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THE DEVELOPMENT OF E-COMMERCE CAPABILITY AND ITS IMPACT ON BUSINESS PERFORMANCE: A CASE OF MALAYSIAN MANUFACTURING INDUSTRIES

by

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THE DEVELOPMENT OF E-COMMERCE CAPABILITY AND ITS IMPACT ON BUSINESS PERFORMANCE: A CASE OF MALAYSIAN MANUFACTURING INDUSTRIES

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MUHAMMAD JEHANGIR

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I, MUHAMMAD JEHANGIR

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DEDICATION

The fruits of this journey are dedicated first to my mother who sacrificed my presence and sent me abroad for higher education, whose love, support, encouragement and prayers inspired me throughout this program. She is the virtuous woman who always encouraged me to do my best.

I am grateful to my late father, who thought me the value of education and showed me that with hard work, determination and long term dedication goals can be achieved.

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ABSTRACT

Firms around the world are embracing electronic-commerce (EC) technologies as strategic marketing tools to enhance the competitive advantage and organizational performance. Over the last two decades, EC obtained prominent importance and has become a key dimension to a firm value. Many firms have invested in this technology to compete in the fast paced business environment. However, the literature contains mixed findings of EC on overall business performance and the success of EC implementations is scarce in the literature. This study attempts to investigate why some firms are getting advantages from EC while some are not. By examining the attributes of firm's business, human and IT resources, this research seeks to enhance an understanding of the relationship between EC capability and business performance.

A total of 287 participants from manufacturing companies throughout Malaysia completed 63 items survey instrument. The instrument measured business resources, human resources, IT resources and business performance factors. Reliability and factor analysis were assessed for data screening; estimation of construct validity by confirmatory factor analysis (CFA) and the relationships between factors were established with structural equation modelling (SEM).

The results of descriptive statistics and reliability presented data usability for current study and by examining firm's business, human and IT resources the results of SEM provided the evidence of significant relationship between EC capability and business performance. This strongly suggests the necessary investments for the utilization of firm's resources for the implementation and usage of EC technologies.

The significant relationship between EC capability and business performance also provides a base to explain that EC is not only a technology; but also a complete business process needing proper strategies to gain its value. The results of this study may explain the issue of mixed business benefits from the implementation of EC

technologies. Finally this investigation offers new insights that applicable to the development of EC capability and its returns. In so doing, this study may help theorists and practitioners, especially within the manufacturing industries, to develop EC strategies at post- and pre- implementation levels of EC application. This study is helpful in providing the resource-based and dynamic capability perspectives of EC in terms of better understanding and usage of the resources for the implementation of EC technology. The findings of this study can be taken into consideration for the successful usage of EC.

Index terms: electronic-commerce, capability, resources, implementation, manufacturing industries

ABSTRAK

Firma-firma di seluruh dunia sedang menggunakan teknologi Perdagangan-Elektronik (PE) sebagai alat pemasaran strategik untuk meningkatkan kelebihan daya saing dan prestasi organisasi. Semenjak dua dekad yang lalu, PE telah memperolehi kepentingan dan telah menjadi dimensi utama untuk menentukan nilai sesuatu firma. Banyak firma telah membuat pelaburan dalam teknologi ini supaya dapat bersaing dalam persekitaran perniagaan mengembang dengan pesatnya. Walaubagaimanapun, kajian yang dibuat mempunyai penemuan yang berbagai tentang PE atas prestasi perniagaan secara kesuluruhannya dan kejayaan pelaksanaan PE adalah sangat terhad di dalam hasil kajian yang terdahulu. Kajian ini cuba untuk menyiasat sebab-sebab sesetengah firma mendapat keuntungan lumayan menggunakan PE dan pada masa yang sama firma-firma yang lain tidak dapat hasil yang sama. Dengan memeriksa ciri-ciri perniagaan firma , sumber manusia dan IT, kajian ini bertujuan untuk meningkatkan tahap pemahaman di antara keupayaan PE dan prestasi perniagaan.

Secara kesuluruhannya, 287 orang dari syarikat perindustrian di Malaysia telah melengkapkan kaji selidik yang mempunyai 63 item. Kaji selidik itu telah mengukur empat factor: sumber perniagaan, sumber manusia, sumber IT, dan prestasi perniagaan. Kebolehpercayaan dan analisis terhadap faktor-faktor ini terlah dinilai untuk memeriksa data; anggaran pembinaan sah dengan “confirmatory factor analysis (CFA)” dan hubungan di antara factor-faktor telah ditubuhkan dengan “structural equation modelling (SEM).”

Hasil keputusan statistic deskriptif dan kebolehpercayaan menunjukkan kebolehgunaan data untuk kajian semasa dan dengan pemeriksaan perniagaan firma, sumber manusia dan IT, keputusan SEM telah membuktikan hubungan ketara di antara keupayaan PE dan prestasi perniagaan. Ini dengan kuatnya mencadangkan keperluan pelaburan untuk penggunaan sumber-sumber firma untuk pelaksanaan dan kegunaan teknologi PE.

Hubungan yang ketara di antara keupayaan PE dan prestasi perniagaan juga menyediakan asas untuk menerangkan bahawa PE bukan sahaja satu teknologi , tetapi ia juga merupakan satu proses perniagaan lengkap yang memerlukan strategi yang betul untuk mendapatkan nilainya. Keputusan kajian ini boleh menerangkan isu-isu berbagai faedah perniagaan dengan pelaksanaan teknologi PE. Akhirnya, kajian ini menawarkan wawasan baru yang berkenaan dengan pembangunan keupayaan PE dan pulangannya. Kajian ini juga boleh membantu ahli-ahli theori dan juga pengamal , terutamanya dalam bidang perindustrian untuk memajukan strategi E-dagang di peringkat pra-pelaksanaan aplikasi PE. Kajian ini adalah membantu dalam menyediakan perspektif keupayaan berasaskan sumber dan dinamik SPR dari segi pemahaman yang lebih baik dan penggunaan sumber bagi pelaksanaan teknologi ini. Hasil kajian ini boleh diambil kira untuk kegunaan kejayaan SPR.

