, H $_{4.2}$, and H $_{4.3}$: Security concern contributes significantly (and is negatively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{5.1}$, H $_{5.2}$, and H $_{5.3}$: Language barrier contributes significantly (and is negatively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

7.4.1.1 Relative advantage

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Relative advantage	Non-interactive Adoption	H $_{1.1}$	0.239	0.107
	Interactive Adoption	H $_{1.2}$	0.096	0.587
	Stabilisation	H $_{1.3}$	**0.359**	0.021

As discussed in Chapter 3, several previous empirical studies have found that relative advantage is an important variable for determining the adoption of many innovations (Saunders, 2000; Tan and Teo, 2000; Taylor and Todd, 1995; Premkumar et al., 1994;

Grover, 1993; Tornatzky and Klein, 1982). In fact, the findings obtained in this study confirmed that perceived relative advantage has a significant positive influence (P<0.05) on the stabilisation stage of e-commerce adoption only, supporting hypothesis H $_{1.3}$. Of note is that Al-Qirim (2007) suggested the same result and observed that SMEs in New Zealand would be motivated to adopt externally oriented e-commerce technologies (i.e. extranet and Virtual Private Network (VPN) more than internal technologies (i.e. e-mail, Intranet) in order to increase their business efficiencies, communications with outside parties and competitiveness in the marketplace. Conversely, the findings in this study suggest that firms that were adopting the Internet and an interactive Web were not witnessing tangible and significant advantages from e-commerce technology. This result is consistent with Teo et al. (1998) who did not find a significant relationship between internet adoption and the relative advantage factor, which suggested that adopters were not witnessing significant advantages from the Internet.

In comparison to simple e-commerce applications such as the use of e-mail and a static Web, advanced e-commerce applications such as ECRM[21] and E-procurement[22] offer a number of advantages such as increased sales, improved customer services, reduced inventory and procurement costs, improved coordination with suppliers, and increased employee productivity. It is commonly believed that firms that perceive e-commerce as advantageous might be more likely to adopt and routinize the technology (Wu et al., 2003; Zhu et al., 2004; Levenburg, 2005; Zhu and Kraemer, 2005; Sanders, 2007). Moreover, this study confirmed that the scores for the non-interactive adoption (i.e. firms that used the Internet and had e-mail access or a static website presence) and the interactive adoption (i.e. firms that had established an interactive web presence) for relative advantage of e-commerce are significantly lower than those who established a transactive web presence and an integrated web status (i.e. stabilisation phase) (see Table 6.4 and Figure 6.8). This is in line with previous work on technology adoption and diffusion (Moore and Benbasat, 1991).

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[21] Electronic Customer Relation Management (ECRM) concerns all forms of managing relationships with customers making use of IT.

[22] Electronic procurement (E-procurement) is the electronic purchase and sale of supplies.

7.4.1.2 Compatibility

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Compatibility	Non-interactive Adoption	$H_{2.1}$	0.070	0.635
	Interactive Adoption	$H_{2.2}$	0.167	0.342
	Stabilisation	$H_{2.3}$	0.093	0.545

Compatibility was not found to be significant for all the three stages of e-commerce technology adoption, thereby rejecting hypotheses $H_{2.1}$, $H_{2.2}$ and $H_{2.3}$. Previous technological innovation literature and e-commerce research suggested the same result (Chong et al., 2009; Lin and Lin, 2008; Al-Qirim, 2007; Nelson and Shaw, 2003). A reason for this lack of significance in this study could be because e-commerce adopting firms may have already made requisite organisational changes, reducing the influence of organisational compatibility in distinguishing different levels of e-commerce diffusion. It is worth noting that this finding marked a difference between the adoption context of Saudi Arabian firms and other firms in countries of the world such as Singapore (Teo et al., 1998; Thong, 1999) and Holland (Walczuch et al., 2000) that found compatibility important to the adoption decision of innovations. This suggests that firms in Saudi Arabia viewed e-commerce as compatible with their business environment, existing values, practices and IT infrastructure.

7.4.1.3 Adoption cost

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Adoption cost	Non-interactive Adoption	$H_{3.1}$	-0.260	0.080
	Interactive Adoption	$H_{3.2}$	-0.065	0.710
	Stabilisation	$H_{3.3}$	**-0.448**	0.004

Adoption cost is not significantly related to non-interactive or interactive adoption of e-commerce, but there was an indication that adoption cost has a significant negative influence ($P < 0.01$) on the stabilisation of e-commerce; therefore, hypothesis $H_{3.3}$ was supported. This result is somewhat consistent with Al-Qirim (2007) and Walczuch et al. (2000) who found

that cost was an insignificant factor and did not influence the adoption in certain e-commerce technologies such as e-mail and Intranet or internal communication. Generally speaking, the adoption of an internet website clearly offers some potential cost savings, such as advertising and communication cost savings (Poon and Swatman, 1998). In fact, one might argue whether or not e-commerce adoption is such a large investment. It seems that the 'extra' costs involved (i.e. high telecommunication costs, cost of software development tools for integrated computer systems, cost of new computer equipment and high investments necessary) appear to be the primary obstacle for electronic trading, which is a step further than simply having Internet access. In fact, as these perceived costs rise, it is more likely that overall B2B e-commerce use will be lower (Claycomb et al., 2005). In addition, it was found that organisations that adopted non-interactive and interactive e-commerce scored significantly lower than organisations at the stabilisation stage of e-commerce technology on the adoption cost construct (Figure 6.8 and Table 6.4).

7.4.1.4 Security Concern

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Security Concern	Non-interactive Adoption	**H 4.1**	-0.255	0.086
	Interactive Adoption	**H 4.2**	-0.261	0.139
	Stabilisation	**H 4.3**	-0.148	0.336

Security concern was not found to be significant for non-interactive adoption, interactive adoption and stabilization of e-commerce, thereby rejecting hypotheses H $_{4.1}$, H $_{4.2}$ and H $_{4.3}$. The evidence from prior studies on the significance of security concern has been inconclusive. While Mpye et al. (2007) did not find it to be an important variable or significant barrier, others (e.g. Alam et al., 2007*;* Hoppe et al., 2001; Kendall et al., 2001a; Lawson et al., 2001) find it to be a critical variable for e-commerce success.

There could be many reasons for lack of significance in this study. First, it is believed that most web browsers and internet technologies utilise Secure Sockets Layer *(*SSL*)* technology and this prevents the content of the communications being monitored as they make their way across the Internet. Second, it is believed that the major issues in developing regions are the

insufficient regulatory environment, lack of human and technical resources that cause serious challenge when adopting new innovations like e-commerce that are new to an organisational setting (Molla and Licker, 2005a; Montealegre, 1998; King et al., 1994); in developed countries, however, the main issues are privacy and security (Lawson et al., 2001). For example, Lawson et al. (2001) find that a major barrier for encouraging SMEs in regional Australia to become involved in electronic business is the concern about security and privacy of online transactions. In summary, Saudi firms did not perceive security as a barrier to the adoption and utilisation of e-commerce technology.

7.4.1.5 Language concern

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Language concern	Non-interactive Adoption	**H $_{5.1}$**	-0.015	0.917
	Interactive Adoption	**H $_{5.2}$**	-0.076	0.664
	Stabilisation	**H $_{5.3}$**	-0.080	0.604

The results of testing hypothesesH $_{5.1}$, H $_{5.2}$ and H $_{5.1}$ indicate that there is an insignificant negative relationship ($P > 0.1$) between the language concern and the adoption of e-commerce in private firms in Saudi Arabia. Moreover, discriminant analysis shows the language concern factor having correlation coefficients below 0.3. This suggests that the English language concern is not a barrier to the adoption and utilisation of e-commerce technology. This is in line with the findings of recent studies (Alam, 2009; Al-Shohaib et al., 2009) that suggested that English language concern is not an important factor that inhibits the adoption of the Internet and e-commerce in organisations in countries that use English as a second language. In fact, during the last four years many websites have appeared in different languages including Arabic. Indeed, this may have downplayed this factor. Therefore, managers of Saudi Arabian firms are facing no hardship with the English language used in most of the information obtained from the Internet. Moreover, it is worth noting that since the majority of the informants in this study's sample (80%) hold Bachelor's and Master's degrees (see Table 6.1), their command of English is thus sufficient for them to understand and use the web.

7.4.2 Factors related to organisational context

It is suggested that the following hypotheses relate organisational factors to non-interactive adoption, interactive adoption and stabilisation of e-commerce; each hypothesis will be discussed below in subsections 7.4.2.1 to 7.4.2.7.

Hypotheses H $_{6.1}$, H $_{6.2}$, H $_{6.3}$: Information technology readiness contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{7.1}$, H $_{7.2}$, H $_{7.3}$: Management team support contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{8.1}$, H $_{8.2}$, H $_{8.3}$: Organisational learning orientation contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{9.1}$, H $_{9.2}$, H $_{9.3}$: Receptivity toward change contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{10.1}$, H $_{10.3}$, H $_{10.3}$: Strategic orientation contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{11.1}$, H $_{11.2}$, H $_{11.3}$: Decentralization of organisations contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{12.1}$, H $_{12.2}$, H $_{12.3}$: Formalization of organisations contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

7.4.2.1 Information Technology (IT) readiness

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
IT readiness	Non-interactive Adoption	**H** $_{6.1}$	**0.410**	0.006
	Interactive Adoption	**H** $_{6.2}$	**0.369**	0.037
	Stabilisation	**H** $_{6.3}$	**0.314**	0.042

As defined in Chapter 4, IT readiness in this study referred to the technology infrastructure and employees' IT knowledge. Technology infrastructure (or technological resources) refers to hardware, operating systems and software resources (Byrd and Turner, 2001), while employees' IT knowledge or skills refer to IT professionals possessing the knowledge and skills to use and implement internet-related applications effectively (Huang et al., 2006; Zhu and Kraemer, 2005). Theoretically, it has been argued that firms' technological readiness and employees' IT knowledge are among the most important organisational characteristics affecting innovation adoption (Wang and Shi, 2009; Tian and Bao, 20007; Scupola, 2003; Harrison et al., 1997; Iacovou et al., 1995; Cragg and King, 1993). Therefore, it is expected that firms with a higher level of IT infrastructure, IT human resource and system integration are expected to have technological and managerial resources and skills to adopt and assimilate e-commerce more intensively and pervasively.

The findings obtained from this study are consistent with the above assumption. Moreover, the analysis results in this research demonstrate that IT readiness can positively impact the non-interactive adoption, interactive adoption and stabilisation of e-commerce. E-commerce is a complex organisational innovation which implies innovative use of the Internet and related technologies to enable business activities.

Despite IT readiness being found to have positive effects on the three stages of e-commerce adoption, the effects are different across the three dimensions. Results here show that the impact of IT readiness on non-interactive adoption (correlation coefficients = 0.410; p = 0.006) is relatively stronger than that on interactive adoption (correlation coefficient = 0.369; p = 0.037) and stabilisation of e-commerce (correlation coefficient = 0.314; p = 0.042).

This finding is consistent with Massetti's (1996) argument that fewer resources are required to increase breadth of EDI usage (number of EDI partners) compared with increasing diversity (the number of different transaction sets). Once e-commerce applications have been implemented to support specific value chain activities (e.g. procurement), technological resources become less critical for enhancing the transaction volume completed via online operation. It is understandable that when a company considers increasing the percentage of online selling or online procurement, IT resources may not be much of a critical concern compared to other internal factors. However, e-commerce applications in enabling diverse value chain activities may rely on technological support more substantially. Information and work flows across various functional applications require integrating disparate legacy systems and reducing incompatibility between existing IS applications. Without these facilitations, information and data communication across business processes or departmental units cannot be possible or are, at least, poorly effective. Thus, IT readiness, including tangible resources, intangible skills, and system integration are especially important to enable e-commerce applications supporting various business activities.

7.4.2.2 Management team support

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Management team support	Non-interactive Adoption	$H_{7.1}$	**0.442**	0.003
	Interactive Adoption	$H_{7.2}$	**0.328**	0.064
	Stabilisation	$H_{7.3}$	**0.426**	0.006

According to the analysis results, management team support has significant positive effects on the non-interactive adoption, interactive adoption and stabilisation of e-commerce technology. Therefore, hypotheses $H_{7.1}$, $H_{7.2}$ and $H_{7.3}$ are supported. As discussed earlier, top management's vision and commitment is essential in encouraging the adoption of new technologies (Agarwal et al., 1997). Moreover, intensive e-commerce applications require that top managers continuously provide commitment and support to facilitate e-commerce projects and to overcome the resistance to change that is normal in such situations (Chatterjee et al., 2002).

This is consistent with findings from previous innovation adoption studies (Wang and Shi, 2009; Lee and Kim, 2007; Tian and Bao, 2007; Raymond et al., 2005; Poon and Swatman, 1999; Delone, 1988). Importantly, another finding here is that management team support is more important in the early phase (i.e. non-interactive adoption) and advanced phase (i.e. stabilisation) of the e-commerce adoption process. Management team support had high, positive correlation coefficients with the discriminant function (i.e. discriminant loading) in the non-interactive adoption and stabilisation phases (0.442 and 0.426 respectively).

Discriminant loading is the correlation between predictor variable and the extracted discriminant function. In fact, management team support becomes more important for the stabilisation of e-commerce since this involves interaction with trading partners and creating business agreements for using the technology. The use of these technologies could significantly change the way business is done within the organisation as well as externally with its trading partners. Moreover, it is believed that these two stages are more challenging for top managers to promote and facilitate e-commerce initiatives in order to enhance the performance of the whole company. Moreover, once an organisation moves to adopt interactive e-commerce systems, the commitment of its managers, especially those at the top, appears to drive how far and how fast it moves up the maturity ladder of e-commerce. This is in line with previous research on technology adoption and diffusion (Molla and Licker, 2005a, 2005b).

In summary, the findings on the significance of management team support in e-commerce adoption extend the cumulative knowledge of the role of top managers in innovation adoption to the e-commerce context. That is, in a context associated with complex innovation, such as e-commerce, the power and influence of top managers remain substantial and necessary for diffusing and routinizing innovation within the company boundary.

7.4.2.3 Learning orientation

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Learning orientation	Non-interactive Adoption	H $_{8.1}$	**0.326**	0.029
	Interactive Adoption	H $_{8.2}$	0.222	0.208
	Stabilisation	H $_{8.3}$	**0.331**	0.032

It was discussed in Chapter 3 that the importance of organisational learning orientation as a facilitator that influences e-commerce adoption and implementation has seldom been addressed. Lin and Lee's (2005) empirical study found significant association between organisational learning and the level of e-commerce technology adoption. A learning orientation construct was included in the research model for this study to evaluate a company's ability to develop a spirit of learning and sharing that could offer new products and services through e-commerce technology.

The findings of this study suggest that learning orientation has a significant positive influence on the non-interactive and stabilisation stages of e-commerce technology adoption, supporting hypotheses H $_{8.1}$ and H $_{8.3}$. Conversely, learning is not significantly related to interactive adoption of e-commerce.

This finding is somewhat similar to findings from previous innovation adoption studies (Lin and Lee, 2005; Fichman and Kemerer, 1997; Rogers, 1995; Attewell, 1992). It is found that, when an organisation decides to adopt new technology such as e-commerce, learning and information sharing among organisational members becomes essential in order to make an adoption decision, gain some understanding of how to use the new technology effectively and to reduce fears and resistance related to the use of the new technology (Robey et al., 2000; Rogers, 1995). Moreover, achievement of the first stages allows the organisation to gain experience to move on to the next stage in which familiarity with related technology obtained through time greatly reduces the effort required to interpret and understand how to use the new technology and thus increases the likelihood of the adoption. Related technology is a key factor driving the adoption decision. Finally, after utilising and implementing the technology, organisations' concerns will focus around how to integrate the logistics of a particular

innovation into their daily activities. In fact, organisational learning becomes essential because the new technology is embodied in organisational routines, practices, and beliefs.

The implementation of complex new technology such as e-commerce becomes effective only through gradual, careful, and sustained assimilation processes that provide organisations with tacit knowledge and the managerial skills necessary to implement the technology efficiently (Zhu et al, 2006c). Moreover, the implementation process requires both individual and organisational learning because the new systems are so multi-faceted, with interactions occurring between subsystems, that it is impossible to know how they will perform.

Individual learning involves the distillation of an individual's experiences regarding a technology into understandings that may be viewed as personal skills and knowledge. Normally, this knowledge is not essential for using an innovation, but would be required if the adopter has to troubleshoot or improve the existing innovation (Rogers, 1995). In summary, successful adoption of complex technology requires adjustments in business practices and procedures; it also requires that the firm modifies and masters the technical aspects of the technology (Attewell, 1992).

7.4.2.4 Receptivity toward change

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Receptivity toward change	Non-interactive Adoption	H $_{9.1}$	0.257	0.084
	Interactive Adoption	H $_{9.2}$	0.176	0.317
	Stabilisation	H $_{9.3}$	0.278	0.072

As defined in Chapter 4, receptivity toward change is defined as organisational members' proclivity, willingness, and inclination to engage in innovative behaviour and adopt ideas that depart from the usual or old way of approaching business (Menguc and Auh, 2006). Receptiveness of organisations to change has been found to be a significant factor for achieving success in technical innovations (Rymound, 2001; Fichman and Kemerer, 1997; Grover et al., 1997; Damanpour, 1991; Zmud, 1984; Leonard-Barton and Deschamps, 1988).

Contrary to the above assumption, the findings of this study suggest that receptivity toward change is not significantly ($P > 0.1$) related to e-commerce adoption and, therefore, hypotheses $H_{9.1}$, $H_{9.2}$ and $H_{9.3}$ are rejected. This finding is consistent with Taalikka (2004), who suggests that organisational openness toward new technologies does not have any effect on the adoption of corporate websites among Finnish medium-sized companies. However, Taalikka (2004) found that management's own open attitudes increase the level of organisational openness.

It can be argued that a possible reason for this finding could be that an organisation's willingness and ability to respond to the new technologies would be more important in the intra-organisational diffusion process where multiple individuals are the final adopters of innovations (Taalikka, 2004). Moreover, it is widely acknowledged that change strategies in developing countries' organisations are inevitably ambiguous because of the need to ensure agreement among diverse parties, the uncertainty in the organisation's technology and environment, the multiple perspectives of different individuals and groups, and the lack of information that characterizes DC contexts (Montealegre, 1998).

7.4.2.5 Strategic orientation

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Strategic orientation	Non-interactive Adoption	$H_{10.1}$	**0.327**	0.028
	Interactive Adoption	$H_{10.2}$	0.173	0.326
	Stabilisation	$H_{10.3}$	**0.426**	0.006

The strategic orientation of the enterprise has been cited by Auger et al. (2003) and Lefebvre et al. (1996) as an organisational factor that influences the adoption of e-commerce. Consistent with the above assumption, the findings of this study suggest that strategic orientation has a significant positive influence on the non-interactive and stabilisation stages of e-commerce technology adoption; therefore, hypotheses $H_{10.1}$ and $H_{10.3}$ are supported. In fact, firms' external environment, such as competition, may first drive firms to initiate and adopt innovations to maintain a competitive edge (Tian and Bao, 20007). Indeed, e-

commerce applications can help firms improve market responsiveness and information transparency, increase operational efficiencies (Zhu and Kraemer, 2005), and achieve customer lock-in (Shapiro and Varian, 1999). These initiatives are critical for firms to maintain their competitive edge (Zhu and Kraemer, 2005).

Consequently, firms with a well-developed strategic rationale in regards to new markets, products and technologies are found to assimilate and routinise e-commerce more extensively for purposes of communication or information, and transaction or collaboration with business partners. On the other hand, firms in which the competitive strategy is based on developing new markets or on maintaining market share by improving their products and services through new technologies would first look to e-communication in order to better promote the firm, its products and services, and to communicate with existing customers more efficiently (Raymond et al., 2005).

7.4.2.6 Decentralization level

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Decentralization level	Non-interactive Adoption	$H_{11.1}$	0.155	0.294
	Interactive Adoption	$H_{11.2}$	0.254	0.149
	Stabilisation	$H_{11.3}$	-0.043	0.782

Mohamed (2002) defined decentralization as the degree to which decision-making power is distributed or shared in an organisation. Hypotheses $H_{11.1}$, $H_{11.2}$, and $H_{11.3}$, which stated that decentralised power contributes significantly and is positively related to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce, were not supported.

The lack of significant relationship in the findings support prior work reporting that not all aspects of organisational structure equally explain innovation (Depietro et al., 1990; Zaltman et al., 1973) and that decentralisation is the least important structural variable associated with innovation (Iyer et al., 2004; Sapolsky, 1967). Sapolsky's (1967) study of innovation in department stores found that decentralised authority and decision-making structures frustrate attempts to implement the innovations.

In fact, it is believed that when authority and structure are diverse, it becomes difficult for the organisation to gather enough influence over participants. Also, with authority and power more diffused among organisational members, more conflict and opposition to the innovation are likely to occur because participants may perceive that the innovation could reduce the amount of influence they currently have. The more decentralised the decision process, the greater the opportunity for different groups and individuals to express disagreement (Corwin, 1969).

It is to be noted that the findings about the influence of decentralisation may be due to a failure to recognize the effect of culture differences on the adoption and diffusion of technological innovations. Straub et al. (1997) and Hofstede (1984) reported that there is an accepted inequality of power in the Arab world and cultural factors might affect an organisation's ability to adopt and utilize IT. In addition, the employees have a stronger dependence need on their bosses. To summarize, it is believed that organisations that centralize decision making tend to evaluate and adopt more e-commerce technologies.

7.4.2.7 Formalisation level

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Formalisation level	Non-interactive Adoption	$H_{12.1}$	0.185	0.211
	Interactive Adoption	$H_{12.2}$	0.030	0.863
	Stabilisation	$H_{12.3}$	**0.341**	0.028

By formalization is meant the emphasis placed within the organisation on following specific rules and procedures in performing one's job (Zaltman et al., 1973). There was an indication that formalisation has significant positive influence ($P < 0.05$) on the stabilisation of e-commerce, supporting hypothesis $H_{12.3}$. In other words, greater formalisation in organisations does influence the stabilisation of technology.

On the other hand, formalisation is not significantly related to non-interactive or interactive adoption of e-commerce. This is in line with the findings of previous research (Zaltman et al., 1973; Shepard, 1967) which suggested that organisational formalisation had opposing

influences on the innovation process in which formalisation is found to be more appropriate and helpful during the implementation stage but not at the initiation and adoption phase (Zaltman et al., 1973). The rationale for this is that adoption is a creative activity (that is, thinking about new things and making a creative decision), while implementation is a process of making that choice part of a bureaucratic routine (Depietro et al., 1990).

During the initiation and adoption stage, the organisation needs to be as flexible and as open as possible to new sources of information and alternative courses of action. Many rules and procedures might become restraints under which the organisation must operate. On the other hand, it is believed that, during the implementation stage, a singleness of purpose is required to bring the innovation into practice (Zaltman et al., 1973; Shepard, 1967). Moreover, formalised procedures are found to help in reducing conflict of opinions and interests associated with the uncoupling processes inherent in implementation and, more importantly, provide both information and specific techniques that facilitate the organisational personnel's ability to utilize the innovation (Saran et al., 2009; Zaltman et al., 1973).

In fact, Zaltman et al. (1973: 141) observe that:

> *The lack of these more-formalised procedures at the implementation stage is likely to lead to both role conflict and role ambiguity. Role ambiguity could result because without more formal procedures the individual is likely to be unclear concerning how the technology is to be implemented and how this new technology will affect how he/she performs his/her job. Role conflict could also occur, because the lack of specific procedures concerning how the technology will be implemented may lead to conflict with existing rules and procedures.*

In summary, formalization reduces the potential ambiguity surrounding e-commerce stabilisation. Therefore, the greater the formalization in the organisation, the greater the stabilization of B2B e-commerce.

7.4.3 Factors related to environmental context

It is suggested that the following hypotheses relate environmental factors to non-interactive adoption, interactive adoption and stabilisation of e-commerce. Each hypothesis will be discussed below in subsections 7.4.3.1 to 7.4.3.9:

Hypotheses H $_{13.1}$, H $_{13.2}$, and H $_{13.3}$: Customers' pressure contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{14.1}$, H $_{14.2}$, and H $_{14.3}$: Trading partner pressure contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{15.1}$, H $_{15.2}$ and H $_{15.3}$: Competitive pressure contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and the stabilisation of e-commerce.

Hypotheses H $_{16.1}$, H $_{16.2}$, and H $_{16.3}$: The existence of regulatory environment contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.

Hypotheses H $_{17.1}$, H $_{17.2}$, and H $_{17.3}$: National e-readiness contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.

Hypotheses H $_{18.1}$, H $_{18.2}$ and H $_{18.3}$: Technology consultants' participation contributes significantly (and is positively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.

Hypotheses H $_{19.1}$, H $_{19.2}$, and H $_{19.3}$: Economic downtown contributes significantly (and is negatively related) to the non-interactive adoption, interactive adoption and stabilisation of e-commerce.

7.4.3.1 Customer pressure

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Customer pressure	Non-interactive Adoption	**H 13.1**	0.254	2.087
	Interactive Adoption	**H 13.2**	0.109	0.537
	Stabilisation	**H 13.3**	**0.363**	0.019

Customer pressure was not significantly related to non-interactive or interactive adoption of e-commerce, but there was an indication that customer pressure has a significant positive influence ($P < 0.01$) on the stabilisation of e-commerce; therefore, hypothesis H $_{3.3}$ was supported. The support for H $_{3.3}$ was expected as Grandon and Pearson (2003) and Scupola (2003) have stated that customer pressure influences the adaptation and evolution of existing approaches to e-commerce development. In summary, higher levels of customer readiness are environmental stimulators at the stabilisation stage of e-commerce adoption.

7.4.3.2 Trading partner pressure

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Trading partner pressure	Non-interactive Adoption	**H 14.1**	**0.330**	0.027
	Interactive Adoption	**H 14.2**	0.240	0.173
	Stabilisation	**H 14.3**	**0.330**	0.033

The digital revolution combined with the availability of network infrastructure has made it technically feasible and a socially acceptable business practice to use e-commerce for business communication (Premkumar and Roberts, 1999). Business partner pressure has significant and positive influence on non-interactive adoption ($p < 0.05$) and stabilisation ($p < 0.05$). Thus, Hypotheses H $_{14.1}$ and H $_{14.3}$ were supported. Yet, the effect of a trading partner on the interactive adoption was not significant. This finding is similar to findings from previous innovation adoption studies (Molla and Licker, 2005a, 2005b; Iacovou et al., 1995). In fact, the extent of e-commerce use by business partners can create a critical mass of e-commerce adopters and motivate more sophisticated e-commerce applications because of

either perceived benefits (i.e. direct online access and network benefits) or fear of market displacement (Au and Kaufman, 2001; Tarafdar and Vaidya, 2004; Premkumar and Roberts; 1999; Grover, 1993). This shows that firms in developing countries that are linked to universal supply chains or parent-subsidiary firms are most likely to spearhead e-commerce adoption as their international suppliers and clients may insist that their suppliers use e-commerce to coordinate supply chains and to realize the full benefits of e-commerce (Molla and Licker, 2005a, 2005b; Grover, 1993). In fact, the lack of trading partner readiness is believed to inhibit e-commerce adoption.

7.4.3.3 Competitive pressure

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Competitive pressure	Non-interactive Adoption	H $_{15.1}$	0.133	0.370
	Interactive Adoption	H $_{15.2}$	0.063	0.719
	Stabilisation	H $_{15.3}$	0.182	0.237

The hypothesised impacts of competitive pressure on e-commerce non-interactive adoption, interactive adoption and stabilisation were not supported, thereby suggesting that competition is not necessarily good for e-commerce adoption and it may be less likely to influence organisational behaviours. This is in line with the findings of previous studies (Wang and Shi, 2009; Martins and Oliveira, 2008; Thong, 1999) that suggested that innovation adoption in a firm is found to be more likely affected by technological and organisational factors, rather than external pressure from a competitor. Also, Zhu et al. (2006c) observe that competition is not good for technology assimilation because it drives firms to chase the latest technologies without infusing existing applications. In fact, this result challenges the conventional wisdom about competition and innovation diffusion (Kamien and Schwartz, 1982; Williamson, 1983).

7.4.3.4 Regulatory and legal environment

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Regulatory and legal environment	Non-interactive Adoption	H $_{16.1}$	**0.532**	0.000
	Interactive Adoption	H $_{16.2}$	**0.336**	0.037
	Stabilisation	H $_{16.3}$	**0.556**	0.000

A group of survey studies showed that the regulatory environment was significantly important in determining e-commerce adoption in developing countries and newly industrialized economies (Zhu et al., 2006c; Gibbs and Kraemer, 2004; Xu et al., 2004; Dasgupta et al., 1999). In fact, countries adopting new technology must have appropriate government policies and regulations to enhance transactional integrity in online markets, thus encouraging private investment in the new medium. Such policies include issues such as intellectual property, consumer protection laws, dispute resolution law and compliance (Zhu and Kraemer, 2005; Dewan and Kraemer, 2000; Oxley and Yeung, 2001; Kraemer et al., 1994; Dedrick et al., 1995).

The findings obtained from this study are consistent with the above assumption. Moreover, regulatory and legal environment has a significant positive effect on the three stages of e-commerce adoption. Moreover, results here show that the impact of regulatory and legal environment on the stabilisation of e-commerce (correlation coefficients = 0.556; p = 0.000) is relatively stronger than that on interactive adoption (correlation coefficient = 0.336; p = 0.037). This finding is consistent with Molla and Licker's (2005a, 2005b) argument that government support is one of the other factors that emerge as discriminating among the three levels of institutionalisation of e-commerce (interactive, transactive, and integrated). It is also in sync with the literature on IT and e-commerce in developing countries, which emphasizes the role of government in facilitating IT and e-commerce diffusion (Montealegre, 1998).

In fact, the open nature of the Internet brings with it many issues including uncertainty, lack of transparency, and fraud and credit card misuse, which in turn pose unique demands on regulatory support, which are different from other internet technologies such as EDI.

7.4.3.5 National e-readiness

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
National e-readiness	Non-interactive Adoption	**H $_{17.1}$**	0.231	0.10
	Interactive Adoption	**H $_{17.2}$**	0.133	0.448
	Stabilisation	**H $_{17.3}$**	0.294	0.058

As discussed in Chapter 3, national e-readiness refers to systems and resources that support the development of e-commerce such as the physical infrastructure (high bandwidth, reliability, and affordable prices), transportation infrastructure, banking infrastructure and skilled workforce (Peng and Kurnia, 2008; Bui et al., 2003; CID, 2002). The existence and reliability of national e-readiness is widely believed to be critical to the development and utilisation of e-commerce (Gibbs et al. 2003; Humphrey et al., 2003; Jiang and Prater, 2002; Travica, 2002; Chvaja et al., 2001). In countries with good technological support and a sound infrastructure, adoption is more marked (Tan and Teo, 2000).

The findings of this study suggest that national e-readiness is not significantly (P > 0.1) related to non-interactive, interactive and stabilisation of e-commerce and, therefore, hypotheses H $_{17.1}$, H $_{17.2}$, and H $_{17.3}$ are rejected. This finding is consistent with the findings reported by Oxley and Yeung (2001) who indicated that although the most salient obstacle to the development of e-commerce in many countries is the lack of necessary physical infrastructure - particularly household access to personal computers and cost-effective telecommunications system, it is important to look beyond these proximate indicators to examine how the institutional environment in a country, particularly with respect to the 'rule of law', contributes to (or undermines) confidence in a new technology such as e-commerce and supports the development of and investments in a new medium. Moreover, Molla and Licker (2005a, 2005b) note that e-commerce is influenced more by organisational readiness than external e-readiness. In fact, organisational capabilities, resources and management commitment have a very strong effect on a firm's decision to adopt innovative business models that can work even within such constraints (Molla and Licker, 2005a, 2005b). Moreover, as discussed in Chapter 2 (see also Table 2.5), the relatively better position of Saudi Arabia in terms of ICT enhancements and availability of support-giving industries such

as banks and chambers of commerce may explain the insignificant contribution of national e-readiness and may have influenced this result. This cautions future researchers not to paint with one brush all developing countries in general and developing Arab nations in particular and to consider the deep differences between them.

7.4.3.6 Technology consultants' participation

Antecedent	E-commerce Adoption	H	Discriminant Loading	Sig
Technology consultants' participation	Non-interactive Adoption	$H_{18.1}$	**0.773**	0.000
	Interactive Adoption	$H_{18.2}$	**0.704**	0.000
	Stabilisation	$H_{18.3}$	**0.566**	0.000

The role and expertise of technology consultants are particularly relevant for organisations adopting innovations, such as e-commerce. Consulting opportunities arise due to the clients' desire to undertake change within their organisation and their realization that it requires external help to do this. There are several reasons that could make management realize the need for change, including extrinsic reasons such as alterations in competition, market, regulations and technology, and intrinsic reasons such as changing stakeholder and management expectations, and redefined vision and role of the company (Tushar, 2004).

According to the analysis results, technology consultants' participation was found to be significant for all the three levels of e-commerce and, therefore, hypotheses $H_{18.1}$, $H_{18.2}$, and $H_{18.3}$ are supported. This is consistent with findings from previous innovation adoption studies (MacGregor and Vrazalic, 2006a; Thong, 1999; Thong et al., 1996).

It is to be noted that, as discussed earlier, compatibility was not found to be significant, and Saudi firms seem to perceive e-commerce to be compatible and simple because they may have received the required technology support from technology consultant and vendors. In addition, interesting insights may be obtained by comparing the magnitude of the effects of different antecedents on e-commerce adoption. For example, technology consultants' participation has stronger influence on non-interactive adoption, interactive adoption and stabilisation of e-commerce than management team support does (Table 7.3, next page). This

implies that the role of technology consultants' participation is relatively more important than management team support in enhancing e-commerce adoption. It might be explained that compared to management team support, the extent to which a company engages in e-commerce projects is still substantively reliant on the availability of technological resources and related skills. In fact, technology consultants can help organisations to increase their self-confidence by providing additional training and support to supplement missing skills and expertise.

Table 7.3	Results of the impact of management team support and technology consultant's participation on the three stages of e-commerce adoption			
E-commerce Adoption	**Management team support**		**Technology consultant's participation**	
	Discriminant Loading	**P**	**Discriminant Loading**	**P**
Non-interactive	0.442	0.003	0.773	0.000
Interactive	0.328	0.064	0.704	0.000
Stabilisation	0.426	0.006	0.566	0.000

7.4.3.7 Economic downturn

Antecedent	**E-commerce Adoption**	**H**	**Discriminant Loading**	**Sig**
Economic downturn	Non-interactive Adoption	$H_{19.1}$	**-0.324**	0.029
	Interactive Adoption	$H_{19.2}$	-0.236	0.180
	Stabilisation	$H_{19.3}$	**-0.319**	0.039

The recent global economic downturn has added additional downward pressure on new technology adoption in which senior executives in many businesses have had to cut back on innovation and ICT spending. This study shows that when firms face a strong economic downturn, they tend to reject adoption and investment in e-commerce technology. Economic downturn was significantly related to the non-interactive adoption and stabilisation of e-commerce. Hence, hypotheses $H_{19.1}$ and $H_{19.3}$ are supported. Yet, its effect on the preliminary stage (interactive adoption) is surprisingly different.

This finding is consistent with the conventional wisdom that investments in innovation seem to occur more in businesses that have been doing well in terms of profits rather than in businesses in financial crisis (Lynch, 2007). Moreover, it is believed that the economic condition of a country is a major determinant of its ability to support e-commerce adoption and diffusion in its businesses (Peng and Kurnia, 2008). It is worth noting that the insignificant negative relationship between economic downturn and interactive adoption seems to suggest that world crisis positively impacts and influences these firms to use technological innovation to fight the recession and deal with the changes they have experienced. Moreover, firms seem to focus on their websites and social computing to increase customer responsiveness and to stay closer to their customers.

7.5 Chapter summary

This chapter discussed and reflected upon the findings from a theoretical perspective. Moreover, this chapter discussed the results in order to address the research questions and to verify the research model. The next chapter (Chapter 8) will conclude this dissertation and a summary of the findings, discussions on research contribution, limitations of the study and implications for future research directions will be initially presented in the next - and last - chapter (Chapter 8) of this dissertation.

Chapter Eight: Conclusions

Figure 8.1:	Overview of chapter eight

8.1 Introduction

↓

8.2 Summary of the research

↓

8.3 Major findings of the research

↓

8.4 Research contributions and implications

↓

8.5 Study limitations

↓

8.6 Future research directions

↓

8.7 Chapter summary
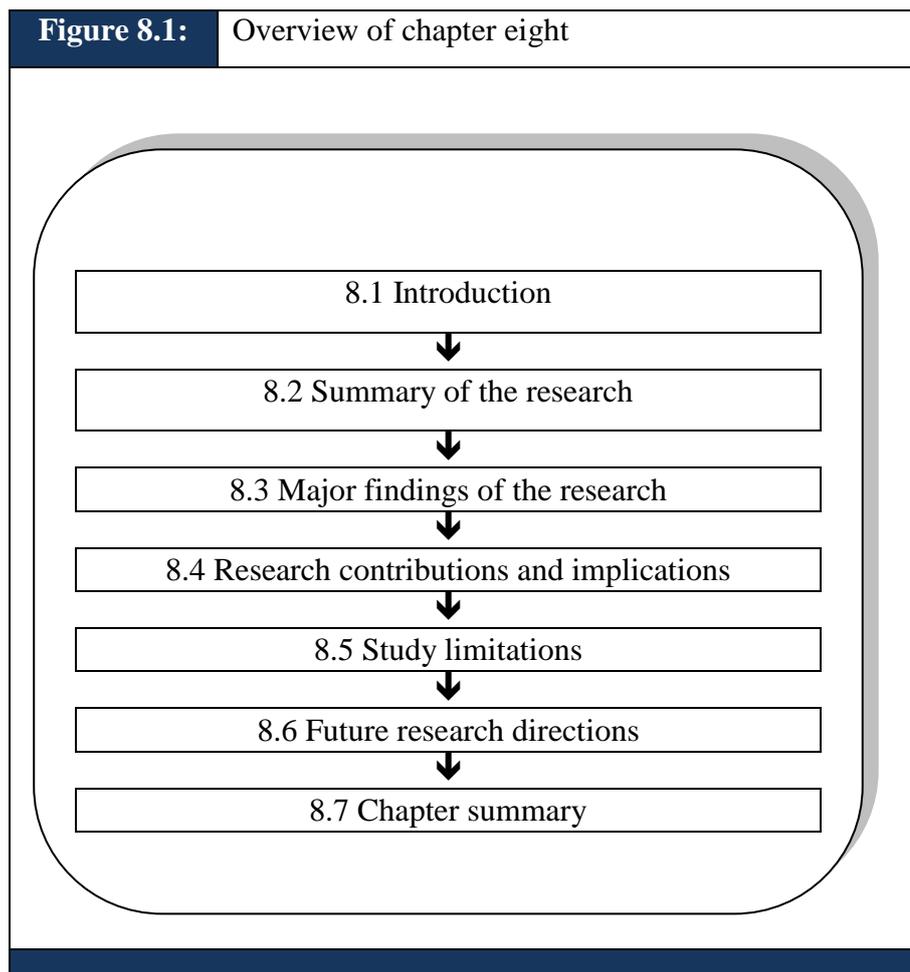
8.1 Introduction

This final chapter provides a conclusion to the results, presents key theoretical and practical implications that can be drawn from this study, considers the limitations of the work, and presents future research directions. Figure 8.1 (previous page) portrays the organisation of the chapter.