Indeks Terma: E-dagang , keupayaan, sumber, pelaksanaan , perindustrian

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CHAPTER 1

INTRODUCTION

1.1 Thesis Overview

Over the last two decades, information technology (IT) and information system (IS) have been significantly influenced business communities around the world and have changed the climate of business towards a digital format. Following this, many firms significantly invest on IT/IS either to improve the efficiency of the business or to achieve a higher level of competitive advantage. IT refers to technological factors such as infrastructure, hardware and software; IS focuses more on organizational/sociological and behavioral factors related to the technology.

The Internet in turn has launched an enormous technological revolution, rapidly affecting society and establishing a platform for organisations to expand their business activities globally by using Electronic commerce (EC) technologies (Angappa et, al., 2009). EC has emerged as one of the most prominent and widely used business models in today's competitive environment. Increasingly firms are likely to experience some disadvantages without some kind of EC applications and e-business strategies (Rodgers et al., 2004). EC is differently defined by authors of different studies. Simply, EC refers to a commercial transaction, transfering products/services and information between and among consumers, customers and organizations using online means (Turban et al, 2009).

EC has introduced new ways of conducting business operations and new processes that reaches across boundaries. It is a core component of business approaches that generate value by allowing organizations, suppliers, customers and consumers to

exchange information about business activities, products and services (Li, 2008) and to facilitate business transactions for materials and services (Wu et, al. 2007).
EC improves productivity by offering better quality and performance through the efficacy in business processes redesign. In particular, EC has a potential to provide and facilitate an efficient operations of supply chain (Romero and Rodrı´guez, 2010).
However, its outcome and allocation highly depends on the features of business models and EC strategies, reflecting that the successful implementation and usage of EC among organizations is uncertain (Hsiao and Teo, 2005). Some of the previous studies show the uncertain evidences about EC and the factors of its failure (Grey et al, 2005, Gefen, 2004, Berryman and Heck, 2001). However, some studies also describe successful business outcomes associated with EC (Craighead and Laforge 2002, Toy 2001, Brynjolfsson and Smith 2000).

The adoption and use of EC principally needs some appropriate strategies and the utilization of specific resources (Leea et al, 2010; Ordanini and Rubera, 2010). For more successful EC outcomes, firms need to specifically blend their organizational resources to meet the challenges of a specific business environment. However, these distinctive resources are sometimes not sufficient to ensure better results. It depends on how firms should assign and use the resources (Barney JB, 1991).

Recently, numerous capabilities have been developed to achieve the successful IT implementations and a better performance of a firm. Fewer researches however are found to develop EC capability by generating and integrating organizational resources. The utilization of organizational resources would be very useful in enhancing business performance in EC environment (Zhuang and Lederer, 2006). Zott (2003) argued that IT capabilities provide better and sustainable benefits to the firm. Meanwhile the utilization of technology, business and human resources would be very effective to meet the challenges of EC, and effectively to serve the customers and increase productivity. The present study is designed to measure EC capability by examining business, human and technology resources to identify the relationship between EC capability and business performance.

1.2 Research Agenda

1.2.1 Research Context

The context for this research has been limited only to Malaysian manufacturing industries including those in electronics, steel, food and beverage, pharmaceuticals, textiles and the automotive industry. The primary reason for choosing the manufacturing industry is due to their involvement in EC applications. The context also has been decided to confine the study to the Malaysian-based manufacturing industries.

In fact, Malaysia is transforming its economy from an agriculture-based economy to an industry-based to become a fully developed country by 2020 vision (Tsen, 2005). Manufacturing industry, one of the key sectors of the country economy, is deemed to be an important engine of the economic growth. The growth of the Internet, ICT and political immovability pushes organizations to implement EC applications in Malaysia. According to Statistical Department (2008) the total online transactions in Malaysia has reached USD26bn and 23.4% of internet subscribers of the whole population has been recorded in 2007.

Recently, the manufacturing industry of Malaysia in addition generated a significant number of employment opportunities and the highest growth rate was recorded in country's GDP by manufacturing sector in 2010, which is 11.4% (Department of Statistics Malaysia). The volume of sales by manufacturing sector has increased to RM43.3 billion in 2009 from RM37.3 billion in 2008. Besides such contribution of manufacturing industries, it has some challenges in IT services for outsourcing goods and services. In this case, IT is universally considered as an essential tool that not only determines the productivity of the firms but also enhances the competitiveness of the economy of the country (Oliveira and Martins, 2011).

Due to the influence and impact of IT, manufacturing industries have reached a turning point at a global level (Lawless, 2000), in this case by focusing on managing and controlling all operations efficiently. Today manufacturing information systems

are maintaining and controlling the process of goods and services in production. While using advanced technologies, manufacturing industries attempt to reach a company's goal and achieve a competitive advantage at global level.

1.2.2 Problem statement

The rapid growth in the use of Internet-based EC for business functions has brought some effects on numerous business strategies and performance of a firm. Expansion of Internet-based EC since the past few years in fact has fostered many opportunities for the organizations and offers enormous potential for transforming the businesses and economy globally. In this case, EC offers the firm to expand its presence in digital environments beyond different geographical borders and has generated considerable diversity and complexity in its formation and applications (Khatibi, 2003). Apart from the fact of many opportunities offered, the rapid spreading of EC across the world, many organizations are still hesitant to engage themselves in online business processes and the number of challenges still being faced by organizations in implementing EC technology (Tassabehji, 2003).

The implementation of EC among organizations is still challenging and uncertain (Tassabehji, 2003). Hsiao and Teo (2005) in their study stated that EC implementation among organizations is uncertain and may cause its failure. However, to be successful in such competitive digital markets, firms need to assess and evaluate organizational capabilities (Fathian, 2008). The successful implementation and usage of EC is vital and significant for the growth of the overall economy (Javalgi et. al., 2005). Nevertheless many firms still find it difficult to achieve the full benefits of this technology and also still hinder to take EC initiative for achieving competitive advantages (Khatibi, 2003).

The apparent lack of understanding and proper strategies is increasing the challenges for the success of this technology. In addition, poor IT infrastructure, lack of proper EC model and strategy, lack of skilled personnel to handle EC activities, security and privacy issues are appearing as barriers to the usage of EC to the organizations in their online business activities. Moreover, the lack of restructuring

and building strategies to meet the challenges of pre and post implementation of EC and to be vibrant in the market also affect some firms and leave them with losses (Patterson, Keith F. Ward 2007). While, to be successful in such competitive digital markets, firms need to develop the capability to deal with and to know how it competes (Erik Rolland, Raymond 2009).