The chapter is divided into seven sections. Section 8.2 summarises the work done in each chapter in this thesis and provides an overview of the research. This is followed in Section 8.3 by an identification of the major findings drawn from the research. Then, Section 8.4 highlights the main contributions and practical implications of the research. The conceptual and methodological limitations of the research are stated in Section 8.5. Suggestions for future research and development are provided in Section 8.6. Finally, a summary of the chapter is provided in Section 8.7.

8.2 Summary of the research

This section summarises the work done in each chapter and briefly comments on the conclusions drawn. This will aid in identifying the major findings of the research.

The first chapter defined the research problem and put into perspective the motivations for conducting the research and its practical and theoretical relevance - that is, the debate regarding why the current subject is worth studying was raised. The discussion showed that given the worldwide growth of e-commerce as a result of internet adoption, the slow uptake of e-commerce practices by Saudi Arabian companies in the private sector was the motivation for the research. In addition, the literature analysis indicated that numerous attempts have been made to study the factors impacting e-commerce adoption but that existing research has frequently attempted to examine the topic of the adoption stage of the diffusion process; most also tended to be conceptual rather than empirical in nature. Therefore, this study adds to the existing literature by investigating the dynamics of the factors that influence the e-commerce adoption process in order to offer some indication of the more critical variables that affect each stage of the e-commerce adoption process directly, and also to improve understanding of the process of successful e-commerce technology adoption. Attention was drawn to the dearth of e-commerce research in developing

economies in the Arab world. The introductory chapter also looked at the objectives for carrying out the study and provided an outline of how the research is organised in making its contribution to the literature.

Chapter 2 attempted to provide a background to Saudi Arabia in terms of its location, demographic profile, economy, business organisations and ICT development. Moreover, Chapter 2 discussed the emergence of e-commerce technology as an opportunity for business organisations; the definition, benefits and challenges of e-commerce technology were also presented. It is to be noted that e-commerce is viewed in this study as an outcome of various antecedents or determinants. Chapter 2 also provided the reader with a review and assessment of e-commerce phenomenon in developing economies in general, and in developing Arab world and Gulf countries in particular. Finally, the chapter ended by providing an overview of the e-commerce situation in Saudi Arabia

The third chapter gave a review and an assessment of previous research on organisational adoption of IS innovations. It first reviewed the most popular theories and models used at the organisational level of technological innovation adoption and diffusion research. These theories provided this research study with a number of underlying constructs or factors that were considered to be guiding frameworks for current research. Moreover, Chapter 3 provided discussions and definitions of the chosen constructs. Initially, organisational innovation was defined as bringing new technologies or capabilities into use, and adoption was conceptualised as the generation, development and implementation of new technology (Damanpour, 1991). It should be pointed out that e-commerce was chosen due to its importance and relevance for the current competitive business environment. Chapter 3 then provided the reader with a review of organisational technology adoption research; the chapter also discussed and justified the reason for selecting the research variables that were expected to predict organisational e-commerce adoption. The literature review identified particular organisational, technological and environmental variables which could promote or hinder the adoption process in an organisational setting.

Chapter 4 built on the theoretical foundation developed in Chapter 3. Its accomplishment led to achieving the first objective of this research, which was 'to develop a conceptual model that can be used to study organisations' adoption of e-commerce technology'. Chapter 4 started by illustrating the proposed theoretical framework adopted in this study and various

hypotheses regarding the proposed relationship of the stated constructs were discussed and developed in light of relevant literature. The study proposed fifty-seven sub-hypotheses of the various relationships.

Hypotheses were developed based on the argument that e-commerce adoption is a complex developmental process in which organisations follow a relatively stable and predictable pattern of development through three successive and cumulative stages: non-interactive adoption, interactive adoption and stabilisation of e-commerce, in which the achievement of the first stages of development allows the organisation to gain experience to move on to the next stage of development. Consistent with the TOE framework, three critical sets of factors were hypothesised to influence the three stages of e-commerce technology adoption, namely: (1) innovation characteristics or e-commerce-specific factors, which are related to the nature of the application and its impact (relative advantage, compatibility, adoption costs, security concern and language concern), (2) organisational factors, which are related to the resources, processes, and structure of the focal enterprise (organisational information technology (IT) readiness, organisational management team support, organisational learning orientation, organisational receptivity to change, organisational strategic orientation, organisational decentralisation level, and organisational formalisation level), and (3) environmental factors (customer pressure, trading partner pressure, competitive pressure, regulatory and legal environment, national e-readiness, technology consultants' participation and economic downturn), which lay outside the boundaries of the focal enterprise factors that influence or hinder the prospecting and stabilisation of e-commerce as a technological innovation.

Chapter 5 covered issues related to the research methodology and scale development used in this study. The research design consisted of two approaches, exploratory and descriptive. The goal of the exploratory study was to gain insights about the research problem, identify the key issues and determine whether other possible factors not covered in previous research exist in the context under investigation, while the descriptive study aimed to verify and test the hypotheses and to allow the generalisation of the results. The data for the former method were collected by means of semi-structured interviews, while a mail survey was chosen for the descriptive method. In fact, the survey approach is considered one of the best possible choices of research instrument when attempting to collect detailed information and meaningful data on populations too large to observe directly; compared to other data

collection techniques, it also requires less labour and resource intensity (Nachmias and Nachmias, 2008; Babbie, 1998).

The population for this study comes from Saudi Arabian manufacturing and service companies from the private sector who were drawn from the Saudi Chamber of Commerce and Industry directory for private organisations. The private sector was selected to be the target population as many of the government-owned companies are going through different stages of privatization and the Saudi government wants to move beyond exports of oil to increase employment opportunities, diversify its income base and become an economic heavy weight. Systematic sampling was done, where 306 questionnaires were hand delivered to the most senior manager of the firm, such as the managing director, general manager or senior manager. The final usable sample consisted of 202 responses, making a response rate of 44.9%.

The issues relating to the data analysis were then discussed in detail, and it was concluded that various forms of statistical analysis, such as medians, frequency counts, factor analysis, t-test, first order correlation and discriminant analysis, were appropriate to be utilised for the data analysis purposes of the research. Moreover, the original data was screened for missing data, normality and multicollinearity. The instrument testing stage was divided into two stages: the pre and pilot tests. The pre-test stage was conducted in the Arabic language using 25 respondents from the sample frame. The purpose of the pre-test was to obtain feedback from the respondents on the instrument and to further enhance the wording of items which would improve the content validity. On the other hand, the purpose of the pilot test was to confirm the reliability of the items. The data obtained from the pilot study was examined for reliability and results demonstrated an acceptable level of reliability for all the constructs. The final questionnaire was more easily read, had a better flow of questions, avoided leading or ambiguous questions and, more importantly, respondents did not have any difficulty in understanding and answering the questions. This shows the importance of performing a content validation to increase the reliability of scale and also the representativeness of the items.

Chapter 5 also presented the findings that illustrate the reliability test and construct validity. It was explained how the measures of all the constructs were subjected to a scale development and validation procedure, as suggested by Churchill (1979) and Gerbing and

Anderson (1988), which consists of an assessment of scale reliability, unidimensionality and convergent validity. The reliability test confirmed that each item measuring the same dimension demonstrates an acceptable level of internal reliability ranging between 0.569 and 0.945. Construct validity was established utilising Principal Component Analysis (PCA) with varimax rotation Kaiser normalization. In order to assess the overall measurement fit and to purify the scale, three PCA analyses were performed, capturing the 19 independent variables shown in the conceptual model. Results of the PCA provided evidence of higher KMO values (greater than 0.8), a significant probability of Bartlett's test of sphericity, extraction of nineteen components consistent with the number of independent factors in the conceptual model (all nineteen factors possessed eigenvalues above 1), factors loaded above 0.40 which is the minimum recommended value in IS research (Straub et al, 2004). This confirmed that convergent validity exists in the survey instrument. Finally, a test of discriminant validity was also conducted on the constructs using the Multitrait-Multimethod Matrix (MTMM). The MTMM matrix (Appendix D) suggests good discriminant criterion.

In Chapter 6, the details of the statistical procedures used to analyse data and the results of the hypothesis testing were presented. The research hypotheses were analysed using multiple discriminant function analysis (MDFA). MDFA was adopted because it is an appropriate technique when the dependent variable is categorical. Three separate discriminant models were generated for three groups of e-commerce adoption - non-interactive adoption (N = 74), interactive adoption (N = 66) and stabilisation (N = 62) - in order to present the factors that influence or hinder e-commerce in each group. Moreover, independent variables that were likely to influence adoption of e-commerce were grouped together as e-commerce technology characteristics, organisational context and environmental context. The results of the discriminant function(s) showed that the overall research model was useful for predicting the extent of e-commerce adoption and that the several factors are significant in differentiating between the three groups but not to the same level of significance. For example, for the non-interactive adoption of e-commerce, the factors that were most significant were IT readiness, management team support, learning orientation, strategic orientation, trading partner pressure, regulatory and legal environment, technology consultants' participation, and economic downturn. Meanwhile, IT readiness, management team support, regulatory and legal environment and technology consultants' participation are identified as significant and positive contributors to interactive e-commerce adoption. The results showed that the factors that were most significant in e-commerce stabilisation are: relative advantage, adoption cost,

IT readiness, management team support, learning orientation, strategic orientation, formalization level, customer pressure, trading partner pressure, regulatory and legal environment, technology consultants' participation, and economic downtown. Finally, accomplishment of Chapters 5 and Chapter 6 led to the achievement of the second objective of this research, which was 'to operationalise the dependent and independent variables included in the conceptual model by developing a research instrument and demonstrating their reliability and validity'

Chapter 7 addressed the results of the study and elaborated on their implications. The discussion was organised based on the hypothesised relationships and previous studies were highlighted in providing the rationales and support. The chapter first provided a brief recap of surveyed companies' profiles. Among the firms making up the population sample were those from sectors such as food and beverages, building materials and construction, health and pharmaceuticals, financial services, and electrical equipment and engineering. Moreover, the majority of the firms sampled (70.8%) had been established for more than 10 years, which means that these firms are well established with their own business strategy and organisational traits. The discussion revealed that the findings supported the assumption made in Chapter 4 that the effects of different factors may vary depending on the stage of adoption, in which factors that influence early adopters of a particular innovation may differ significantly from those that impact late adopters. It is possible to conclude from the discussion that firms that adopt non-interactive e-commerce, interactive commerce or institutionalise or stabilise e-commerce differ significantly in terms of the attributes of e-commerce technology, organisational characteristics, and environment determinants. In fact, some factors exert one effect on the early stages of adoption (non-interactive and interactive adoption) but a different effect on the later stage (stabilisation). Completion of Chapter 7 led to achieving the third objective of this research, which was 'to empirically validate the conceptual model that is proposed to examine e-commerce adoption among Saudi Arabian businesses'.

Finally, implications, contributions, and suggestions for future research will be presented later in this chapter (chapter 8) which will lead to achieving the fourth objective of this research, which was 'to provide valuable guidelines to policy makers, technology vendors and practitioners in implementing and accelerating e-commerce development and utilisation

among firms in the private sector'. Table 8.1 presents the objectives of this study together with the evidence of how they were met.

Table 8.1	Objectives of the study and their achievement	
Objectives of the study		**Achievement**
1. To develop a conceptual model that can be used to study organisations' adoption of e-commerce technology.		Chapter 4
2. To operationalise the dependent and independent variables included in the conceptual model by developing a research instrument and demonstrating their reliability and validity.		Chapters 5 and 6
3. To empirically validate the conceptual model that is proposed to examine e-commerce adoption among Saudi Arabian businesses.		Chapter 7
4. To provide valuable guidelines to policy makers, technology vendors and practitioners in implementing and accelerating e-commerce development and utilisation among firms in the private sector.		Chapter 8 (section 8.4)

8.3 Major findings of the research

The TOE framework and DOI were proposed to examine the adoption of e-commerce in the private organisations in Saudi Arabia. Compared to other IT, e-commerce is considered a more complex developmental process and has multi-faceted impacts on firms. Therefore, a model of e-commerce adoption for organisations in developing countries was proposed to explain this complex phenomenon. The model combines three main variable categories that can influence the adoption of IT innovations in organisations, namely, technological or e-commerce-specific characteristics, organisational characteristics, and environmental characteristics. These were empirically tested against the dependant variables - the non-interactive adoption, interactive adoption and stabilisation of e-commerce.

The findings indicate that the model is sufficiently valid to discriminate non-interactive adopters of e-commerce from interactive adopters of e-commerce as well as the degree of stabilisation of e-commerce. As illustrated in Figure 8.2, the empirical evidence supported the idea that the considerable variability between non-interactive adopters, interactive adopters and stabilisation of e-commerce was due to significantly different technological,

organisational and environmental determinants. For example, (1) some factors influenced all stages of e-commerce adoption (i.e. IT readiness, management team support, regulatory and legal environment, technology consultants' participation), (2) some factors influenced early stages of e-commerce adoption and later stages (i.e. learning orientation, strategic orientation, business partner pressure), and (3) some factors constrained later processes only (i.e. adoption cost).

Figure 8.2   Determinants of e-commerce adoption
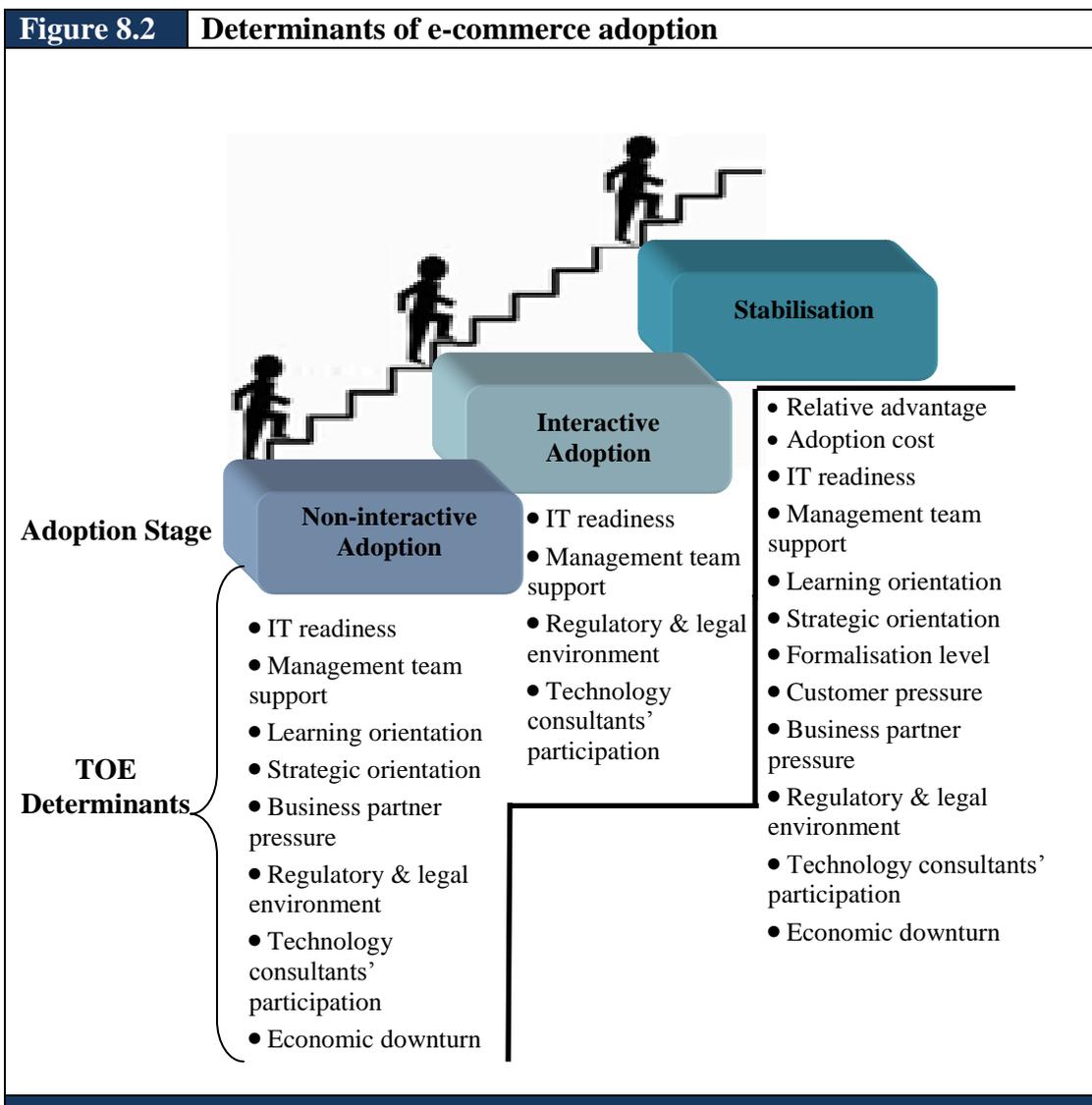
Source: current study

As can be seen from Figure 8.2, four organisational factors (IT readiness, management team support, learning orientation and strategic orientation) and four environmental factors (business partner pressure, regulatory and legal environment, technology consultants' participation and economic downturn) turn out to be a contributing factor for non-interactive

e-commerce adoption. Moreover, at the interactive adoption stage of e-commerce, two organisational factors (IT readiness and management team support) and two environmental factors (regulatory environment and technology consultants' participation) have significant effect on the interactive adoption of e-commerce. All factors related to e-commerce technology characteristics (relative advantage, compatibility, adoption cost, security concern and language concern), and most of the organisational and environmental variables (learning orientation, receptivity toward change, strategic orientation, decentralization level, formalisation level, customer pressure, business partner pressure, competitive pressure and economic downturn) do not appear to have any significant effect on the interactive adoption of e-commerce. Finally, as organisations adopt more sophisticated e-commerce practices, relative advantage and adoption cost are found to affect organisational e-commerce adoption. Moreover, the maturity level of e-commerce adoption is affected by organisational factors (especially IT readiness, management team support, learning orientation, strategic orientation and formalisation), together with environmental factors related to external pressure from customers and trading partners.

From previous research it would appear that most of the variables that were insignificant are empirically studied in relation to single stage such as 'adoption decision'. However, while favourable results were observed, and also given the exploratory nature of the current study, further empirical work is clearly needed to validate and increase the reliability of the presented findings. It is hoped that future research will enrich knowledge of e-commerce adoption and implementation by looking at other determinants beyond the research variables in this study.

Insights gained from the investigation suggest that, as organisations adopt and utilise more sophisticated e-commerce practices, cost stands as a major barrier to e-commerce technology. However, benefits realised from e-commerce adoption motivate organisations to utilise more e-commerce practices. Benefits of e-commerce adoption include improved customer service, lower marketing and distribution costs, increased market reach and reduced operation costs.