An issue then is arising on why some firms get benefits from EC technology and others do not. The resolution of this issue is somewhat imperative because many of the organizations are investing in this technology and applying numerous efforts for the implementation and usage of IT technologies (Hitt and Brynjolfsson, 1996). Considerable research has been conducted in the IT/IS field about why IT investment improves performance in some firms, but not for others. However, the reasons for this are still poorly understood (Hales and Chakravorty, 2006). In other words, the attributes of EC technology implementation that predict success are still unknown or poorly explained. Therefore, current study is conducted to address this gap that is scarce in the literature. Implementation and usage of EC requires an advanced planning and the ability of an organization to utilize the organizational resources for EC success (Ordanini and Rubera 2010). Therefore, this study focuses on how organizational resources develop EC capability that leads to its better outcomes.

1.2.3 Research Objectives

Emerging technologies have pushed the organizations for implementation and usage of IT/IS applications to handle business operations efficiently. In digital business environment, EC applications in turn are becoming the primary concerns. However the better outcomes of this technology are scarce, organizations need to develop proper strategies to implement and use this technology successfully.

This study examines the attributes of organizational resources that predict success in EC environment. Organizational resources such as business, human and IT resources are hypothesized to examine EC capability and its relationship with business performance. The main objective of this study is to develop a model that identifies the organizational resources factors which enhances EC capability, and further identifies

the relationship between EC capability and business performance. The objectives of this study are stated as follow.

- To propose a model explaining how EC capability develops by utilizing organizational resources.
- To find out the relationship between EC capability and business performance.
- To examine the attributes of business, human and IT resources for the development of EC capability.

1.2.4 Research Question

Based on the research objectives of the study, four research questions are established as follows:

- RQ1: What determines EC capability and to what extent does it impact on business performance?
- RQ2: Do business resources such as innovative capacity, market orientation and strategic flexibility influence on EC capability?
- RQ3: Do Human resources such as managerial expertise, top management support and learning capacity influence on EC capability?
- RQ4: Do IT resources such as IT infrastructure and EC resources influence on EC capability?

1.3 Motivation

This research is motivated by the researcher's interest in the field of commerce. The researcher have obtained his undergraduate and master's degrees in the field of commerce and finance. During his MSc, the researcher has studied several techniques of the operations of conventional commerce. Recently, due to technology advancement and the growth of information technology, the researcher wanted to explore and understand the capabilities of digital commerce. Consequently, the research motivation lies in a fundamental ability to understand and recognize the attributes that significantly contribute to the EC success. Resource and dynamic capability-based approach in this case was undertaken to explore the organizational

resources for the development of EC capability. EC implementation is one of the challenging tasks for most of the organizations and researchers. There must be strategic planning and ability of the organizations to reconfigure and deploy the organizational resources for its success, and the researcher wanted to explore the attributes of organizational resources that develops distinctive ability of firms in making strategies for EC based businesses. Managers apparently need to know what factors should surely be included in the pre and post EC implementation plan to contribute to EC success. EC appeared as one of national agendas in Malaysia, providing opportunities to the organizations to expand their business presence across the world (Tsen, 2005). Accordingly, EC will enhance the competitive advantages of the firms. Hence, there is a need for vibrant and efficient EC model, which are easily adoptable and implement able.

1.4 Scope of the study

This study covers the facet of EC operations on the internet and WWW as tools either to communicate and exchange the information for commercial transactions or to promote online marketing. The completion of business processes via other electronic means i.e. Electronic Data Interchange (EDI) is not considered in this study. The term of EC in this refers to the process of the delivery of good, services, information or payments including electronic publishing to promote marketing, advertising and customer support via internet and WWW (Turban et, al. 2009). In addition, this study was proposed to identify the utilization and deployment of the attributes of business, human and technology resources factors such as Innovative capacity, market orientation, strategic flexibility, managerial expertise, top management support, learning capacity, IT infrastructure and EC resources. In this case, the researchers targeted manufacturing industries around Malaysia. The first reason for scoping manufacturing industries is to examine the various business processes for conducting online business activities that other industries may not have. The second one is to focus on only one industry sample in order to avoid a bias because the manufacturing industries arrangements and composition differs from other industries.

1.5 Significance of the study

Being the first step to investigate an EC capability to achieve the higher level of business performance, this research is vital for the practitioners. This research is unique in being the first step to integrate organizational resources to develop an EC capability. Defining resource attributes which may have the impact on EC capability includes examining those who have the contribution to the business performance both directly and indirectly in online business environment. This research also highlights the impact of EC capability on the firm's financial and non- financial performance which will facilitate the managers to develop the strategies in order to exceed benefits, cope with the costs and avoid the technology disappointment. This research is essential because given limited resources to the managers; they need to know that EC is worth implemented to improve business performance.

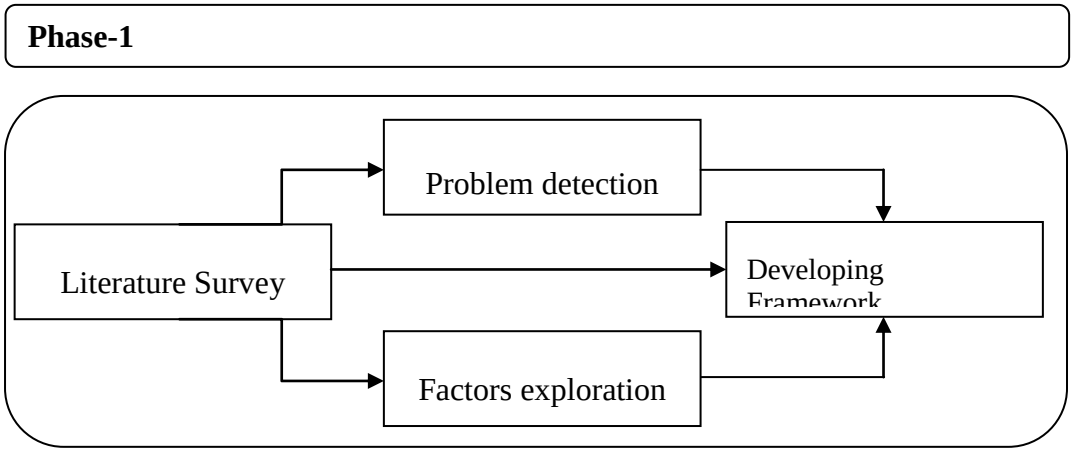
Contribution to the method literature includes measuring the capability of EC by measuring organizational resources which may better imitate the EC accomplishment in the real world firms. Collectively these findings may provide a better understanding and also some alternative explanations of EC success which has bewildered the researchers for two decades.

This study is helpful in providing the resource-based and dynamic capability perspectives of EC in terms of better understanding and usage of the resources for this technology. The findings of this study should be taken into consideration for the successful usage of EC. This study will prove to be valuable among enterprises that are dealing with EC and additionally contributes some valuable insights into the development of EC capability.

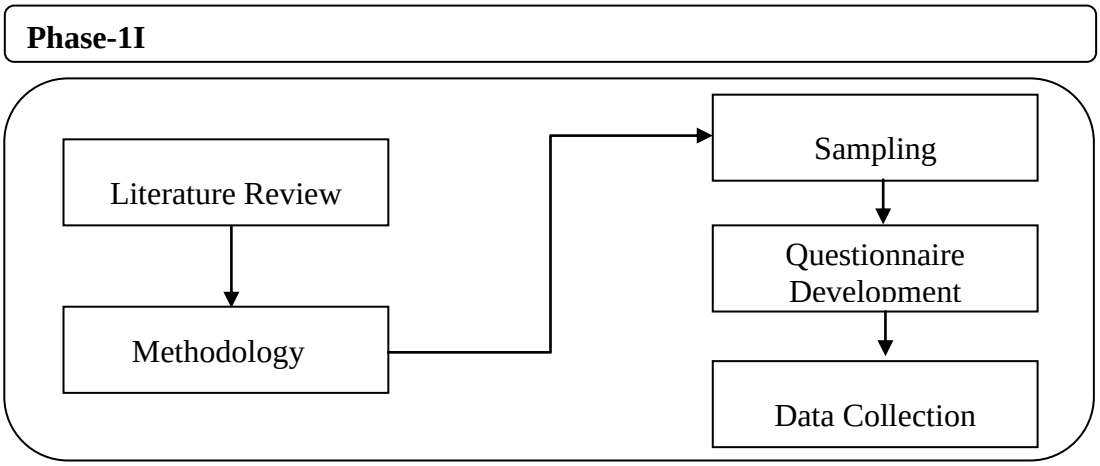
1.6 Research Plan

It has been categorized into three phases performed for the completion of this study and including as follows:

The first phase included the literature review. Based on the literature review, the research problem was identified and the additional examination of this literature was then undertaken to identify the attribute for the development of EC capability that links to business performance. After the investigation and exploration of the attributes, the theoretical model was then developed.



In the next phase, the research methodology was designed based on the literature survey to achieve the research objectives. The research methodology design was carried out in three stages; sampling procedures at the first, questionnaire development at the second and data collection at the last stage.



In the last phase of this study the collected data were analyzed by using statistical tools. Data were interpreted and analyzed using the Software Package for Social

Science version-16 (SPSS-16). Structural equation modelling was subsequently conducted using AMOS 18.

1.7 Outline of thesis

The next chapters of this dissertation are structured as follow:

Chapter 2 begins by reviewing existing literature on EC. It includes definitions and classifications of EC, EC implementation and evaluates studies of the existing literature. The literatures on firms' capabilities and business performance are reviewed. This chapter presents a discussion of possible variables and a summary of the findings relevant to the research questions.

Chapter 3 of this dissertation describes the conceptual model, hypothesis of the study and reports the methodology used in current study. The chapter also describes the survey instrument and statistical methods used to analyze the constructs and relationships between constructs.

Chapter 4 reports the results of data treatment using descriptive statistics, reliability testing and factor analysis.

Chapter 5 reports the results of confirmatory factor analysis and structural equation modelling.

Chapter 6 discusses results pertinent to the research question and reports on how well the theoretical model explains and predict inter-variables relationships.

Chapter 7 includes conclusions drawn from the analysis and finishes with a discussion of limitations and implications of the research.

CHAPTER 2

LITERATURE REVIEW

2.1 Chapter Overview

This chapter highlights a review of the literature to provide theoretical and empirical foundations for current study. Since involving several disciplines and streams, this study includes other studies from the fields of strategic management, IT, IS and EC. Several topics are discussed in this chapter, including the Resource-Based View and Dynamic Capability Theory. The chapter also includes a literature review of EC, theoretical foundations of the study and factors to serve the organizations of the constructs to be investigated in this study. At the end of this chapter a summary is provided.

2.2 Internet and EC

The Internet, especially its services, has become a communication interface to computer networks. It is a massive utility structured for information, communication and media services and introduces a cost-effective mechanism for organizations to engage in global supply chain (Subramaniam, 2003). When firstly introduced in 1960s, the Internet was a collaborative effort among industry, government, and academia. It was planned to be an open accessible means for communicating and sharing information and to be expandable by using packet switching technologies. As a result, IT enables organizations to carry out trade more efficiently and completely different.

With emerging information technologies, the Internet has formed enormous changes in business environments. As for its engagement, IT has long been applied to support the exchange of goods, services and information among organizations to improve the process of supply chain (Dai and Kauffman, 2001). New means of distribution and supply are promising, and meanwhile new marketplaces and exchanges are being electronically formed, known as Electronic Commerce (EC). Although Internet has emerged in the era of 1960s, internet EC in fact arrived in the early 1990s. EC has been elaborated in many ways. In the literature, there are many definitions used to describe EC.

Kolkata and Whinston (1997) defined EC in four dimensions: communication, business process, service and online perspectives. According to Kolkata and Whinston (1997), EC from communication perspective refers to the delivery of information, product and service, or payment via telephone lines, computer networks or any other online means. Meanwhile, from business process perspective, EC represents "the application of technology towards the computerization of business communications and workflow." Service perspective of EC indicates "a means that deal with consumers, and management to cut service costs while improving the quality of goods and growing the pace of service delivery." Online perspective of EC in turn describes as "the capability of buying and selling products and information on the internet and other online services."