Drawing from the previous discussion, it seems that changes in organisational routines and procedures to use e-commerce may be more important in the stabilisation and institutionalisation of e-commerce. Moreover, the study found that e-commerce adoption in organisations does not depend on the general receptivity toward change held by the

organisation's members. However, supportive management and resourceful organisations in terms of human and technological resources are found to encourage innovation adoption. Management of the organisation is a key influencer on the duration of the adoption process of a particular innovation and the managerial favourable attitudes toward change naturally influence and lead to an internal climate conducive toward the innovation. Organisational members tend to conform to the expectations of top management, and they are more likely to accept an innovation that they perceive to be backed by the management of their organisation. Moreover, it appears that successful companies that embrace IT and internet technologies such as e-commerce are often the ones where top management takes the role of innovation champion of the e-commerce adoption. In addition, such champions will have a reasonable level of knowledge and understanding regarding the specific technology.

Organisational learning is necessary to maintain a high level of innovation. Further, to encourage initiation and institutionalisation of new technology, organisational resources might best be utilised by incorporating incentives for innovation into reward systems, by opening information channels through which organisational members on their own can learn about new methods, and by encouraging greater professionalism among software and IT personnel (Zmud, 1982). Indeed, learning that allows a greater degree of autonomy is associated with higher levels of IT use. Overall, the study supports the work of Attewell (1992) and Brancheau and Wetherbe (1990), who conclude that people will not simply use new technology because it is there, or because they develop a positive attitude towards it. Without using effective intervention strategies and offering suitable learning opportunities, it is difficult to ascertain whether and to what extent organisational members will use the innovation (Takey El-Din, 2005). Moreover, organisational members will increasingly need to offer time for the learning of new technological skills in order to remain in business.

It seems that, without the necessary physical infrastructure - particularly access to personal computers and effective telecommunications systems at a reasonable cost - organisations are unable to migrate from traditional commerce to e-commerce. However, the results of this study show that the presence of an adequate infrastructure is not a sufficient condition for the development of e-commerce in a developing country. Moreover, the study finds that the institutional environment, particularly with respect to the 'rule of law', contributes significantly and supports the development of and investments in e-commerce technologies in developing countries. Arguably, even with access to the necessary equipment, organisations

will not become active e-commerce participants unless they have reasonable confidence in the integrity of transactions undertaken online. Only in a supportive legal environment can participants in e-commerce transactions have confidence of satisfactory performance. It is to be noted that Saudi Arabia has a relatively advanced ICT infrastructure and sufficient industries that support e-commerce practices such as banks and ISPs.

Finally, the study suggests that the new technology adoption is likely to be facilitated by technology consultants' participation and involvement. In fact, technology consultants and vendors can help organisations develop the capability to solve their problems and achieve a rewarding implementation experience by providing end-user training, advocating the innovative use of e-commerce, preparing the firm to be more receptive to change and transforming business.

8.4 Research contributions and implications

This research presents one of the initial efforts towards gaining an understanding of the adoption and diffusion of e-commerce technology in organisations in developing Arab economies in general, and in Saudi Arabia in particular. Also, this study is one of the very few empirical investigations that address the issue of adoption and diffusion of e-commerce at the organisational level, which is beyond the individual level adoption of e-commerce.

This study fills a gap in innovation research in developing economies and attempts to quantify in an area where research on e-commerce adoption by Arabian firms is very limited (Alrawi and Sabry, 2009; Yasin and Yavas, 2007; Rose and Straub, 1998). The following statement shows the importance of conducting a study that investigates the adoption of e-commerce at organisational level in the developing Arab countries context:

> *…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: 69).

It is expected that the quantitative and qualitative nature of this study will provide a better understanding of the issue under investigation. As a result, the study provides new insight

into the adoption process of complex technologies such as e-commerce. In fact, this study not only builds upon the technology–organisation–environment (TOE) framework developed by Tornatzky and Fleischer (1990), it also extends it by incorporating e-commerce-specific constructs that represent unique characteristics of e-commerce such as security concern and language and content related barriers.

In sum, findings from this study helped in obtaining an extensive understanding of adoption and diffusion from the perspective of organisations, and empirically examined the factors that discriminate the adoption decision between e-commerce non-interactive adopters, interactive adopters and the stabilisation of e-commerce at the organisational level. This study brings about several theoretical contributions with a number of implications for both practice and policy. These contributions and implications are discussed below.

8.4.1 Theoretical contributions

First and foremost, the major contribution of this study to innovation adoption literature is its extending of innovation adoption and information systems (IS) literature to the context of e-commerce in order to enrich knowledge and understanding of the innovation adoption process in this era of rapid development of new technologies. This study evaluates the applicability of different theories and concepts of organisational innovation adoption and diffusion which were developed for Western developed countries to understand issues in the context of developing countries in the East. The study then utilises findings from previous research to develop a 'big picture' of the technology adoption research conducted in the area of innovation adoption and IS research. Consequently, this study contributes to the literature by proposing a comprehensive conceptual framework by integrating factors from different theoretical perspectives in order to provide a holistic view of the facilitators and inhibitors of e-commerce technology across the different stages in the adoption process from an organisation's perspective. It also provides an understanding of the complex interaction of process and context in successful adoption.

The second theoretical offering of this study is that the determinants considered are related to alternative theoretical perspectives. For instance, it sheds some light on the role of 'receptivity towards change' (a concept drawn from change management theories) and 'learning orientation' (a concept drawn from organisational learning theories) of the firm on

e-commerce adoption, and it determines the importance of these factors in explaining firms' innovative behaviour. Generally, few studies (i.e. Lin and Lee, 2005; Wu et al., 2003) have considered the effects of important factors such as strategic orientation, learning orientation and receptivity towards change, which are perceived as advantages of organisations.

Third, an added strength of this research is that, unlike other related studies on e-commerce adoption (i.e. Lertwongsatien and Wongpinunwatana, 2003; Mirchandani and Motwani, 2001), the current work recognises e-commerce as a complex phenomenon consisting of multiple dimensions The study investigated three levels of the use and management of e-commerce, comprising non-interactive adoption, interactive adoption and the stabilisation of e-commerce, in order to illustrate and conceptualise organisational maturity and to support and facilitate business activities, processes, and operations.

The conceptualization of e-commerce adoption in this research is modified by recognizing the uniqueness of e-commerce from other IT innovations. In fact, by this conceptualisation of the dependent variable, this study answers the call by Klein and Sorra (1996) to focus on multilevel frameworks to capture the innovation adoption phenomena in order to understand the adoption of innovations by organisations. In fact, process and stage research models are valuable in identifying the context in which events occur and show the casual linkages and relationships among context and processes. Rogers (1983) advocates developing such dynamic models to "capture the complex, over-time nature of the innovation process in organisations … [which] permits greater insight in tracing the nature of the innovation process" (Rogers, 1983: 361, 358). Through this sequence of stages, the firm redefines/restructures both the technology and organisational processes, clarifies its members' understanding of the innovation and the firms' goal for adopting it, and routinizes the innovation by making it part of an everyday practice context (Gallivan, 2001).

In sumary, investigation of e-commerce adoption processes and opportunities can provide insights into their impacts. Thus, insightful findings from this research can complement previously accumulated knowledge regarding specific e-commerce applications.

Fourth, previous studies on innovation adoption in general have primarily taken an organisational theory perspective and have explored the "visible" organisational determinants of innovation adoption or have focused on the effect of the external environment on

innovation (Saleh and Wang, 1993; Damanpour, 1991, 1988). In fact, this study adopts a broad perspective on e-commerce and answers the call by Zwass (2003) who suggests that e-commerce needs to be understood in its entirety and, more importantly, research agendas need to address the all-important issues that condition the organisational deployment of innovation opportunities. In fact, such a general perspective on e-commerce research is more significant in capturing the complex nature of e-commerce on firms. Consequently, this research contributes to the existing literature on organisational innovation adoption by examining the effects of three key elements on the following distinct dimensions of e-commerce - non-interactive adoption, interactive adoption, and stabilisation. These three elements are 1) technology characteristics (relative advantage, compatibility, adoption cost, security concern and language concern), 2) organisational factors (IT readiness, management team support, learning orientation, receptivity toward change, strategic orientation, decentralization level, and formalisation level) and 3) environmental determinants (customer pressure, business partner pressure, competitive pressure, regulatory and legal environment, national e-readiness, technology consultants' participation and economic downturn).

The examination of the effects of the aforementioned antecedents on e-commerce non-interactive adoption, interactive adoption and stabilisation strengthens the work of this study compared to existing studies in the literature (Lertwongsatien and Wongpinunwatana, 2003; Mirchandani and Motwani, 2001), and manifests an insightful effort through its profound investigation of the complexity of e-commerce adoption. It is to be noted that this is study did not intend to pick and choose from a list of factors that have been empirically tested and validated to have influenced the adoption of innovations. Instead, this study commenced with an initial qualitative research design which led to the exploration of seven firms to develop a preliminary understanding and to discover the most critical factors that should be included within the conceptual framework before running the questionnaire survey.

Fifth, findings from this research study support the claim that the different stages or dimensions of innovation adoption are affected by influential factors with different magnitude. Prior research in IS suggests that antecedents may have a different, and sometimes opposite, impact across different stages of innovation (Waarts et al., 2002; Cooper and Zmud, 1990; Damanpour, 1988). Moreover, the effects of several antecedents on different aspects of innovation adoption have been studied in this study.

The data collected from Saudi manufacturing and service companies in this research show that companies vary in adopting e-commerce innovation in which the three dimensions - non-interactive adoption, interactive adoption and stabilisation - of e-commerce are not only different levels of e-commerce adoption, but also have different determinants. For example, the analysis demonstrates that (1) in considering the non-interactive adoption of e-commerce, IT readiness, management team support, learning orientation, strategic orientation, pressure from business partner, regulatory and legal environment, technology consultants' participation and economic downturn are the most important drivers, (2) when e-commerce interactive adoption is investigated, IT readiness, management team support, regulatory environment and technology consultants' participation emerge as the strongest factor, and (3) pressure from customers may not have much effect on the non-interactive adoption of e-commerce by companies, but does significantly influence the stabilisation of e-commerce adoption by firms.

In fact, the recognition of innovation as a phenomenon consisting of a multiple dimension responds to the weakness of previous research in treating innovation as a single dimension (Cooper, 1994). In general, the distinction between non-interactive, interactive and stabilisation of e-commerce indicates that there are different aspects or patterns of how companies diffuse and implement e-commerce applications. This suggests that researchers investigating e-commerce phenomenon should contemplate the potential effects of such complexity.

Finally, the study makes a substantial contribution towards the research methodology by establishing, modifying, and validating measures that correspond to various constructs included in the conceptual model. For example, the conceptualization of e-commerce adoption as three different dimensions - non-interactive, interactive and assimilation - offers an example of a multi-dimensional innovation adoption framework. In fact, based on previous innovation adoption frameworks such as EDI adoption in IS adoption literature, distinct dimensions of e-commerce adoption are identified and a multi-phase model of e-commerce adoption is developed. In general, the research instrument developed and validated in this research can be utilised to examine various emerging technologies such as mobile commerce and web 2.0 from organisations' perspective.

8.4.2 Research implications

Given the importance of widespread adoption for the success of e-commerce and the slower than expected growth of e-commerce among Saudi Arabian firms, there is a great need for more understanding of what factors are important in the adoption of e-commerce. Theoretically grounded in a technology-organisation-environment framework, this study represents an early attempt to examine these factors. Moreover, findings of this research have a number of important implications that may assist managers, technology consultants and software vendors, and government and policy makers to facilitate organisational adoption of e-commerce. These implications are discussed below.

8.4.2.1 Implications for managers

The management implications of firms' e-commerce adoption are worth elaborating on. In fact, findings from this study have important implications for managers who are involved in efforts to introduce complex Type III innovations such as e-commerce into their organisations or are interested in expanding their e-commerce applications and generating more revenue. Indeed, this study sought to help firms become more successful in moving from a traditional commerce to electronic commerce by identifying the profile of early and sustained e-commerce adopters.

Empirical findings from this study demonstrate the importance of management roles in developing countries on the entire diffusion process. In fact, without the commitment and the support of top managers, e-commerce will not be adopted and implemented.

Top management support is imperative for enhancing the extent of e-commerce adoption. Management teams should commit continuous support to e-commerce initiatives by dedicating a high level of resources to foster a greater use of the technology. First, top managers should exert their significant influence on organisational members in terms of the promise and importance of conducting e-commerce. Undoubtedly, if senior managers are motivated to innovate and/or have favourable attitudes toward the innovation, there is likely to be a positive attitude to implement the technology, and resources will be allocated for its acquisition and alteration. In fact, senior managers can express their belief and participation via various types of support mechanisms, such as steering committees, working groups, and

training activities and programmes. Second, senior managers should recognise that exploiting the full potential of e-commerce will require them to go beyond initial financial investment. They must provide more technical and organisational support to promote a favourable environment to infuse e-commerce and reduce uncertainties around technical and organisational changes.

Findings from the study also suggest that IT readiness influences e-commerce penetration and pervasion in a firm. Both financial and organisational resources are of great importance in the adoption of these advanced technologies. This suggests that companies with high level technological resources, including tangible and intangible ones, may be more likely to expand the scope and magnitude of the applications of e-commerce technologies. Therefore, managers involved in e-commerce projects for their firms must pay great attention to their information technology readiness and develop strategies to evaluate the availability of existing IT resources. In developing and implementing IS strategy, the more important concern is to ensure alignment between e-commerce applications and existing IT resources.

8.4.2.2 Implications for technology consultants and software vendors

This study also points to important practical implications for technology consultants and software vendors. Firstly, the study has identified the profile of organisations that are more likely to adopt e-commerce technologies. Organisations that fail at diffusing an innovation may become influential negative opinion leaders (Leonard-Barton, 1988). Vendors and mediating institutions should, therefore, be more focused on identifying appropriate role models, learn about the specific problems these organisations face, understand organisational characteristics, take a more proactive role to promote successful diffusion in these organisations and, more importantly, target those segments whose characteristics indicate that they are likely to become e-commerce adopters. Consequently, understanding factors impacting organisations' adoption of e-commerce technologies will enable technology consultants to design strategies for the widespread adoption of e-commerce.

Secondly, the take-up of new IS innovations is sometimes delayed because decision makers are unaware of the potential benefits of adopting these in the short term as well as in the long term. Generally, lack of awareness of the potential benefits of e-commerce technology can hinder its growth. The study found that relative advantage was an important factor

influencing the stabilisation and institutionalisation of e-commerce. On the other hand, early adopters were found to be unaware of the benefits of e-commerce technologies. Therefore, it is essential for technology consultants and vendors to educate firms about the potential benefits of e-commerce by developing a training strategy that actively communicates the benefits of e-commerce through promotional seminars, workshops, presentations and on-site visits. This would protect firms against any adverse developments, and will provide a supportive business environment. It is believed that training sessions offered by vendors should have a crucial role in the learning process and should be concerned with building an image of the strategic benefits of the e-commerce.

Finally, technology consultants can help organisations to evaluate the resources needed for successful e-commerce adoption, offer ways to help organisations to understand the prerequisites for launching their online presence and also offer some incentives dedicated to potential e-commerce adopters, such as developing an interactive website. Furthermore, technology consultants and vendors can increase the e-commerce rate of adoption among organisations by offering trial periods before full implementation of e-commerce. This would create awareness and demonstrate what e-commerce can do for an organisation. In summary, technology consultants and software vendors should understand that each stage in the innovation adoption process is a potential rejection point (Zaltman et al., 1973). For example, it is possible to reject an innovation at the initiation stage by simply forgetting about it after gaining adequate knowledge because unsatisfactory outcomes were achieved.

8.4.2.3 Implications for government and policy makers

The study finds that regulatory environment is an important factor that influences the tendency of organisations to adopt e-commerce. E-commerce adoption requires the existence of appropriate government policies and regulations. Such policies include promotion of computer use among organisations, endorsement of low taxes and tariffs on computer imports, consumer privacy, conflicts of international law, and intellectual property protection. Indeed, government support is a critical factor in fostering e-commerce and has an important role in overcoming these concerns and challenges.

For government bodies or others whose task is to support business and promote e-commerce adoption in firms, one implication would be to assist organisations in identifying and

incorporating e-commerce technology in the business process which would improve the competitiveness of organisations in the new digital economy. This would also imply finding appropriate ways to identify and transmit the required knowledge to the decision makers of these firms.

E-commerce growth and development could involve government reviewing its policies and incentives in promoting the adoption of technology in the manufacturing and service sectors. As mentioned earlier in Chapter 2, the Saudi government has taken various measures to refine and enhance business processes and to transform Saudi Arabia into a digital society. In fact, the research model will help maximize the potential benefits of the Saudi government's ICT implementation effort by providing an understanding of the factors that influence the adoption and implementation of internet technologies such as e-commerce. This will lead to more acceptable internet technologies to enhance firms' capabilities and better choices for ICT.

It is to be noted that, the Saudi private sector plays a critical role in creating employment opportunities and the government aims to increase Saudi employment in the private sector by 7.2 percent per year. In fact, the study suggests that e-commerce can be seen as an opportunity to increase female employment in the private sector. It is worth noting that women in Saudi Arabia mainly work in public sector jobs which do not involve mixing with men, such as teaching and administrating girls' schools. In fact, the social and cultural barriers against female interaction with men seem to stall any effort to increase female participation rates in Saudi Arabia. However, segregation of the sexes in public or social venues is yet another Arab cultural norm derived from Islamic tradition that may affect the acceptance of women in, for example, management jobs. Therefore, the business world has traditionally been exclusively male in the Middle East. In general, there are a lot of constraints and costs imposed on employers in relation to logistical issues such as creating female only working places, special entrances and other separation arrangements, making it harder to hire females. Therefore, e-commerce can be seen as a chance to enable females to work from home in jobs such as customer support over the Internet and in online marketing.

Taking all the above into account, it can be argued that the contributions of this research are important for organisations, technology consultants, vendors and policy makers. Therefore, this research is viewed as being relevant to the current era of rapid developments of e-

commerce technologies. Finally, the above discussion on contributions and implications of this research has led to the achievement of the fourth, and final, objective of this research, which was 'to provide valuable guidelines to policy makers, technology vendors and practitioners in implementing and accelerating e-commerce development and utilisation among firms in the private sector'.

8.5 Study limitations

In this research, effort has been made to develop a comprehensive research framework, employ reliable and valid measures of study variables, and analyse the data using robust and powerful statistical techniques. Further, a research design has been chosen that maximizes the generalizability or transferability of research findings. However, as with any study of this nature, it is wise to recognise and understand all of the limitations of the work. The areas of these limitations will now be discussed in turn.

First, this study only examines e-commerce adoption at a specific time and in fact the use of a cross-sectional survey design does not allow the interpretation of causal inferences between constructs. It is important to stress the exploratory nature of this study, and that causality may not be drawn in this kind of study. A longitudinal study would be preferable. In fact, diffusion of innovation is a socialization process that occurs over time in which member attitudes toward the desirability of various behaviours are developed over time (Zmud, 1982; Ouchi, 1979). Therefore, there is no way to avoid including time when diffusion is studied. However, such research project requires much financial investment and human effort. This deemed impossible for this research study. In addition, longitudinal studies tend to be somewhat weak in capturing a large sample. Also, it was planned to have in-depth interviews to get more detail on certain issues related to e-commerce practices with some of the respondents; however, responding organisations denied access.