Derstyne (2001) defined EC as business and market processes functions on the internet or World Wide Web (WWW) technology. EC is a term that describes how companies conduct business electronically. EC holds a group of technologies to correspond, collect information and perform business with companies or customers. It covers many different actions ranging from the electronic trading of goods and services, online delivery of digital content, electronic fund transfers, electronic share trading, electronic bills of lading, business auctions, mutual design and engineering, online sourcing, public procurement, direct consumer marketing, to sales and service.

According to Turban et al. (2009) EC refers to the procedure of purchasing, selling transferring or exchanging products, services, or information via communication networks, including the Internet. It has different elements or applications that have been used for information, selling and buying of goods and services electronically. The EC applications are Customer to Customer (C2C), Business to Customer (B2C), Business to Government (B2G) and Business to Business (B2B), known as Electronic Procurement (e-Procurement). The e-procurement application domain encompasses business-to-business (B2B), government-to-business (B2G) and government-to-government (G2G) and attracting many researchers (Ash and Burn, 2006; Dooley and Purchase, 2006; Yu, 2008, Gunasekaran and Ngai, 2008 and Teo et al., 2009). These are the core functions for industries to increase their sales volume and reduce the transaction cost. IT has a major influence on commercial activities and accelerating the adoption of EC among industries (Chang and Wong, 2010). Organizations have been utilizing IT systems to streamline and automate the procurement process (Vaidya et al., 2006).

A number of prior research on EC definition is exhibited in Table 2.1.

Table 2.1 EC Definitions

Authors/References	Electronic Commerce Definitions
(Teo et al., 2009)	EC is the streamlining of corporate purchasing processes by eliminating traditional paper-based documents to facilitate purchase orders and requisitions forms
(Angappa et, al., 2009)	An automated purchasing process of information technology through EDI, Internet and WWW
(Angappa et. al., 2008)	A comprehensive process in which organizations use IT systems to establish agreements for the acquisition of products or services (contacting) or purchase products or services in exchange for payment (purchasing)

(Li, 2008)	Purchasing of goods and services for business operations with the support of the internet
(Wu et al., 2007)	The use of information technologies to facilitate business transactions for materials and services
(Turban, et al., 2006)	EC refers to the electronic acquisition of goods and services in a firm
(Min and Galle's 2003)	Electronic commerce identified as potential sources of supply, to purchase goods and services, to transfer payment, and to interact with suppliers"
(Davila et al., 2002)	Any technology designed to facilitate commercial or a government organization for the acquisition of goods over the internet

2.3 Potential benefits of EC

Being an important element of business strategies to generate value by allowing organizations, suppliers, customers and consumers to exchange information about product and services and make transactions, EC has become important tool providing opportunities for organizations to develop idiosyncratic strategic positions. Numerous potential benefits of EC have been discussed in the IT/IS literature. EC, for instance, can improve productivity by providing good quality and performance through the effectiveness in business processes redesign, and reduce data processing errors, cost and fewer inventories (Wu et al., 2007). EC especially has potential to provide and facilitate effective and efficient operations of supply chain and ultimately provides the opportunity to the organizations to build a reliable relationship with the suppliers and customers and also delivers products and services and accomplishing low costs. Since

EC transactions are conducted online, it favourably can reduce operation costs (Min and Galle's 2003). Any level of user can access the EC website to purchase product/services or access the information.

Ghosh (1998) pointed out four types of potential benefits of EC. First, organization can build a direct link to the customers and suppliers for purchasing and selling purposes of goods and services. Second, it allows organizations to sidestep other channels in the value chain that facilitates the supply chain. This would help the organizations to sell good/services directly to customers without any intermediation by retailers/wholesalers. Third, the organizations can utilize the internet services to be more innovative in producing goods/services to meet the attitude of customers. Lastly, it helps the organization to become a player in electric channel to facilitate segments and set new business regulations. These outcomes of EC will help organizations to stay tuned and face the challenges of market turbulence environment.

According to Croom's (2000) the deployment of EC could increase effectiveness and efficiency in ordering systems and provide just-in-time inventory management that helps to reduce costs and customize products and services. Thus EC implementation outcomes would include low inventory cost, prompt data exchange and rapid response system to changing requirements of customers (Archer & yuan, 2000).

According to Chan, J (2002), EC benefit can be divided into two categories: efficiency and effectiveness. EC efficiency helps in lower procurement costs, faster time frames, more highly organized information and tighter integration of systems. Meanwhile, EC effectiveness facilitates supply chain control, proactive management and high quality purchasing decisions within organizations. The most important potential benefits of EC are the improvement of vendor relationship control, effectiveness in purchasing process, higher service, and reduction in prices from suppliers, inventory cost and order cycle (Panayiotou et al., 2004). EC may also result better in purchasing processes (Engstrom et al., 2008). Efficiency of EC process and integration process may provide worth contribution to the firm performance (Ordanini

and Rubera, 2008). EC increases the firms' competitiveness through cost reduction and efficiency with inbound logistics (Wu et al., 2007).

A study by Yang (2009) stated that the advantages of EC are transparent vendor management, optimized supply chain management, short production cycle and reduced cost. EC also has the potential to reduce purchasing costs (Chircu and Kauffman, 2000). Purchasing cost reduction benefits for both the seller and buyer, in which the buyer saves while the seller may increase his/her sale volume. Such purchasing cost savings add to profit. These savings are generated from reducing inventory holding costs and transportation costs (Dai, 2000). According to (Mahnke and Henriksen (2005), public e-procurement portal enhances efficiency in two ways; cost savings transaction and direct reduction of procurement costs. Other EC benefits are suggested by Engstrom et al. (2009), such as cost savings, increasing contract compliance and control efficiency and better coordination of deliveries.

Min and Galle (1999) indicate that EC will benefit to purchasing practices, such as cost savings, shorter order cycle time and the enhancement of the partnership between customers and suppliers. EC also enhances the efficiency of supply chain through offering real-time info about product availability, shipment status, production obligation and inventory level. However EC is a complex technology where many organizations still hesitate to go for it or even after post implementation many organizations still face difficulties to gain the proper outcomes from this technology. For this, EC principally needs some proper strategies to optimize its potential benefits and positive outcomes.