Second, each respondent represents a firm, and self-reported measures were used to assess all of the constructs in the questionnaire. The data collected from key informants of each firm makes this study subject to certain drawbacks. Innovation adoption scholars criticize the appropriateness of self-reported measures of innovation usage. Devaraj and Kohli (2003) argue that self-reported measures of innovation usage have several limitations and might not be an appropriate surrogate for actual usage because of subjects' lack of information,

attention lapses, and bounded rationality. Nevertheless, this practice is common in IS research and only replications can validate the measures used in the study findings. This issue raises questions about the threat of biased responses due to social desirability. This threat, however, is not believed to be a serious concern for this study because of the respondents' lack of knowledge of the objective of the study. The second concern might arise from the use of a single respondent where the study utilizes a key decision maker who provides relevant information as the representative of the decision-making unit in an organisation. It is assumed that these managers are involved with the strategic activities of the companies, have had a particular experience they can elaborate upon, and are credible sources of information about an organisation's functions, activities and operating environment. Multiple respondents from each firm are more favourable for such research. However, access would have been difficult, and probably would have resulted in a smaller usable sample size from organisations. Therefore, the single respondent approach was adopted

Third, some items in the research survey may differ in wording from those employed for measuring essentially the same constructs by other researchers. In fact, some items in the questionnaire were revised to ensure they were valid for use within the context of e-commerce adoption in Saudi Arabia. Therefore, for future empirical research that employs these constructs, it is advisable to use the original source of reference (Table 5.3).

Fourth, it is to be noted that although the three-item factor for the language concern construct had a low reliability (0.569), it was retained as none of the three items exhibited low item-total correlation (Tan et al., 2007) (see Table 1.E, Appendix E). In addition, research suggests that alpha values as low as 0.50 are acceptable for early stages of research or in exploratory research (O'Leary-Kelly and Vokurka, 1998; Nunnally, 1967). In fact, the low value could be attributed to using only three items for measuring the variable in which it is believed that alpha values are sensitive to the number of items used for measuring a construct (Premkumar and Roberts, 1999). A particularly interesting avenue for future research, both from a practical and theoretical point of view, seems to be the development of a solid measurement scale that captures the language concern factor. In fact, this study was focused upon utilising a quantitative approach that may have limited the ability of this research when attempting to obtain an in-depth view of e-commerce adoption among businesses. However, due to the time and resources there was a constraint such that it was not possible to conduct both qualitative

and quantitative research to develop measures that address language and content related barriers.

Finally, the study was limited to the city of Jeddah (the most cosmopolitan city in the western region of Saudi Arabia). In fact, more research is needed to validate the results obtained so far for e-commerce adoption determinants, to increase generalizability of results over different contexts (e.g. within different regions, countries, different cultures) and to understand the role of cross-national differences on organisational adoption in addition to consumer adoption. Future research can also test the influence of moderating factors such as the culture from the countries. It is believed that, culture is found to influence adoption processes (Frambach and Schillewaert, 2002).

8.6 Future research directions

Findings from this study and its limitations have paved the way for future research directions and investigations. Several future research recommendations and suggestions are thus presented.

Firstly, while this study provided insights on the drivers to innovate, and the interaction of technological, organisational, and environmental characteristics, more detailed research needs to be directed to the understanding of issues related to the management of staff resistance in organisations when moving forward with e-commerce change, and to exploration of the factors that influence employees' acceptance of the use of e-commerce.

Secondly, the population of this study was taken from manufacturing and service companies from the private sector. It would be interesting to use the research model to examine non-business e-commerce or the adoption of e-commerce by not-for profit organisations such as religious organisations, government agencies and academic institutions in order to identify potentially important factors that may facilitate the use of e-commerce in educational institutions and other non-business settings. Unfortunately, the area of non-business e-commerce has not attracted any serious empirically based research in the Middle East.

Third, it would be useful to conduct a follow up studies to find out the financial, operation and relationship benefits of implementing e-commerce to enrich understanding of how e-

commerce technology contributes to firm performance improvement at various stages of the e-commerce adoption phenomenon.

Fourth, findings reported in this study should be interpreted with caution due to the sample size. Future tests and refinements of the proposed model using a larger sample will be extremely useful in advancing knowledge of the determinants of e-commerce adoption in developing countries. Particularly, comparative, case study research targeted at rural, remote areas with comparisons made to the advanced regions in other developing countries would be desirable. In fact, rural areas in developing countries are characterized by having less access to education and communications and are less attractive to skilled individuals (Montealegre, 1998). Moreover, the importance of the effects that type of innovation may have on the adoption decision has been pointed out by Damanpour (1991). Other researchers may identify whether the findings of this study are valid for different types of innovation and should see how factors change as the type of innovation changes.

As discussed above (in Section 8.5), although a longitudinal research design is relatively costly and time consuming, it is suggested that future research can adopt a longitudinal process method to explore the adoption behaviour over time and to determine the causal links more explicitly. For instance, if time allowed, the author would ask permission from the participating organisations to follow up the survey based on the same respondents after the adoption of new innovation aiming to improve business activities. This further research would compare in more detail the factors that motivate organisations in the pre-adoption stage, the initial adoption stage, and the post-adoption stage of the new technology use. This would certainly be a significant contribution to the future of innovation adoption and information systems (IS) literature.

When introducing an innovation in an organisation, it is critical to reach to the right people as early as possible in order to avoid that an innovation remains underused. Some individuals readily accept certain innovations while others do not. In fact, although a tradition of individual acceptance models exists in the information systems literature such as technology acceptance model (TAM), research on individual innovation acceptance in organisational environments remains limited and relatively little is known about the organisational dynamics with respect to innovation acceptance (Gopalakrishnan and Damanpour, 1994). Therefore, future research should provide more insights in the role of personal characteristics, and

organisational and social processes that occur after the organisational adoption decision. Moreover, longitudinal studies may provide us richer insights into the determinants of innovation acceptance in organisations.

Finally, from experience, the researcher would like to suggest potentially useful tips for future research. In fact, it is advised that appropriate timing should be taken into consideration. Researchers should avoid conducting interviews and questionnaire surveys during holidays as well as at the end of the financial year since they are regarded as busy periods for organisations. During these periods, informants may hesitate to answer questions, cooperate, or give any access. It is to be noted that, in Saudi Arabia and most Arab countries, the holy month of Ramadan (i.e. the month of fasting) and Eid are regarded as religious occasions or special holidays in which the working day is shorter and all organisations are required by law to reduce their working time. Therefore, it is suggested that researchers wait until the end of the vacation period and until participants have cleared the backlog of work which has accumulated in their absence before asking them to participate in any research.

In conclusion, e-commerce represents a major opportunity for organisations in less developed countries who are able to use it effectively, and a threat to those organisations that cannot. E-commerce adoption by organisations remains a complex, elusive, yet extremely vital phenomenon.

8.7 Chapter summary

Despite the limitations faced in this research, the work presented here makes a substantial contribution in the field of organisational innovation and information system adoption. The study proposed a conceptual framework to understand organisational e-commerce adoption. Finally, although e-commerce is a dynamic and evolving technology, it is believed that the findings obtained in this study would still be beneficial in providing the necessary guidance for firms wishing to adopt technology. The current study findings can be summarised in the two conclusions given below:

(1) Organisational factors (especially management support and IT readiness) and environmental factors (especially e-commerce regulation and external support from technology consultants) are more influential than the technological factors related to

e-commerce such as security and language concern in the non-interactive and interactive adoption of e-commerce.

(2) As organisations adopt more sophisticated e-commerce practices, relative advantage and adoption cost affect organisational e-commerce adoption. Moreover, the maturity level of e-commerce adoption is affected by organisational factors (especially IT readiness, management team support, learning orientation, strategic orientation and formalisation) together with environmental factors related to external pressure from customers and trading partners.

To this end, this study has fulfilled its goals and expectations and has answered all research questions initially set at the beginning of the study. The findings are beneficial to innovation literature, practitioners, and policy makers.

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Appendix

Appendix A: English Questionnaire

Dear CEO/Manager/Owner

As a part of my Ph.D. dissertation at Aston University, I am conducting a study to better understand the use of electronic commerce (e-commerce) among firms in Saudi Arabia. You are among a small number of professionals I am asking to complete the attached questionnaire. Your response is important to the completion of this study. The survey should take no longer than 15 minutes.

Your identity will be anonymous and your responses will be confidential. You are free to withdraw at any time with no prior notice. There are no right or wrong answers, but please answer as truthfully as possible.

I will share the result of this study with you if you indicate your interest and I truly appreciate your time and interest.

 If you need more information about the study, please do not hesitate to contact the principal investigator, Ms.Sabah Al-Somali by e-mail: alsomals@aston.ac.uk .

Thank you for your participation.

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Electronic commerce Adoption and usage among Saudi Arabian companies

E-commerce: The term 'electronic commerce' or 'e-commerce' is defined here as the utilization of Internet technologies such as e-mail and information technologies to support business activities (i.e. marketing activities, purchasing, communication with suppliers and customers)

Important Note: If you are already an e-commerce user, please answer the questions based on your experience of e-commerce usage and implementation. If you have not implemented e-commerce, please answer the questions based on your expectations of e-commerce usage in the future. Your information is important to us.

PART 1: E-commerce Technologies

This section asks several questions about your thoughts and current practices regarding the e-commerce technologies and applications. When answering these questions, think of your organisation as a whole and the way that things are usually done and not your local department or function. **Please respond to the statements below by choosing the scale closest to your views.**

1) Which one of the following best describes your current e-commerce status? **Please choose only one option**

	Yes	No
A. Not connected to the Internet, no e-mail.	( )	( )
B. Connected to the Internet with e-mail but no website	( )	( )
C. Static Web: that is, publishing basic organisation information on the web without any interactivity.	( )	( )
D. Interactive web presence: that is, accepting queries, e-mail, and form entry from users.	( )	( )
E. Transactive web: that is, online selling and purchasing of products and services including customer service.	( )	( )
F. Integrated web: that is, a website connecting your computer systems with online systems allowing most of the business transactions to be conducted electronically, such as to record all sales transactions, update inventory records and generate all appropriate paperwork – i.e. invoices and receipts.	( )	( )

2- The following questions are related to your organisation's learning and developmental approach. **Please circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. Our firm is quick to learn about new technologies.	1	2	3	4	5
2. Supervisors are actively engaged in the learning process and development of their employees.	1	2	3	4	5
3. People in our organisation exchange and share information freely and frequently.	1	2	3	4	5
4. Learning and continuous improvement of the personnel is considered to be a major priority.	1	2	3	4	5
5. Success or failure is always discussed as part of the learning process and as an opportunity for learning and improvement.	1	2	3	4	5

3. Please rate your agreement with each of the following statements, regarding your business approach and strategy. **. Please circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1.Our business objectives are driven by customer satisfaction.	1	2	3	4	5
2.We measure customer satisfaction systematically and frequently.	1	2	3	4	5
3.We give close attention to after-sales service.	1	2	3	4	5
4.We keep promises made to customers.	1	2	3	4	5
5.Top management regularly discusses competitors' strengths and strategies.	1	2	3	4	5
6.We respond rapidly to competitive actions.	1	2	3	4	5
7.The policy of the firm has been to always consider the most up-to-date available technologies.	1	2	3	4	5
8.We have a long tradition and reputation in our industry of attempting to be first to try out new systems, applications, methods and equipment.	1	2	3	4	5
9.We devote extra resources (i.e. time, money) to technological forecasting.	1	2	3	4	5

4. The following question looks for your thoughts about the compatibility of e-commerce technologies with the existing firm's systems and application. **Kindly circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. The implementation of e-commerce is/will be incompatible with the firm's IT infrastructure.	1	2	3	4	5
2. The implementation of e-commerce is/will be incompatible with existing hardware.	1	2	3	4	5
3. Web applications used in e-commerce are/will be incompatible with existing software and applications.	1	2	3	4	5

5. Please rate the degree to which you agree with the following statements about your organisation's capabilities to dealing with rapid changes in technology. **Please circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. We respond well to competitors and other changes in the business environment.	1	2	3	4	5
2. In our organisation, people can easily accept a change in their organizational roles.	1	2	3	4	5
3. In my organisation, people can easily accept a change in the software applications that they use.	1	2	3	4	5
4. In our organisation, people are proactive in requesting changes in the software applications that they use in order to exploit new technologies.	1	2	3	4	5
5. Our organisation is capable of dealing with the rapid technological changes.	1	2	3	4	5
6. Attempts to create change usually meet with resistance.	1	2	3	4	5

6. The following question looks for your opinion about top management support and interest in the use of electronic business in the firm. **Please circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. Top managers are willing to try to provide the necessary resources for implementing e-commerce practices.	1	2	3	4	5
2. Top managers often advise employees to keep track of the latest developments in Internet technologies and Internet-related business practices.	1	2	3	4	5
3. Our top management is likely to consider the implementation of e-commerce applications as strategically important.	1	2	3	4	5
4. Top managers in our firm keep telling people that they must bring more of their business practices online in order to meet customers' future needs.	1	2	3	4	5
5. According to top managers in our firm, incorporating e-commerce practices is a very important way to gain competitive advantage.	1	2	3	4	5

7. Please rate the degree to which you agree with the following statements about the local language content available on the Internet. **Please circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. More Arabic language websites would encourage our workforce to use more e-commerce technologies.	1	2	3	4	5
2. We face difficulties in accessing English content websites.	1	2	3	4	5
3. Greater English language proficiencies among our staff would be advantageous.	1	2	3	4	5

8. Based on your organisation's structure, to what extent do you disagree or agree with the following statements? **Please circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. Only major strategic decisions need to be approved by top management.	1	2	3	4	5
2. Small matters can be dealt with by operational level staff.	1	2	3	4	5
3. Employees who want to make their own decision would be encouraged here.	1	2	3	4	5
4. Whatever situation arises, we have procedures to follow in dealing with the situation.	1	2	3	4	5
5. Every employee has a specific job to do.	1	2	3	4	5
6. When rules and procedures exist here, they are usually well defined in written form.	1	2	3	4	5

9. Please rate the degree to which you agree with the following statements about your organisation's technological capabilities. **Please circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				
1. Our organisation is highly computerized with internal and external network connections that connect the firm with its branches (i.e. Local Area Network (LAN) and Wide area network (WAN).				1	2	3	4	5
2. We have connectivity to the Internet.				1	2	3	4	5
3. Our firm has individual(s) with 'expert' knowledge of information technology (IT) and e-commerce technologies.				1	2	3	4	5
4. We have sufficient financial resources to implement e-commerce.				1	2	3	4	5
5. Our firm has individual(s) who could plan and carry out various parts of the evaluation procedure of e-commerce implementation.				1	2	3	4	5
6. Most of our employees have unrestricted access to computers.				1	2	3	4	5
7. Most of our employees are computer literate.				1	2	3	4	5

10. Please rate the degree to which you agree with the following statements about the legal framework for e-commerce.**Please circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				
1. Information about electronic commerce laws and regulations is sufficient.				1	2	3	4	5
2. There is adequate legal protection for Internet buying and selling.				1	2	3	4	5
3. Information about e-commerce privacy and data protection law are sufficient.				1	2	3	4	5
4. Information about consumer protection and conflict resolution is sufficient.				1	2	3	4	5
5. In general, we receive enough information about e-commerce laws and regulations from the government and chamber of commerce.				1	2	3	4	5

11. Please rate your agreement with each of the following statements, regarding the IT consultants or technology vendors that support and supply your IT systems and e-commerce applications.
Kindly circle the scale closest to your views

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				
1. Our IT consultant/technology vendor solves our firm's problems quickly.				1	2	3	4	5
2. Our IT consultant/technology vendor provides relevant information to our firm.				1	2	3	4	5
3. Our IT consultant/technology vendor provides on-time information.				1	2	3	4	5
4. We are confident in the support we receive from our IT consultant/technology vendor.				1	2	3	4	5
5. Our IT consultant/technology vendor has high integrity.				1	2	3	4	5
6. Our IT consultant/technology vendor gives us reliable information and advice.				1	2	3	4	5
7. In general, there is efficient support from our IT consultant/technology vendor to support our move to the Internet.				1	2	3	4	5

12. The following question ask your opinions on the competitive pressure on your organisation's move on the Internet. **Kindly circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				
1. Competition in our industry is not very intense.				1	2	3	4	5
2. Our firm does not experience competitive pressure forcing us to implement e-commerce solutions.				1	2	3	4	5
3. New technology is slow to emerge in our industry.				1	2	3	4	5
4. Our competitors are relatively weak.				1	2	3	4	5
5. Firms that readily implement new technologies will be competitive.				1	2	3	4	5

13. Based on the affect of the current global economic crisis, to what extent do you disagree or agree with the following statements. . **Kindly circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				
1.The global economic downturn did not put significant pressure on the firm to cut ICT and e-commerce applications' costs or budget.				1	2	3	4	5
2.The global economic downturn did not put significant pressure on the firm to cut the training budget to learn and adopt innovations like e-commerce.				1	2	3	4	5
3.The global economic crisis did not affect the purchasing power of our organisation.				1	2	3	4	5

14. The following questions ask your perceptions about the influence of your firm's customers and suppliers to implement e-commerce technologies. **Kindly circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				
1. A majority of our customers recommended that we establish strong e-commerce relationships with them.				1	2	3	4	5
2. A majority of our customers requested that we implement e-commerce.				1	2	3	4	5
3. Our relationship with our major customers would have suffered if we had not implemented e-commerce practices.				1	2	3	4	5

15. The following questions ask your perceptions about the influence of your firm's customers and suppliers to implement e-commerce technologies. **Kindly circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				
1. A large number of our suppliers and business partners have already adopted e-commerce practices.				1	2	3	4	5
2. The majority of supplier and business partners recommend the implementation of e-commerce.				1	2	3	4	5
3. Our business partners and suppliers usually set the mode of communication (e.g., fax, e-mail, etc.)				1	2	3	4	5
4. Supplier and business partners are generally very knowledgeable regarding technical matters.				1	2	3	4	5

16. The following questions ask your opinions (or expectations) about the potential benefits of e-commerce technologies. **Kindly circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. E-commerce use will increase business profitability.	1	2	3	4	5
2. E-commerce is useful to expand the market share for existing products/services.	1	2	3	4	5
3. E-commerce is useful to increase international sales.	1	2	3	4	5
4. E-commerce is useful to improve coordination with suppliers and trading partners.	1	2	3	4	5
5. E-commerce is useful to provide a better relationship with our suppliers and trading partners.	1	2	3	4	5
6. E-commerce is useful to improve internal communications and processes.	1	2	3	4	5
7. E-commerce is useful to communicate better with customers.	1	2	3	4	5
8. E-commerce is useful to increase customer satisfaction.	1	2	3	4	5
9. E-commerce is useful to improve customer service.	1	2	3	4	5

17. Please rate the degree to which you agree with the following statements about the Saudi Arabian infrastructure and support given to institutions wanting to migrate to the Internet.**Kindly circle the scale closest to your views**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1.The telecommunication infrastructure is reliable and efficient to support e-commerce.	1	2	3	4	5
2.The technology infrastructure of commercial and financial institutions is capable of supporting e-commerce transactions.	1	2	3	4	5
3.The postal service is reliable in its support of e-commerce and e-commerce practices.	1	2	3	4	5
4.The electronic payment facilities are sufficient.	1	2	3	4	5
5.High quality e-commerce applications and services are available at increasingly affordable rates.	1	2	3	4	5
6.Wireless lines and wireless communication services are reliable and available at affordable rates.	1	2	3	4	5
7.The current Internet connection speed is sufficient for e-commerce transactions.	1	2	3	4	5
8.The Internet connection is available 24/7.	1	2	3	4	5
9.There are sufficient individual(s) with 'expert' knowledge of IT and e-commerce technologies in the labour market.	1	2	3	4	5

18. The following questions ask opinions about the financial requirements for e-commerce implementation. <u>Kindly circle the scale closest to your views.</u>

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. The costs of e-commerce applications and systems are acceptable.	1	2	3	4	5
2. The cost of access to the Internet is acceptable.	1	2	3	4	5
3. The hosting charge for websites with sufficient bandwidth is acceptable.	1	2	3	4	5
4. E-commerce requires a substantial investment in training for employees to maintain a multi-skilled workforce.	1	2	3	4	5

19. The following questions ask your opinions about the security settings for e-commerce implementation. **Kindly circle the scale closest to your views.**

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5				

1. E-commerce is associated with insufficient security safeguards and authentication issues.	1	2	3	4	5
2. Internet protocols are inadequate to support secure electronic ordering and payments.	1	2	3	4	5
3. Our firm is concerned about cybercrime such as hacking.	1	2	3	4	5
4. E-commerce environment is secure enough.	1	2	3	4	5

Part 2: General Information

Please tell me a little about yourself and your organisation: *Please tick (✓) the appropriate box for each question.*

20) Kindly describe the main industry your organisation operates in. Although you may operate in several industries, specify the single most important industry.