2.4 ICT and EC in Malaysia

Information and communication technologies (ICT) have a tremendous impact on society, particularly on organizations and customers. Many Malaysian organizations are adopting more innovative ways to maximize the use of ICT and to obtain the benefits of the Internet from their business activities. As a result, the rapid use of ICT has boosted EC in Malaysia. According to Economist Intelligent Unit (2008), Malaysia's e-readiness is ranked 35th out of 65 countries and its score dropped from

previous years of 5.61 to 5.43 in E-readiness level. However, Malaysia is ahead of Thailand, Indonesia, India and China but behind Singapore, Hong Kong, South Korea and Taiwan in the E-readiness level (Yew et al., 2007). Consequently, ICT is affecting on the internet growth and increasing rapidly in the country. According to Department of Statistics (2008), 52.9% of the Malaysia population is within the same range of age. The internet users by age and the smooth usage of internet by the age of population in the country are shown in Figure 2.1 that shows 85% of Malaysian's internet users range from 15 to 50 years of age. According to International Data Corporation (2007) most of the internet users are professionals, students and traders that shown in Figure2.2.

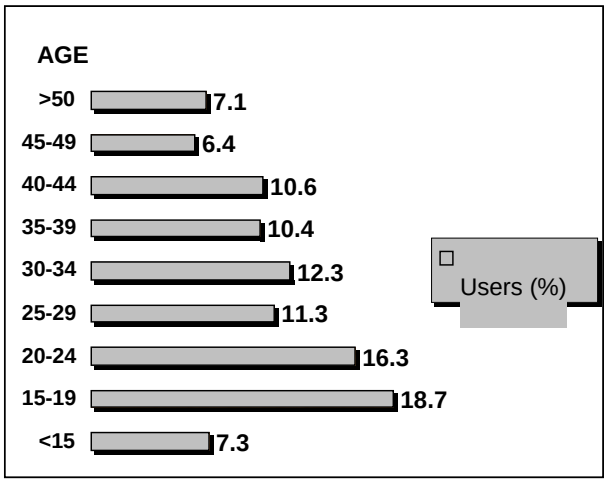


Figure 2.1. Internet users profile by age (Source: Department of statistics)

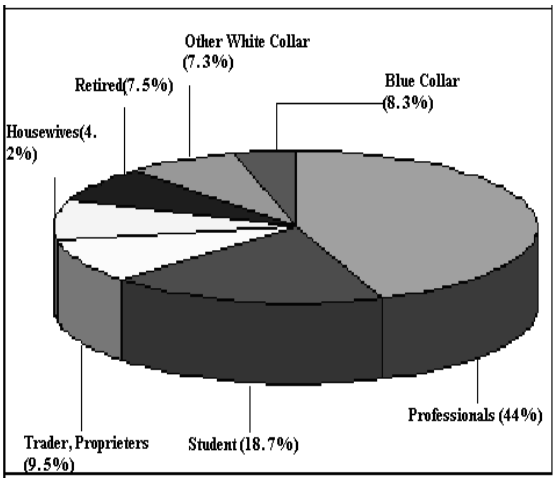


Figure 2.2. Internet users profile by occupation (Source: international data corporation)

Online buyers in Malaysia year by year are also moving upward. The development of information and communication technologies and government interest are boosting the online transactions in the country. According to International Data Corporation (2007) the online buyers in Malaysia had reached to 7.1 millions in 2008 (Figure 2.3). Internet buyers include all people who purchase a product or service from a seller by clicking the order and make a commitment to transfer a fund.

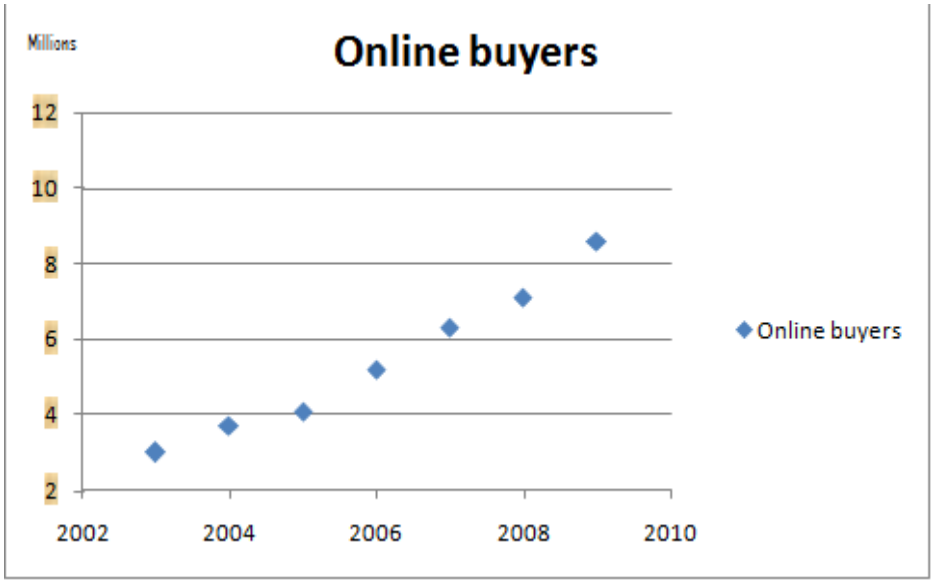


Figure 2.3. Total online buyers year by year (Source: Department of statistics Malaysia)

The growth of the Internet, ICT and political immovability pushes organizations to implement EC. Figure 2.4 showing the increase of EC spending year by year. According to Statistical Department (2008) the total online transactions in Malaysia has reached USD26bn. The rapid growth of new technologies is not only increasing the buyer's satisfaction but also helping the online customers to access rapid internet, going for secure transactions and providing easy and fast services. Government is encouraging foreign investors and providing assistance to the private sector to invest in ICT. According to International Data Corporation (IDC) the internet devices including all PCs videogame consoles and mobile devices are rapidly increasing. According to IDC (2009) the total internet devices with internet capability can reach

to 17.5 millions in 2010. Figure 2.5 shows the forecast of total internet devices which have the capability of accessing internet.

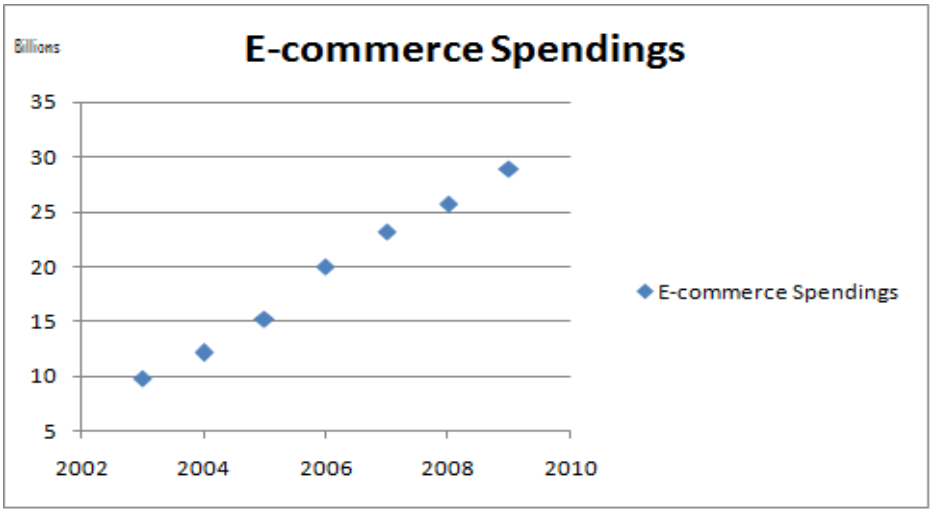


Figure 2.4. EC spending year by year in Malaysia (Source: Department of statistics Malaysia)

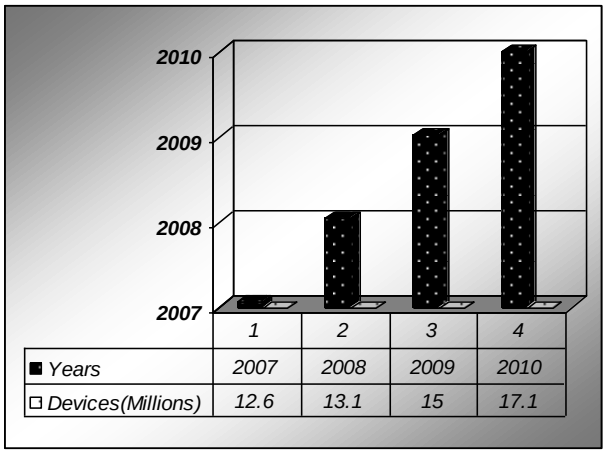


Figure 5. Internet Devices Forecast (Source: international data corporation)

The Malaysian government has stated that ICT is a strategic driver to directly support and contribute to the economic growth in the country. For the purpose of deploying resources to develop a knowledge-based economy and to strategically enter the digital age, the Malaysian government announced the 8th Malaysian Plan in which several initiatives were proposed to build vital ICT infrastructure for the public sector as well as the private sector. This plan has focused on increasing computerization and the IT

infrastructure government agencies. The main objectives of this plan were the initiation of national information security, the creation of as emergency response centre to administer regulatory policy, technical aspects and internet security. As a result in the 8th National Plan 4.7% an annual growth rate in ICT investment spending from across all economic sectors has been reported. The government of Malaysia intends to promote and facilitate the wider adoption and usage of ICT in everyday life such as through EC, industry, education and health. Motivations for this plan are to shift from a knowledge-based economy to a competitive knowledge-based economy.

Commercial activities on the internet are rapidly increasing all over the world. EC becomes a strong and easy way of business. For organisations in particular, the economy brings an exceedingly demanding competition and opportunities in a global scale. EC definitely is a corporate tools, if it has been well utilised than it will lead to long-term success in terms of business profitability and competitive advantage in the marketplace. In Malaysia according to survey of International Data Corporation (IDC) the overall EC spending had grown to US$22.3 billion in 2007 (IDC, 2007). It is also recorded from Malaysia Department of Statistics that in 2007 internet subscribers reached 23.4% of the whole population and this percentage will increase year by year.

EC and Internet technologies in fact have an impact on the firm's value. ICT in this case has become an effective tools for the organizations to improve its efficiency (Khatibi. 2003). The successful implementation and usage of ICT however is still becoming a major challenge for the organizations. Government and private agencies in response are providing the assistance and guidelines for the usage and implementation of these technologies (Angappa et. al., 2008).

The Malaysian government has played a vital and catalyst role in the development of EC infrastructure and to encourage the private sector to implement EC as part of vibrant and productive knowledge-based economy. Malaysia Communication and Multimedia Commission (MCMC) was established in 1998 to promote the broadcasting, telecommunications and internet services, the objectives of which are to develop the relevant infrastructure and to promote Malaysia as IT hub. In 2005, the government launched the first public service portal at http://www.gov.my facilitate

communication between citizens and government agencies (Tsen, 2005). Many programs were introduced to support and develop a knowledge-based economy such as venture-capital funds, tax incentives for venture capital and technology firms and other high-risk investments.

The implementation of the technology-oriented Multimedia Super Corridor Malaysia and a slate of new laws to protect intellectual property were also implemented. To support the local industry to participate in EC the government launched Dagang.Net as service provider which operates as a national Electronic Data Interchange (EDI) system and provides other electronic trade-facilitation services. The company plans to apply the United Nations electronic-trade documents (UNeDocs) standard, which permits any countries to support their local systems with the international purchase and supply chain and assists exports by small and medium-sized enterprises (Poong et, al., 2007).

For addressing the issues on small and medium industry, government then established the agency named The Small and Medium Industries Development Corp (SMIDEC), a government agency that provides loans and grants to use ICT to improve competitiveness, efficiency and productivity. Government also encouraged the banking sector in the country to establish internet banking in which May bank is the first who offered this service in 2000 followed by foreign banks such as HSBC (UK), Citibank (US), OCBC and UOB in 2002. Government also planned to grow the electronic communications and to encourage private enterprises. By April 2006 the governement had issued 62 licenses for ASPs, 64 for NSPs and 58 to NFPs. Six companies including government institute Malaysian Institute of Microelectronic Systems (MIMOS) has been established to provide a strategic foundation for the development of knowledge-based economy (http://www.bnm.gov.my). There are many opportunities for EC to grow in Malaysia. Development of information and communication technologies is pushing EC initiatives. New technologies are providing many easy and fast online transactions, enhancing consumers to go online and take the advantage of EC (Min and Galle's 2003)

.