(   ) Computer and electronic products   (   ) Food and beverages

(   ) Electrical material and accessories   (   ) Construction

(   ) Marketing and Advertising   (   ) Tourism and Hospitality Services

(   ) Publishing and Printing   (   ) Furniture

(   ) Motors and autos   (   ) Textiles and clothing

(   ) Pharmaceuticals & medical equipment   (   ) Medical care

(   ) Insurance and Financial Services   (   ) Other: (Specify)_____

21) How long has your organisation been in existence?

(   ) Less than 5 years   (   ) 5 to 9 years   (   ) 10-19 years

(   ) 20 to 49 years   (   ) More than 50 years

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22. Does your company have?

Multiple establishments or branches.   (   ) Yes   (   ) No

Establishments or branches outside Saudi Arabia.   (   ) Yes   (   ) No

Headquarter located outside Saudi Arabia.   (   ) Yes   (   ) No

23. Please indicate the total number of people that are currently employed in your organisation. (<u>Choose only one option</u>).

(   ) 1- 9 employees   (   ) 10 - 25 employees   (   ) 26 - 100 employees
(   ) 101-200 employees   (   ) 201 - 250 employees   (   ) 251- 500 employees
(   ) 501 -1,000 employees   (   ) 1,001-2,500 employees   (   ) More than 2,500 employees

24. Your Position:

☐ President, managing director, CEO;   ☐ Business Operation manager, COO;

☐ Information Services (IS) manager, Director, Planner   ☐Administration/Finance manager, CFO;

☐Others (Specify)_____

25. Gender:

(   ) Male   (   ) Female

26. Age
(   ) 21-29 yrs   (   ) 30-39 yrs   (   ) 40-49 yrs
(   ) 50- 59 yrs   (   ) 60 or older

27. Qualification – please indicate the highest level of education.

(   ) Less than High School   (   ) High School   (   ) Trade qualifications

(   ) Bachelor's   (   ) Master's   (   ) Doctoral

(   ) Others (Specify)_____

28. Where did you study for your highest level of qualification?

(   ) Inside the kingdom   (   ) USA

(   ) Europe   (   ) Others (Specify)_____

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE!

If you would like to receive a summary of the findings of this study, please provide us with the following information: **Company name:** _____ **E-mail address:** _____ **Fax Number:** _____

YOUR CONTRIBUTION IS GREATLY APPRECIATED, THANKS!!!!

Appendix B: Arabic Questionnaire

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استبيان لتحديد العوامل التي تؤثر على استخدام وتطبيق المعاملات التجارية الإلكترونيه في المؤسسات
بالمملكة العربية السعودية

ســـعـــادة الرئيس التنفيذي / المدير / المالك الموقـــر

أنا طالبة بكلية إدارة الأعمال بجامعة استن، أقوم بإجراء بحث علمي أُلقي فيه الضوء على العوامل التي تؤثر على استخدام وتطبيق المعاملات التجارية الإلكترونيه بين الشركات في المملكة العربية السعودية، وأسعى من خلال هذه الدراسة إلى الحصول على درجة الدكتوراه في إدارة الأعمال من جامعة استن الواقعة بمدينة بيـــرمنجهام بالمملكة المتحدة. ومن متطلبات التخرج إكمال أطروحة التخرج، وسوف يتم تطبيق هذا البحث على المؤسسات بالمملكة العربية السعودية.

أرجو منكم التكرم بالمشاركة في هذا البحث من خلال تعبئة مسح اســـتبـــياني قصير, وسوف يستغرق إكمال الاستبانة من 10 إلى 15 دقيقة فقط ، ومما لاشك فيه أن مشاركتكم في الإجابة عن أسئلة الاستبانة سيكون لها الأثر البالغ على نتائج الدراسة   ولاتوجد إجابات صحيحة أو خاطئـــة، ولكن يرجى تحري المصداقية في الاجابة عن الأسئلة قدر الامكان. كما أُحيط سعادتكـــم علماً بأني سأقوم باطلاعكم بملخص عن نتيجة الدراسة عند الانتهاء منـــها إذا رغـــبتـــم في ذلك. ونؤكد أن جميع المعلومات سوف تعامل بخصوصية وسرية تامة, ولن تستخدم إلا لغرض البحث العلمي.

وإذا كنت تحتاج إلى مزيد من المعلومات عن هذه الدراسة، يرجى عدم التردد في الاتصال بالباحـــثة عن طريق البريد الإلكتروني alsomals@aston.ac.uk

شاكرين حسن تعاونكم،،،

الباحثـــة

صباح الصومالي
طالبة دكتوراة، جامعة استن Aston University
بيـــرمنجهام، المملكة المتحدة

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يعرف مصطلح " المعاملات التجارية الإلكترونيه " بأنة عملية التحول من النظام التقليدي إلى نظام جديد يعتمد على إستخدام تقنيات المعلومات والشبكات الحاسوبية مثل استخدام الإنترنت والبريد الإلكتروني لإدارة وتنفيذ مختلف أعمال المنظمة إلكترونياً كإدارة عمليات البيع و الشراء و خدمة الزبائن والتعامل مع الموردين.

ملاحظة هامة: إذا كنت من ممارسي المعاملات التجارية الإلكترونيه نرجو الإجابة على الأسئلة اعتمادا على خبراتك في ممارسة واستخدام المعاملات التجارية الإلكترونيه إما إذا لم تكن من الممارسين والمستخدمين للمعاملات التجارية الإلكترونيه نرجو الإجابة على أسئلة الاستبيان بناءاً على <u>توقعاتك</u> لتطبيق واستخدام المعاملات التجارية الإلكترونيه في المستقبل.

القسم الأول: معلومات عن المعاملات التجارية الإلكترونيه

يبحث هذا القسم عن مستوى استخدام المعاملات التجارية الإلكترونيه على مستوى المنظمة ككل والعوامل التي تؤثر في قرارات المدراء لتطبيق وتبني المعاملات التجارية الإلكترونيه. الرجاء <u>وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.</u>

1. أي من الجمل التالية تصف مستوى تطبيق وتبني المعاملات التجارية الإلكترونيه لدى منظمتكم . <u>الرجاء اختيار خيار واحد فقط</u>

لا	نـــعم	
( )	( )	1. لايوجد للمنظمة إتـــصـــال بالإنترنت وبريد الإلكتروني.
( )	( )	2. لدى المنظمة إتـــصـــال بالإنترنت وبريد الإلكتروني ولايوجد لدينا موقع على الشبكة العنكبوتية.
( )	( )	3. لدى المنظمة موقع غير تـــفـــاعلي على الشبكة العنكبوتية يوفر معلومات تعريفية عن الشركة.
( )	( )	4. لدى المنظمة موقع تـــفـــاعلي على الشبكة العنكبوتية يسمح بإرسال واستقبال الاستفسارات وإرسال البريد الإلكتروني.
( )	( )	5. لدى المنظمة موقع تفـــاعلي على الشبكة العنكبوتية يتم من خلالة البيع والشراء للمنتجات والخدمات عبر الإنترنت.
( )	( )	6. لدى المنظمة شبكة وموقع متكامل يتم من خلالة ربط نظم معلومات الشركة مع موقعها الإلكتروني للسمـــاح لأكبر عدد من المعاملات التجارية الإلكترونيه كتسجيل معاملات البيع والتواصل مع العملاء والموردين.

2. مامدى موافقتك أو عدم موافقتـــك على العبارات التالية التي تتعلق بنهج التعلم والتطوير في منظمتكم. <u>الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.</u>

أوافق بشدة 5	أوافق 4	محــايد 3	لا أوافق 2	لا أوافق بشدة 1

5	4	3	2	1	1. تتميز منظمـــتـــنا بحبها للمعرفة وتعلم التكنولوجيا الجديدة.
5	4	3	2	1	2. يقوم الرؤساء بالمشاركة في عملية التعلم وتطوير العاملين في المنظمة.
5	4	3	2	1	3. يقوم الموظفون والرؤساء بتبادل ومشاركة المعلومات المهمة بحرية تامة وبصفة متكررة.
5	4	3	2	1	4. التعلم والتحسين المستمر للموظفين يُــعد مسألة ذات أولوية رئيسة.
5	4	3	2	1	5. يُــعد النجاح أو الفشل جزءاً من العملية التعليمية في الشركة وفرصة للتعلم والتحسين المستمر.

3. الأسئلة المدرجة ادناه تسأل عن مدى موافقتكم عن كل من العبارات التالية والتي تتعلق بنهج واستراتيجية المنظمة.
الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.

أوافق بشدة 5		أوافق 4	محــــايد 3	لا أوافق 2	لا أوافق بشدة 1

5	4	3	2	1	1. من أهم أهداف منظمتـــنـــا رضا العملاء.
5	4	3	2	1	2. نقوم في معظم الأحيان بقياس رضا العملاء.
5	4	3	2	1	3. نُولي اهتماماً كبيراً لخدمات ما بعد البيع.
5	4	3	2	1	4. تلتــزم المنظمة بوعودها تجاه عملائها.
5	4	3	2	1	5. عادة يقوم المدراء بالمنظمة بتبادل المعلومات والآراء عن استراتيجيات المنافسين ونقاط القوة لديهم.
5	4	3	2	1	6. نستجيب سريعا ونراقب عن كثب أعمال ونشاطات المنافسين.
5	4	3	2	1	7. من سياسة المنظمة أن تأخذ بعين الاهتمام أكثر التكنولوجيات الحديثة والمتاحة في السوق.
5	4	3	2	1	8. لدينا تــقليد عريق وسمعة في مجال صناعتنا بأننا من السبـــاقـــــين في استخدام الأنظمة الجديدة، والتطبيقات، والأساليب، والمعدات الحديثة في العمل.
5	4	3	2	1	9. نكرس الموارد الضرورية من الوقت والمال للتنبؤ التكنولوجي.

4. الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية التي تتعلق بقدرة المنظمة على التعامل مع التغيرات المتكررة في التكنولوجيا. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4	محــــايد 3	لا أوافق 2	لا أوافق بشدة 1

5	4	3	2	1	1. نتعامل بشكل سريع مع المنافسين والتغيرات الأخرى التي تحدث في بيئة العمل.
5	4	3	2	1	2. الموظفون في المنظمة يمكنهم التأقلم وقبول التغيرات التي تحصل بالمنظمة.
5	4	3	2	1	3. الموظفون في المنظمة يمكنهم قبول التغييرات في برامج الكمبيوتر المستخدمـــة بسهولة.
5	4	3	2	1	4. يطالب الموظفون في هذة المنظمة بإجراء تغييرات في برامج الكمبيوتر التي يستخدمونها من أجل الاستفادة من تكنولوجيا نظم المعلومات بفعالية.
5	4	3	2	1	5. منظمتنا قادرة على التعامل مع التغيرات السريعة في التكنولوجيا.
5	4	3	2	1	6. المحاولات الرامية إلى إحداث تغيير في أنظمة الكمبيوتر والبرامج تُواجه عادة بالمقاومة والرفض في المنظمة.

5.مامدى موافقتكم على كل من العبارات التالية التي تتعلق بمدى ملائمة تكنولوجيا المعاملات التجارية الإلكترونيه مع الأنظمة والتطبيقات في المنظمة. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك**

أوافق بشدة 5		أوافق 4		محــــايد 3		لا أوافق 2		لا أوافق بشدة 1
5	4	3	2	1	1. إن تطبيق واعتماد المعاملات التجارية الإلكترونيه غير متوافق (أو لن يكون متوافقاً) مع البنية التحتية لتقنية المعلومات الخاصة بالمنظمة.			
5	4	3	2	1	2. إن تطبيق واعتماد المعاملات التجارية الإلكترونيه غير متوافق (أو لن يكون متوافقاً) مع الأجهزة والمعدات الحالية المستخدمة في المنظمة.			
5	4	3	2	1	3. إن التطبيقات والبرامج المستخدمة في المعاملات التجارية الإلكترونيه غير متوافقة (أو لن نكون متوافقة) مع البرامج والتطبيقات الموجودة والمستخدمة حاليا في المنظمة.			

6.الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية التي تتعلق بدعم الإدارة العليا لاستخدام المعاملات التجارية الإلكترونيه. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4		محــــايد 3		لا أوافق 2		لا أوافق بشدة 1
5	4	3	2	1	1. المدراء على استعداد تام لتوفير الموارد اللازمة لاستخدام وتبني المعاملات التجارية الإلكترونيه.			
5	4	3	2	1	2. يقوم المدراء في المنظمة بتقديم المشورة والنصح للموظفين لمتابعة آخر التطورات في تكنولوجيا الإنترنت وغيرها من ممارسات الأعمال التي لها علاقة بالإنترنت.			
5	4	3	2	1	3. يأخذ المدراء بعين الاعتبار تبني المعاملات التجارية الإلكترونيه وتطبيقاته وجعله موضوعاً استراتيجياً مهماً.			
5	4	3	2	1	4. يعتقد المدراء في المنظمة أنه يجب تحويل أكثر أعمال الشركة لتصبح الكترونية لكي يتسنى للشركة الاستجابة لطلبات واحتياجات العملاء في المستقبل.			
5	4	3	2	1	5. يعتقد المدراء في المنظمة، أن استخدام المعاملات التجارية الإلكترونيه يُــعد في غاية الأهمية للحصول على ميزة تنافسية.			

7. الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية والتي تسأل عن محتوى اللغة العربية المتوفر على شبكة الإنترنت. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4		محــــايد 3		لا أوافق 2		لا أوافق بشدة 1
5	4	3	2	1	1. إن توفر مزيد من المواقع التي تدعم اللغة العربية من شأنه أن يشجع على استخدام المزيد من تقـنيات المعاملات التجارية الإلكترونيه.			
5	4	3	2	1	2. نواجه صعوبات في فهم محتوى المواقع إلإنجليزية الحالية المتاحة على شبكة الإنترنت.			
5	4	3	2	1	3. من المناسب ان يكون هناك اتقان جيد للغة الإنجليزية لدى الموظفين لتطبيق المعاملات التجارية الإلكترونيه.			

8. الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية التي تتعلق بالنهـــج الإداري المتبع في المنظمة. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4		محـــــايد 3	لا أوافق 2	لا أوافق 1
5	4	3	2	1		1. القرارات الاستراتيجية الكبرى هي التي تتطلب فقط موافقة الإدارة العليا بالمنظمة.
5	4	3	2	1		2. يمكن للموظفين على المستوى التنفيذي البت في الأمور الصغيرة دون الحاجة إلى تحويلها إلى شخص ذي سلطة أعلى.
5	4	3	2	1		3. يلقى الموظفين الذين يرغبون في اتخاذ القرارات والإجراءات اللازمة لتسهيل العمل تشجيعاً من الاداراة العليــا.
5	4	3	2	1		4. كل موظف لديه وظيفة محددة يقوم بها.
5	4	3	2	1		5. في الغالب، لدينا إجراءات مناسبة مُتبعة للتعامل مع أي وضع أو حالة تنشأ لدينا في المنظمة.
5	4	3	2	1		6. في الغالب، معظم القواعد والإجراءات المتبعة في المنظمة تكون بشكل مكتوب.

9. الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية التي تتعلق بالموارد التكنولوجية المتاحة لتطبيق المعاملات التجارية الإلكترونيه. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4		محـــــايد 3	لا أوافق 2	لا أوافق 1
5	4	3	2	1		1. منظمتنا لديها شبكة داخلية على نحو عال لاتصال الكمبيوترات مع بعضها البعض داخل المنظمة وايضاً شبكة لربط فروع المنظمة مع بعضها البعض.
5	4	3	2	1		2. لدى المنظمة اتصال بالإنترنت ذو سرعة عالية.
5	4	3	2	1		3. لدى المنظمة موظفون لديهم خبرة ودراية في نظم المعلومات وتكنولوجيا المعاملات التجارية الإلكترونيه.
5	4	3	2	1		4. لدى المنظمة الموارد المالية الكافية لتطبيق وتبني المعاملات التجارية الإلكترونيه.
5	4	3	2	1		5. لدى المنظمة موظفون لديهم الخبرة في التخطيط والتنفيذ لتطبيق وتبني المعاملات التجارية الإلكترونيه.
5	4	3	2	1		6. معظم الموظفين في الشركة لديهم كمبيوتر أو حاسب الي لاجراء العمل.
5	4	3	2	1		7. معظم الموظفون في الشركة لديهم خبرة باستخدام الكمبيوتر.

10. مامدى موافقتكم على كل من العبارات التالية التي تتعلق بمعـــدل تأثــــر أنشطـــة المنظمة بالزبائن والموردين. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4		محـــــايد 3	لا أوافق 2	لا أوافق 1
5	4	3	2	1		1. يفضل معظم عملائنا أن نــقــــيم معهم علاقات قوية من خلال استخدام وتطبيق المعاملات التجارية الإلكترونيه مثل استخدام البريد الإلكتروني للتواصل معهــم.
5	4	3	2	1		2. يطلب معظم عملائنا أن نطبق التجارة الإلكترونية.
5	4	3	2	1		3. لن تتضرر علاقتنا مع كبار عملائنا إذا لم نطبق المعاملات التجارية الإلكترونيه.

11. الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية التي تتعلق بالإطار القانوني للتجارة الإلكترونية. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4	محـــــايد 3	لا أوافق 2	لا أوافق بشدة 1
5	4	3	2	1	1. بشكل عام, لدينا معلومات كافية عن القوانين والتشريعات المتبعة الخاصة بالتجارة الإلكترونية.
5	4	3	2	1	2. يوجد لدينا معلومات كافية عن قوانين عملية البيع والشراء التي تتم عن طريق شبكة الإنترنت.
5	4	3	2	1	3. يوجد لدينا معلومات كافية عن قوانين الخصوصية وحماية المعلومات الإلكترونية في شبكة الإنترنت.
5	4	3	2	1	4. يوجد لدينا معلومات كافية عن قوانين حماية المستهلك وحل النزاعات الخاصة المعاملات التجارية الإلكترونيه.
5	4	3	2	1	5. بشكل عام، تـلقينـا معلومات كافية من وزارة التجارة أو الغرفة التجارية عن الإطار القانوني والتشريعي الخاص المعاملات التجارية الإلكترونيه و بالتجارة الإلكترونية.

12. الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية التي تتعلق بمورد أنظمة الحاسب الآلي ونظم تقنية المعلومات في الشركة الذي تتعاملون معه لصيانة الأجهزة. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4	محـــــايد 3	لا أوافق 2	لا أوافق بشدة 1
5	4	3	2	1	1. يقوم مورد أنظمة الحاسب الآلي وتقنية المعلومات بحل المشاكل الخاصة بأنظمة الكمبيوتر والأجهزة بشكل سريع.
5	4	3	2	1	2. يقوم مورد أنظمة الحاسب الآلي وتقنية المعلومات بإعطائنا المعلومات التي يراها مهمة لنا في استخدام أنظمة الكمبيوتر.
5	4	3	2	1	3. يقوم مورد أنظمة الحاسب الآلي وتقنية المعلومات بإعطائنا المعلومات الخاصة بكيفيـة عمل البرامج فوراً حينما نحتاجها.
5	4	3	2	1	4. نحن راضون عن مستوى الخدمة التي نحصل عليها من مورد أنظمة الحاسب الآلي وتقنية المعلومات.
5	4	3	2	1	5. يتميز مورد أنظمة الحاسب الآلي وتقنية المعلومات بالنزاهة والثقـة العـاليـة.
5	4	3	2	1	6. يقوم مورد أنظمة الحاسب الآلي وتقنية المعلومات بإعطائنا النصائح والمعلومات التي نحتاجها.
5	4	3	2	1	7. بشكل عام, نحصل على دعم فعال وبأسعار معقولة من مورد أنظمة الحاسب الآلي وتقنية المعلومات وهذا سيساعدنا على تطبيق التعامل الإلكتروني في منظمتنا.

13. الأسئلة المدرجة أدناه تسأل عن مدى موافقتكم على كل من العبارات التالية والتي تتعلق بمعـــدل تأثـــر أنشطـــة المنظمة بأنشطة المنافسين. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5			أوافق 4	محـــايد 3	لا أوافق 2	لا أوافق بشدة 1
5	4	3	2	1		1. المنافسة ليست مكثفة جداً في المجال الذي تعمل بة المنظمة.
5	4	3	2	1		2. لا توجد أية ضغوط علينا من المنافسين لتطبيق المعاملات التجارية الإلكترونيه.
5	4	3	2	1		3. ظهور أو استخدام التكنولوجيا الجديدة بطيئة أو قـــليلة في المجال الذي تعمل بة المنظمة.
5	4	3	2	1		4. قوة منافسينا ضعيفة نسبياً.
5	4	3	2	1		5. المنظمات التي تُطبق وتُنفذ التكنولوجيات الجديدة والحديثة ستكون قادرة على المنافسة.

14. مامدى موافقتكم على كل من العبارات التالية والتي تتعلق بمعـــدل تأثـــر أنشطـــة المنظمة بالأزمة الاقتصادية العالمية. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5			أوافق 4	محـــايد 3	لا أوافق 2	لا أوافق بشدة 1
5	4	3	2	1		1. الأزمة الاقتصادية العالمية لم تضع أية ضغوط على المنظمة لقطع الميزانية المخصصة لأنظمة تكنولوجيا المعلومات والاتصالات.
5	4	3	2	1		2. الأزمة الاقتصادية العالمية لم تضع أية ضغوط على المنظمة لقطع الميزانية المخصصة للتدريب والتعلم وتطبيق الابتكارات الحديثة مثل المعاملات التجارية الإلكترونيه.
5	4	3	2	1		3. لم تقلل الأزمة الاقتصادية العالمية من القوة الشرائية للمنظمة.

15. مامدى موافقتكم على كل من العبارات التالية التي تتعلق بمعـــدل تأثـــر أنشطـــة المنظمة بالزبائن والموردين. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5			أوافق 4	محـــايد 3	لا أوافق 2	لا أوافق بشدة 1
5	4	3	2	1		1. اعتمد عدد كبير من موردي وشركاء المنظمة استخدام وتطبيق المعاملات التجارية الإلكترونيه.
5	4	3	2	1		2. غالبية موردي وشركاء المنظمة يقترحون أو يدعون المنظمة باستخدام وتطبيق المعاملات التجارية الإلكترونيه .
5	4	3	2	1		3. عادة ما يحدد موردو وشركاء المنظمة طريقة الاتصال بهم (على سبيل المثال، استخدام الفاكس، البريد الإلكتروني، إلخ).
5	4	3	2	1		4. لدى موردين وشركاء المنظمة دراية ومعرفة تامة بالأمور والمسائل التقنية الخاصة المعاملات التجارية الإلكترونيه.

16. مامدى موافقتكم على كل من العبارات التالية التي تتعلق بالفائدة التي تعود على المنظمة من تطبيق المعاملات التجارية الإلكترونيه. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4		محــــايد 3	لا أوافق 2	لا أوافق بشدة 1
5	4	3	2	1	1. من فوائد استخدام المعاملات التجارية الإلكترونيه زيادة ربحية المنظمة.	
5	4	3	2	1	2. من فوائد استخدام المعاملات التجارية الإلكترونيه زيادة الحصة السوقية من جراء بيع المنتجات أو الخدمات على الانترنت.	
5	4	3	2	1	3. من فوائد استخدام المعاملات التجارية الإلكترونيه زيادة مبيعاتنا في الأسواق الدولية أو العالمية.	
5	4	3	2	1	4. من فوائد استخدام ا المعاملات التجارية الإلكترونيه تسهيل عملية الاتصال الداخلي بين الموظفين وجعل سير العمليات داخل المنظمة أكثر كفاءة.	
5	4	3	2	1	5. من فوائد استخدام المعاملات التجارية الإلكترونيه تحسين التنسيق مع الموردين والتنيسق بين قنوات التوزيع.	
5	4	3	2	1	6. من فوائد استخدام المعاملات التجارية الإلكترونيه المساعدة على إقامة علاقات أفضل مع الموردين ومع شركائنا التجاريين.	
5	4	3	2	1	7. من فوائد استخدام المعاملات التجارية الإلكترونيه المساعدة على التواصل مع العملاء بشكل أفضل.	
5	4	3	2	1	8. من فوائد استخدام المعاملات التجارية الإلكترونيه زيادة رضا العملاء.	
5	4	3	2	1	9. من فوائد استخدام المعاملات التجارية الإلكترونيه تحسين الخدمة المقدمة للعملاء.	

17. مامدى موافقتكم على كل من العبارات التالية التي تتعلق باستعدادات الشبكة الوطنية والبنية التحتية في المملكة لتطبيق واستخدام المعاملات التجارية الإلكترونيه. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5		أوافق 4		محــــايد 3	لا أوافق 2	لا أوافق بشدة 1
5	4	3	2	1	1. البنية التحتية الحالية لتكنولوجيا المعلومـــات والاتصــالات فعالـــة لــدعم المعـاملات التجاريــة الإلكترونيه.	
5	4	3	2	1	2. البنية التحتية للمؤسسات المالية والبنوك قادرة على دعم عمليـات الــدفع المعـاملات التجاريــة الإلكترونيه.	
5	4	3	2	1	3. خدمات البريد والشحن فعالة وموثوق بها لدعم المعاملات التجارية الإلكترونيه.	
5	4	3	2	1	4. خدمات الدفع الإلكتروني e-payment ببطاقة الائتمان أو البطاقة المسبوقة الدفع متـوفرة بشـكل كافٍ.	
5	4	3	2	1	5. نظم المعلومات وبرامج و تطبيقات المعاملات التجارية الإلكترونيه متاحـة علـى نحـو متزايـد وبأسعار في متناول الجميع.	
5	4	3	2	1	6. خطوط وخدمات الاتصالات اللاسلكية wireless فعالة جداً ومتاحة بأسعار ميسورة.	
5	4	3	2	1	7. السرعة الحالية للاتصال بالإنترنت كافية لتطبيق المعـاملات التجاريــة الإلكترونيــه ولتواصــل المنظمة مع عملائها والموردين.	
5	4	3	2	1	8. الاتصال بالإنترنت متاح على مدى 24 ساعة وبأسعار معقولة.	
5	4	3	2	1	9. سوق العمل يوفر ما يكفي من الأفراد الذين لديهم الخبرة والدراية في نظم المعلومات وتكنولوجيا المعاملات التجارية الإلكترونيه.	

18. ما مدى موافقتكم على كل من العبارات التالية التي تتعلق بالمتطلبات المالية لتطبيق المعـــاملات التجاريـة الإلكترونيــه .
الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.

أوافق بشدة 5	أوافق 4	محــــايد 3	لا أوافق 2	لا أوافق بشدة 1

5	4	3	2	1	1. الاستثمارات المالية اللازمة لتنفيذ المعاملات التجارية الإلكترونيه مناسب على وجه العموم.
5	4	3	2	1	2. تكلفة الاتصال بالإنترنت مناسبة على وجة العموم وهذا يشمل رسوم الخدمة ورسوم الاتصال.
5	4	3	2	1	3. رسوم استضافة وصيانة موقع المنظمة على شبكة الانترنت مناسبة على وجة العموم.
5	4	3	2	1	4. تطبيق التعاملات الإلكترونية يتطلب استثمارات مالية لتدريب الموظفين وصقل مهاراتهم لمواكبة التغير التكنولوجي.

19. مامدى موافقتكم على كل من العبارات التالية والتي تتعلق بالإعدادات الأمنية المعاملات التجارية الإلكترونيه. **الرجاء وضع دائرة حول الرقم الذي يعبر عن وجهة نظرك.**

أوافق بشدة 5	أوافق 4	محــــايد 3	لا أوافق 2	لا أوافق بشدة 1

5	4	3	2	1	1. استخدام وتطبيق المعاملات التجارية الإلكترونيه مرتبط بمشاكل أمنية غير محلولة.
5	4	3	2	1	2. تفــتقر الإنترنت إلى بروتوكولات لدعم الشراء والــدفع الإلكتروني بطريقة آمنة.
5	4	3	2	1	3. منظمتنا قلقة من الجرائم الحاسوبية مثل التصيد الاحتيالي والقرصنة وعمليات ســرقة الارقام السرية.
5	4	3	2	1	4. عموماً, نعتقد أن استخدام وتطبيق المعاملات التجارية الإلكترونيه عملية آمنة.

القسم الثاني: معلومات عامة

نرجو الإجابة عن الأسئلة التالية بـــوضع علامة صح (✓) أمام الإجابة المختارة.

20- ماهو نشاط أو المجال الاساسي التي تعمل بة المنظمة؟ الرجاء اختيار نشاط واحد فقط .

( ) الأغذية والمشروبات.   ( ) أجهزة الكمبيوتر والمنتجات الإلكترونية.

( ) البناء والمقاولات.   ( ) المواد الكهربائية وملحقاتها.

( ) السياحة والخدمات الفنــدقية.   ( ) التسويق والاعلان.

( ) الأثاث والديكور.   ( ) النشر والطباعة.

( ) المنسوجات والملابس.   ( ) السيــارات وقطــع غيــار.

( ) الخدمات الصحية والطبــية.   ( ) الأدوية والمعدات الطبية.

( ) أخرى (حددها)_____   ( ) الخدمات المالية والتأمين.

21- منذ متى تــم تأسيس المنظمة؟

( ) أقل من 5 سنوات   ( ) 5- 9 سنوات

( ) 10- 19 سنــة   ( ) 20 – 49 سنــة

( ) أكثر من 50 سنــة

22- هل لدى الشركة؟

أ- عدة فروع.   ( ) نـــعم   ( ) لا

ب- فروع خارج المملكــة العربية السعودية.   ( ) نـــعم   ( ) لا

جـــ- مكتب رئيسي خارج المملكــة العربية السعودية.   ( ) نـــعم   ( ) لا

23- ماهو عدد الموظفين في الشركة؟

( ) 1 – 9 موظف   ( ) 10 – 25 موظف   ( ) 26- 100 موظف

( ) 101- 200 موظف   ( ) 201- 250 موظف   ( ) 251- 500 موظف

( ) 501- 1000 موظف   ( ) 1001- 2500 موظف   ( ) أكثر من 2500 موظف

24-المسمى الوظيفي؟

( ) رئيس, مدير إداري, رئيس تنفيذي.   ( ) مدير أو رئيس خدمات نظــم المعلومات.

( ) مدير عمليات.   ( ) مدير مالي.

( ) أخرى (حددها) _____

25- الجنس؟

( ) ذكر   ( ) أنثى

26- العمر؟

( ) 21 – 29 سنة   ( ) 30 – 39 سنة   ( ) 40 – 49

( ) 50 – 59 سنة   ( )60 فأكثر

27- المؤهل العلمي؟ (الرجاء تحديد اخر مؤهل علمي حصلت علية)

( ) أقل من ثانوي.   ( ) ثانوية عامة.   ( ) شهادة تجارية.

( ) بكالوريوس.   ( ) ماجستير.   ( ) دكتوراه.

( ) أخرى (حددها)_____

28- من أين حصلت على اخر مؤهل دراسي؟ (الرجاء اختيار اجابة واحدة)

( ) المملكة العربية السعودية.   ( ) دول الخليج العربي.

( ) أمريكا.   ( ) أوروبا.

( ) أخرى (حددها)_____

كمشارك في هذا البحث، لك الخيار بأن تزودنا باسم منظمتكم وعنوان بريدها الإلكتروني، ليتسنى لنا الاتصال بكم وإرسال ملخص النتائج النهائية للدراسة. هذا ونقدر دعمكم لنا. ونؤكد أن جميع المعلومات سوف تعامل بخصوصية وسرية تامة.

اسم المنظمة: _____

البريد الإلكتروني: _____

رقـــم الفاكس: _____

Appendix C: Inter-item and intra-item correlations matrix

Table C.1									Inter-item and intra-item correlations matrix													
	RAD1	RAD2	RAD3	RAD4	RAD5	RAD6	RAD7	RAD8	RAD9	COM1	COM2	COM3	SEC1	SEC2	SEC3	SEC4	COS1	COS2	COS3	COS4	LAC1	LAC2	LAC3
RAD1	.658																						
RAD2	.703	.761																					
RAD3	.607	.638	.613																				
RAD4	.638	.665	.548	.779																			
RAD5	.666	.688	.623	.754	.777																		
RAD6	.659	.680	.620	.731	.759	.744																	
RAD7	.652	.679	.584	.759	.759	.737	.755																
RAD8	.667	.707	.588	.744	.738	.720	.742	.750															
RAD9	.678	.725	.578	.759	.736	.716	.748	.760	.781														
COM1	.033	.022	.158	-.243	-.102	-.057	-.186	-.186	-.210	.787													
COM2	.032	.044	.130	-.276	-.154	-.114	-.222	-.201	-.206	.739	.755												
COM3	.045	.042	.155	-.241	-.109	-.065	-.188	-.183	-.198	.790	.761	.801											
SEC1	.012	-.065	.157	.063	.181	.187	.094	-.008	-.070	.320	.136	.263	.765										
SEC2	.100	.033	.184	.187	.260	.267	.189	.089	.053	.280	.106	.243	.681	.695									
SEC3	.175	.160	.149	.263	.251	.245	.230	.169	.192	.079	.034	.091	.253	.367	.384								
SEC4	.259	.284	.156	.266	.209	.225	.230	.264	.295	.021	.016	.048	-.173	-.004	.118	.397							
COS1	.194	.179	.139	.257	.228	.253	.232	.251	.236	.021	-.097	.004	.064	.181	.046	.386	.648						
COS2	.180	.172	.134	.179	.163	.199	.166	.207	.187	.114	.004	.099	.006	.111	-.033	.414	.687	.766					
COS3	.172	.162	.127	.177	.161	.195	.162	.197	.179	.115	.006	.101	.025	.132	-.008	.399	.659	.729	.695				
COS4	.336	.322	.262	.515	.470	.463	.472	.434	.441	-.158	-.253	-.166	.188	.331	.295	.279	.386	.315	.317	.516			
LAC1	.291	.302	.162	.448	.355	.343	.377	.343	.400	-.159	-.162	-.124	-.016	.203	.403	.316	.184	.096	.115	.439	.614		
LAC2	.029	.030	-.039	.067	.012	.014	.013	-.024	.032	.120	.141	.163	.022	.190	.365	.182	-.018	-.070	-.042	.170	.442	.520	
LAC3	.335	.346	.218	.492	.414	.399	.433	.400	.446	-.180	-.193	-.155	.010	.203	.367	.290	.193	.106	.121	.444	.564	.357	.533

Table C.1 (Cont.)

	STO1	STO2	STO3	STO4	STO5	STO6	STO7	STO8	STO9	ITR1	ITR2	ITR3	ITR4	ITR5	ITR6	ITR7	RTC1	RTC2	RTC3	RTC4	RTC5	RTC6R	LRO1	LRO2	LRO3	LRO4	LRO5	DEC1	DEC2	DEC3	FOR1	FOR2	FOR3
STO1	**0.94**																																
STO2	-0.17	**0.96**																															
STO3	-0.11	-0.22	**0.94**																														
STO4	-0.33	0.08	-0.36	**0.95**																													
STO5	-0.02	-0.02	-0.09	-0.03	**0.95**																												
STO6	0.00	-0.10	0.06	-0.21	-0.42	**0.93**																											
STO7	0.02	-0.01	0.02	0.00	-0.09	-0.12	**0.95**																										
STO8	-0.08	-0.04	-0.12	0.01	-0.01	0.04	-0.44	**0.92**																									
STO9	-0.06	-0.13	-0.04	0.11	0.09	-0.09	-0.11	-0.35	**0.91**																								
ITR1	-0.03	0.00	0.04	0.11	0.00	-0.08	0.10	0.00	-0.15	**0.93**																							
ITR2	-0.08	0.02	0.03	-0.02	0.01	0.09	-0.18	0.09	-0.01	-0.26	**0.95**																						
ITR3	0.03	-0.05	0.03	-0.07	0.02	-0.10	0.07	-0.13	0.05	-0.21	-0.15	**0.95**																					
ITR4	-0.17	0.03	0.10	0.07	-0.03	0.03	0.08	-0.13	0.03	0.01	-0.05	-0.04	**0.94**																				
ITR5	0.13	-0.08	0.02	-0.07	-0.07	-0.01	-0.01	0.01	-0.08	-0.08	-0.12	-0.34	-0.31	**0.93**																			
ITR6	0.03	0.01	0.05	-0.02	-0.15	0.02	-0.05	0.14	0.08	-0.23	0.08	0.09	-0.15	-0.10	**0.90**																		
ITR7	-0.09	0.01	0.02	0.04	0.08	0.03	0.03	-0.11	0.12	0.16	-0.15	-0.19	0.09	-0.07	-0.58	**0.93**																	
RTC1	0.05	0.04	-0.14	-0.06	-0.05	-0.21	-0.06	0.00	-0.08	-0.05	0.05	0.00	0.03	0.19	-0.10	-0.10	**0.94**																
RTC2	0.00	-0.10	0.07	-0.08	0.03	-0.01	0.02	-0.03	-0.12	-0.01	-0.05	0.13	0.13	-0.04	-0.01	0.01	-0.28	**0.95**															
RTC3	-0.09	-0.02	-0.05	0.00	-0.14	0.19	0.05	0.01	0.00	0.07	0.10	-0.02	0.02	-0.08	0.10	-0.07	-0.05	-0.28	**0.95**														
RTC4	0.15	0.02	-0.08	0.05	0.07	-0.07	0.01	0.09	-0.32	0.08	0.01	-0.02	-0.05	0.03	-0.10	-0.03	-0.07	0.10	-0.15	**0.90**													
RTC5	0.01	0.14	0.01	-0.04	0.06	-0.04	-0.10	-0.20	0.06	-0.05	-0.02	-0.18	0.00	-0.10	-0.07	0.05	-0.18	-0.10	-0.21	-0.14	**0.96**												
RTC6	0.04	-0.01	-0.12	0.07	0.10	-0.09	-0.05	-0.12	0.18	0.07	-0.03	-0.06	-0.07	0.12	-0.16	0.00	0.17	-0.12	-0.09	0.08	0.03	**0.55**											
LRO1	-0.10	0.04	-0.02	0.02	0.06	-0.09	-0.02	0.08	-0.05	0.06	-0.09	-0.01	-0.06	-0.05	-0.01	-0.03	-0.11	-0.02	-0.10	0.12	-0.06	-0.06	**0.96**										
LRO2	0.00	0.02	-0.23	0.05	-0.09	0.05	-0.01	0.05	-0.15	-0.06	0.05	0.08	0.06	-0.02	-0.14	-0.12	0.10	-0.09	0.10	0.08	0.04	0.03	-0.35	**0.95**									
LRO3	-0.08	-0.18	0.06	-0.09	-0.11	0.10	-0.10	0.09	0.08	-0.05	-0.01	-0.04	-0.08	0.05	0.08	-0.02	0.00	-0.02	-0.08	-0.21	0.00	-0.07	0.01	-0.24	**0.96**								
LRO4	-0.09	-0.21	0.11	-0.09	-0.13	0.03	-0.02	0.15	-0.04	-0.06	-0.02	0.06	-0.18	-0.01	0.18	-0.07	-0.09	0.09	-0.01	0.05	-0.11	-0.12	0.02	-0.10	-0.04	**0.93**							
LRO5	-0.12	0.03	0.03	0.05	0.01	-0.14	-0.04	0.12	0.00	0.09	0.10	-0.02	0.08	0.07	-0.01	-0.03	0.11	0.03	-0.02	-0.13	-0.10	-0.07	-0.07	-0.03	-0.04	-0.32	**0.90**						
DEC1	-0.27	0.03	0.02	0.04	0.12	0.02	-0.06	-0.08	0.26	-0.09	0.10	-0.09	-0.05	-0.13	-0.05	0.03	-0.02	-0.23	0.08	-0.14	0.13	0.02	0.00	0.04	0.05	0.03	-0.03	**0.83**					
DEC2	0.17	0.00	0.04	-0.05	-0.12	-0.05	0.01	-0.17	0.03	-0.03	-0.11	-0.10	-0.03	0.18	-0.01	-0.01	0.24	-0.03	-0.05	-0.12	0.16	0.07	-0.10	-0.04	-0.06	-0.10	0.01	-0.18	**0.89**				
DEC3	0.11	0.06	-0.16	0.07	-0.05	0.07	0.04	0.03	-0.12	0.04	-0.02	0.09	-0.11	-0.08	-0.03	0.03	-0.16	0.09	-0.01	0.16	-0.10	0.03	-0.01	0.02	-0.06	-0.09	-0.19	-0.22	-0.28	**0.94**			
FOR1	-0.09	-0.01	0.10	-0.07	0.00	-0.04	-0.05	-0.05	0.03	0.08	-0.14	0.10	-0.07	0.07	-0.05	-0.17	-0.07	-0.05	-0.02	-0.05	0.14	0.10	0.13	-0.02	0.01	-0.09	0.02	-0.06	0.03	-0.04	**0.95**		
FOR2	0.09	0.02	-0.13	0.03	0.15	-0.12	0.12	-0.09	0.14	-0.09	-0.03	0.03	-0.01	-0.24	0.12	-0.04	0.04	-0.13	0.01	-0.08	-0.02	0.05	-0.11	-0.05	-0.09	0.14	-0.17	0.20	-0.05	-0.19	-0.35	**0.92**	
FOR3	0.03	-0.02	0.12	-0.09	-0.12	0.18	-0.15	0.05	-0.05	-0.04	0.03	-0.12	0.01	0.17	-0.07	0.06	0.03	-0.01	-0.15	-0.10	-0.11	-0.04	0.01	-0.06	0.11	-0.14	0.19	-0.03	-0.02	-0.01	-0.09	-0.28	**0.92**

Table C.1 (Cont.)

	EPR-CUST1	EPR-CUST2	EPR-CUST3	EPR-COMP1	EPR-COMP2	EPR-COMP3	EPR-COMP4	EPR-COMP5	EPR-SUPP1	EPR-SUPP2	EPR-SUPP3	EPR-SUPP4	REG1	REG2	REG3	REG4	REG5	NRE1	NRE2	NRE3	NRE4	NRE5	NRE6	NRE7	NRE8	NRE9	ECO1	ECO2	ECO3
EPR-CUST1	**.829**																												
EPRCUST2	-.560	**.806**																											
EPR-CUST3	.134	-.008	**.783**																										
EPR-COMP1	.000	.110	.124	**.686**																									
EPR-COMP2	.123	-.086	-.124	-.406	**.760**																								
EPR-COMP3	-.030	.063	-.001	-.038	-.231	**.714**																							
EPR-COMP4	-.030	-.004	-.196	-.416	.051	-.334	**.738**																						
EPR-COMP5	-.031	.089	.090	.100	-.016	.013	-.106	**.721**																					
EPR-SUPP1	-.167	-.046	-.158	.014	-.041	-.020	.093	.021	**.871**																				
EPR-SUPP2	.091	-.290	-.021	-.117	-.075	-.124	.180	-.123	-.336	**.853**																			
EPR-SUPP3	.056	.040	-.179	-.090	.191	-.063	.046	-.322	.038	-.164	**.667**																		
EPR-SUPP4	-.140	.093	.042	-.023	.009	.034	-.009	.046	-.238	-.169	-.362	**.863**																	
REG1	-.141	.042	.086	.081	.007	-.148	.030	-.114	-.244	.034	.123	.010	**.911**																
REG2	.063	-.176	.067	.102	-.153	.186	-.192	.095	.038	-.042	-.126	.011	-.235	**.879**															
REG3	-.106	.008	-.033	-.139	.007	-.129	.156	.037	.090	.122	-.220	.046	-.205	-.331	**.866**														
REG4	.088	.120	-.004	.072	.062	-.008	-.043	-.067	-.051	-.088	.202	-.120	-.078	-.321	-.360	**.843**													
REG5	.030	-.115	.132	.047	.007	-.011	-.033	.175	.029	-.034	-.144	.115	-.168	.027	.014	-.446	**.870**												
NRE1	.053	.017	.022	-.016	-.084	.116	-.053	-.061	-.017	.024	.199	-.036	-.127	.069	-.210	.075	-.064	**.831**											
NRE2	-.068	-.040	-.043	.054	.109	-.133	-.069	-.047	-.006	.016	-.131	-.076	.151	-.029	.073	.000	.075	-.689	**.809**										
NRE3	.012	-.038	-.154	-.136	.007	.091	.102	-.009	.055	-.051	.060	-.036	-.168	.003	-.097	.016	.012	.147	-.427	**.906**									
NRE4	.122	-.173	.053	.025	-.057	.092	-.007	-.088	-.076	.077	-.026	-.024	.077	-.055	-.071	-.017	.001	.088	-.077	-.021	**.900**								
NRE5	-.178	.184	-.029	-.033	.043	.023	.090	.079	.081	-.165	.002	.048	-.070	-.036	.068	.051	-.088	-.028	-.101	-.117	-.351	**.913**							
NRE6	.050	-.099	.068	-.158	.170	.034	.006	-.003	.085	-.001	.058	-.099	.019	-.002	.102	-.140	.094	-.088	.060	-.096	-.072	-.245	**.916**						
NRE7	.047	-.034	-.027	.023	-.067	.141	-.040	.094	.010	-.005	-.083	.045	-.022	.037	-.041	.012	-.084	-.033	-.068	.011	-.086	-.073	-.235	**.916**					
NRE8	-.095	.119	.044	.004	.048	-.007	-.023	-.114	-.121	-.050	.015	.058	.029	-.108	.053	.132	.061	-.125	.160	-.161	-.018	-.026	-.150	-.372	**.888**				
NRE9	.056	-.032	.037	.156	-.135	-.066	-.103	.046	-.091	.002	-.038	-.032	.017	.098	-.074	-.058	-.023	-.065	-.060	.106	.112	-.159	-.111	-.176	-.185	**.917**			
ECO1R	.041	-.045	-.048	.094	-.097	-.100	-.086	.034	.051	-.055	.123	-.064	-.007	-.014	.036	.061	-.054	.049	-.067	.051	-.141	.090	-.022	-.045	.017	.079	**.823**		
ECO2R	-.013	.019	-.014	-.023	.010	.044	-.045	.117	-.089	.047	-.238	.186	-.015	-.035	.068	-.040	-.032	-.046	.013	-.015	.028	.013	-.026	-.001	-.012	.043	-.536	**.757**	
ECO3R	-.073	.054	-.089	-.096	-.048	.130	-.027	-.063	.009	-.093	.194	-.129	.080	.015	-.113	.017	.034	.068	.016	.078	.155	-.065	.038	-.043	.088	-.018	-.152	-.423	**.847**

Appendix D: Handling missing data

Table D.1	Techniques for handling missing data

Information on this page has been removed for data protection purposes

Source: Tsikriktsis, 2005.

Aston University

Information on this page has been removed for data protection purposes

Source: Tsikriktsis, 2005.

Appendix E: Item analysis

Table E.1	Item analysis: corrected item-total correlation for research variables					
Item		**Mean if deleted**	**Variance if deleted**	**Item-total correlated**	**p**	**Alpha if deleted**
Relative advantage	RAD1	31.78	47.547	0.731	0.000	0.941
	RAD 2	31.78	47.365	0.787	0.000	0.938
	RAD 3	31.89	48.887	0.646	0.000	0.946
	RAD 4	31.61	46.537	0.809	0.000	0.937
	RAD 5	31.74	46.284	0.827	0.000	0.936
	RAD 6	31.69	46.602	0.807	0.000	0.937
	RAD 7	31.61	46.727	0.819	0.000	0.936
	RAD 8	31.73	46.247	0.814	0.000	0.937
	RAD 9	31.55	47.373	0.827	0.000	0.936
Compatibility	COM1	5.60	5.137	0.774	0.000	0.825
	COM2	5.54	5.533	0.712	0.000	0.880
	COM3	5.59	5.099	0.821	0.000	0.783
Security Concern	SEC1	9.99	4.652	0.321	0.000	0.392
	SEC2	9.86	3.931	0.558	0.000	0.156
	SEC3	9.78	4.699	0.261	0.000	0.451
	SEC4	9.77	6.018	0.064	0.000	0.600
Adoption cost	COS1	10.39	5.960	0.630	0.000	0.673
	COS 2	10.48	5.146	0.650	0.000	0.654
	COS3	10.47	5.832	0.620	0.000	0.675
	COS 4	10.07	6.741	0.371	0.000	0.803
Language concern	LAC1	7.49	3.445	0.428	0.000	0.390
	LAC2	8.03	3.671	0.311	0.000	0.581
	LAC3	7.33	3.923	0.409	0.000	0.432
IT readiness	ITR1	22.91	31.136	0.634	0.000	0.888
	ITR2	22.78	31.435	0.681	0.000	0.882
	ITR3	22.96	31.157	0.757	0.000	0.874
	ITR4	22.94	32.449	0.637	0.000	0.887
	ITR5	23.14	30.309	0.791	0.000	0.870
	ITR6	22.96	29.386	0.683	0.000	0.884
	ITR7	22.87	30.475	0.725	0.000	0.877
Management team support	MTP1	14.33	14.878	0.722	0.000	0.880
	MTP2	14.51	15.097	0.730	0.000	0.878
	MTP3	14.38	14.605	0.830	0.000	0.856
	MTP4	14.35	15.383	0.705	0.000	0.883
	MTP5	14.21	15.001	0.744	0.000	0.875

	Item	Mean if deleted	Variance if deleted	Item-total correlated	p	Alpha if deleted
Table E.1(Cont.)						
Learning orientation	LRO1	14.56	12.416	0.647	0.000	0.796
	LRO2	14.76	12.782	0.693	0.000	0.784
	LRO3	14.75	13.331	0.646	0.000	0.798
	LRO4	14.70	12.518	0.646	0.000	0.796
	LRO5	14.61	13.622	0.542	0.000	0.825
Receptivity toward change	RTC1	17.31	12.594	0.706	0.000	0.658
	RTC2	17.41	13.029	0.637	0.000	0.678
	RTC3	17.41	13.058	0.636	0.000	0.678
	RTC4	17.40	14.021	0.505	0.000	0.715
	RTC5	17.35	12.576	0.697	0.000	0.659
	RTC6	17.78	18.619	0.074	0.000	0.857
Decentralization level	DEC1	7.00	3.796	0.404	0.000	0.671
	DEC2	7.43	3.649	0.510	0.000	0.529
	DEC3	7.63	3.608	0.526	0.000	0.507
Formalisation level	FOR1	7.18	4.051	0.597	0.000	0.676
	FOR2	7.23	4.008	0.661	0.000	0.609
	FOR3	7.30	4.003	0.530	0.000	0.758
Strategic orientation	STO1	29.79	47.064	0.680	0.000	0.907
	STO2	30.32	47.561	0.666	0.000	0.908
	STO3	30.30	45.784	0.729	0.000	0.903
	STO4	30.00	46.721	0.740	0.000	0.903
	STO5	30.18	46.101	0.699	0.000	0.906
	STO6	30.28	46.012	0.726	0.000	0.904
	STO7	30.18	45.643	0.736	0.000	0.903
	STO8	30.33	45.337	0.718	0.000	0.904
	STO9	30.57	47.788	0.629	0.000	0.910
Customer Pressure	EPR-CUST1	36.45	38.129	0.525	0.000	0.714
	EPR-CUST2	36.66	39.480	0.471	0.000	0.722
	EPR-CUST3	36.63	42.412	0.206	0.000	0.753
Business partner Pressure	EPR-SUPP1	36.91	38.141	0.404	0.000	0.730
	EPR-SUPP2	36.69	39.119	0.409	0.000	0.729
	EPR-SUPP3	36.77	40.866	0.294	0.000	0.744
	EPR-SUPP4	37.12	37.787	0.492	0.000	0.717

	Item	Mean if deleted	Variance if deleted	Item-total correlated	p	Alpha if deleted
Table E.1(Cont.)						
Competitive pressure	EPR-COMP1	36.05	42.509	0.209	0.000	0.753
	EPR-COMP2	36.50	40.201	0.455	0.000	0.725
	EPR-COMP3	36.51	40.520	0.435	0.000	0.727
	EPR-COMP4	36.05	42.485	0.309	0.000	0.740
	EPR-COMP5	36.35	40.526	0.436	0.000	0.727
Regulatory & legal environment	REG1	11.92	17.610	0.779	0.000	0.912
	REG2	11.94	17.817	0.826	0.000	0.903
	REG3	11.85	17.610	0.823	0.000	0.903
	REG4	12.07	17.054	0.864	0.000	0.895
	REG5	12.22	17.246	0.735	0.000	0.922
National e-readiness	NRE1	26.74	45.269	0.690	0.000	0.893
	NRE2	26.57	46.187	0.709	0.000	0.891
	NRE3	26.88	46.258	0.675	0.000	0.894
	NRE4	26.96	47.187	0.556	0.000	0.903
	NRE5	26.96	45.058	0.768	0.000	0.887
	NRE6	27.00	44.910	0.721	0.000	0.890
	NRE7	26.90	44.567	0.728	0.000	0.890
	NRE8	26.72	46.761	0.667	0.000	0.894
	NRE9	26.79	47.701	0.589	0.000	0.900
Economic downturn	ECO1	6.06	4.349	0.736	0.000	0.805
	ECO2	6.19	4.273	0.791	0.000	0.752
	ECO3	6.22	4.751	0.684	0.000	0.85
Technology consultants' orientation	TCO1	20.05	29.619	0.708	0.000	0.931
	TCO2	20.02	30.149	0.812	0.000	0.920
	TCO3	20.05	30.748	0.765	0.000	0.924
	TCO4	20.20	29.794	0.796	0.000	0.921
	TCO5	20.01	31.169	0.754	0.000	0.925
	TCO6	20.01	29.706	0.856	0.000	0.916
	TCO7	20.14	30.120	0.814	0.000	0.920

Appendix F: Firms participating in the preliminary study

- S1 is a food and beverage business. It is a family-owned firm established in 2007. S1 has 12 employees and the firm has a computer network with direct access to the Internet. S1 provides a wireless Internet connection for its customers. The firm has access to e-mail and it is used within the firm to circulate documents to employees. Moreover, e-mail is also used to contact customers, place orders and negotiate with suppliers. S1 is planning to have a website which will be mainly used as a promotional and advertisement tool.

- S2 is a retail clothing store offering a wide range of casual, informal and formal women's clothing apparel. It has been operating for six years. S2 has ten employees and there are only two staff members with the appropriate PC usage and email application skills. An outsourced IT consultant supports the firm in its computing networks and systems. The Internet is not used extensively and is mostly used for basic purposes such as e-mail to communicate with their overseas clothing suppliers. S2 is in the process of designing a static website as the firm believes that it is important to prepare for the future where Internet usage will continue to expand.

- S3 is a women's clothing manufacturer. It is a family owned enterprise. S3 imports the raw materials from France and the United States. The SME employs 33 people and it has two branches to show product samples to clients. S3 uses personal contacts and word of mouth to attract customers. Moreover, phone and fax are used mainly for receiving and placing orders, and to contact customers. S3 is not willing to have an online catalogue because the CEO thinks that this will decrease competitive advantage by passing useful sensitive product information to competitors, who will be able to copy designs and styles. S3 has standalone PCs which have Microsoft applications and an inventory system. The firm outsources its IT services but it is considering hiring skilled IT employees to support their computing systems.

- S4 is an architecture and engineering design specialist. It has been operating for four years. The firm achieved 30% growth in 2008. Although S4 provides online shopping service on their website, customers do not use it, primarily because of security concerns. The company has an online catalogue that provides useful information about its product lines. Moreover, the company has open Internet access all the time and it has started introducing online order processing. S4 has an IT department comprised of two full time engineers and does not

believe in outsourcing if the Internet is to be used to achieve competitive advantage. S4 uses e-mail extensively to contact overseas suppliers. The firm checks e-mail on a daily basis and internal e-mail is used to transfer data between employees such as electronic forms and images.

- S5 was founded in 2004 and provides computer maintenance and support services. It currently employs 27 people and the firm is considering hiring more employees. Technology staff turnover is high and considerable energy is involved in recruiting and retaining skilled technology workers. Not surprisingly, there is a local area network (LAN) and Internet connection used by all staff. The company has a customer database and a timesheet reporting system. S5 has a marketing website that is updated regularly on a weekly basis. However, there is no plan to offer online selling for computer hardware and software as a result of the economic downturn. The company believes in focusing on improving the quality of current IT services as opposed to introducing new services.

- S6 is a service firm that offers ICT solutions and training such as software development and website design for local SMEs. S6 is a family-owned firm comprised of ten employees. The company has a PC network and all employees have computers. The systems have been set up and maintained by staff. S6 has a permanent Internet connection using a Digital Subscriber Line (DSL), a static website; both internal and external e-mails are extensively used. In terms of future development, there is recognition of the need to develop an e-business system to host a portal to sell local SME products online. S6 capability is at level 3.

- S7 was established by the CEO in 1991 to provide advertising, graphic design and printing services. The owner believes that the market is competitive, with the Internet seen as a means of offering added value to customers. Therefore, S7 recently developed its website for advertising and marketing their services to generate future profits. The firm uses e-mail to contact their suppliers and the company sees this communication channel as a positive way to offer better customer service. Moreover, the company believes that it is important to always remember that customers today expect excellent customer service and will go where they can find it. Indeed, companies lose customers over bad service. S7 has continuous open Internet access and it is used to download clipart images and to access commercial databases. S7 is planning to implement a local area network that enables all departments to communicate with each other to minimise duplication of resources and improve efficiency.