Stability of policies and regulatory reforms are also affecting on EC growth. The government has been willing to develop and introduce EC with new technologies. Moreover The government stability has emerged a continuity in policies, implementation and formulation strategies enhancing the effectiveness of online trading. Government stability and efforts are the key elements to create institutions (Khatibi, 2004). Malaysian government has created some institutions that help industries and people to adopt EC. These institutions have built up legal regulations, technological infrastructure and economic support to develop EC in the country. These organizations have also announced some plans and strategies to improve EC in Malaysia.

Technological infrastructure is a key strength of the Malaysian EC industry. In Malaysia information and communication technologies are playing a vital role in improving EC practices. Strategic position of the country particularly in Asia is also the strength for online and conventional businesses as it can effect foreign investment and technology attraction (Alam et, al. 2007).

The challenges for the development of EC in Malaysia are caused by some factors. The lack of policy implementation is the one affecting on long-term objective and competitive advantages that respectively affects the businesses sector. At this point, the investors and consumers hinder due to uncertainty. Security and privacy issues are also the other key obstacles for online businesses in which consumers are still hindering to go online and majority of buyers prefer conventional shopping in Malaysia (Ainin and Rohana 2000). E-Readiness is also a major weakness of Malaysian EC practices. The lacks of understanding about new technologies are then affecting EC. The awareness and knowledge about information and communication technologies are still in the formative phases. Some new technologies are seemingly still new for buyers. Furthermore, high costs also the threat to EC in Malaysia. High cost internet services like bandwidth, broad band services and the usage of new technologies are costly compared to other regional locations. As a result, buyers are still reluctant to implement these technologies.

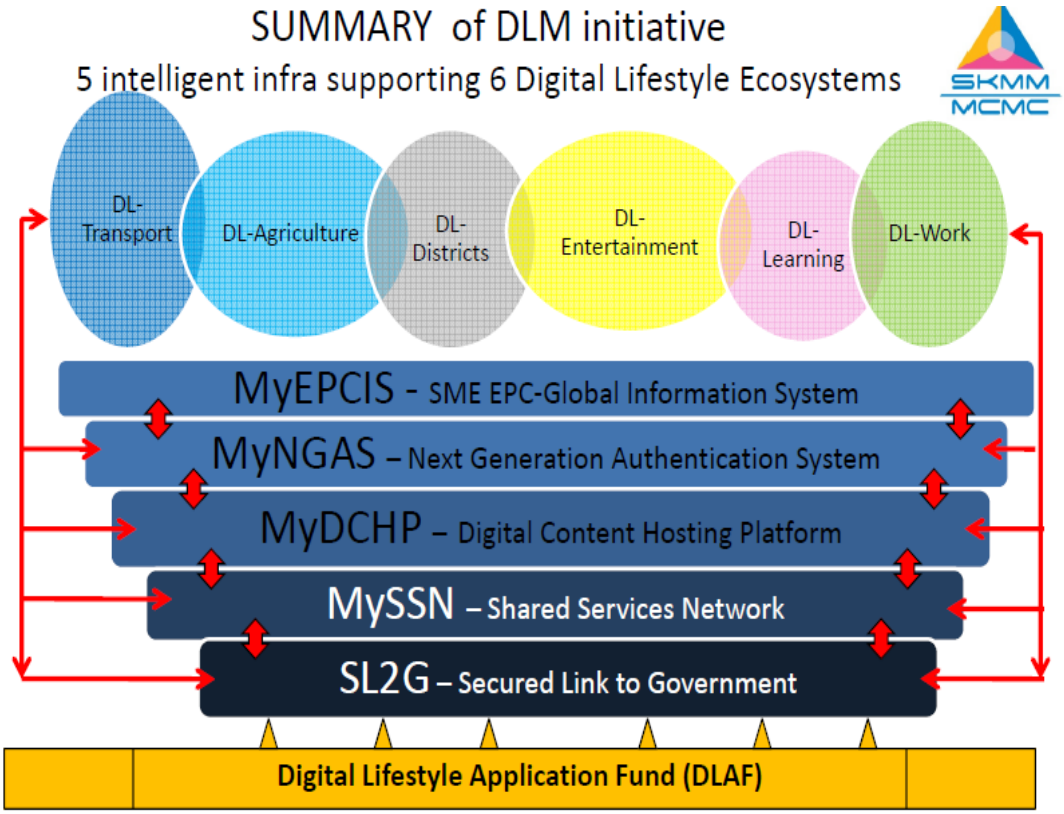
The consumers still hinder to use these services and new technologies. Other legal issues include as copyright infringement, protection of patent rights, domain name disputes and the safeguarding of trade secrets (Khatibi, 2003).

In 2010, Malaysia Communication and Multimedia Corporation (MCMC) announced Digital lifestyle Malaysia (DLM) plan 2011-2015 to establish a platform with new growth areas and innovativeness to communications and multimedia industry and to offers support to ICT industry to become a high income nation by 2020.

There three main objectives of DLM plan as follow:

- To provide a better quality of life for all in Malaysia using ICT applications
- To enable Malaysians to compete internationally by increasing productivity and sustainability through the adoption of intelligent ICT services and Internet of Things applications
- Ultimately, to make Malaysia a high income nation by 2020 using broadband networks and ICT services

DLM initiatives are expected to increase usages of Internet based transactions and will help in promoting digital business around the country (http://www.skmm.gov.my).



(Source: MCMC)

2.5 Prior research on EC

The rapid growth of Internet use for business functions has a perceptible effect on numerous firms' business strategies and performance. Online shopping has emerged as the fastest ways for purchasing goods and services. However, to be successful in such competitive markets the firms often need to re-examine the strategies (Khatibi, 2003). Over the last two decades EC appeared as important agenda of IT/IS researchers, marketing and strategic management research streams. Here, EC has been seen to contribute to economic growth. However, EC outcomes depend on the features of business models and EC strategies (Zhou and Li, 2010). Several authors have investigated the factors influencing on technology adoption, EC adoption and its usage.

Introduced by F. D Davis (1989) as an attempt to explain the computer usage behavior and widely adopted in studies of IT and EC adoption in recent years, the Ttechnology Acceptance Model (TAM) has earned considerable attention in EC and internet research. TAM posits that the usefulness and ease of technology use leads to attitude, behavior and lastly actual usage as shown in Figure 2.6.

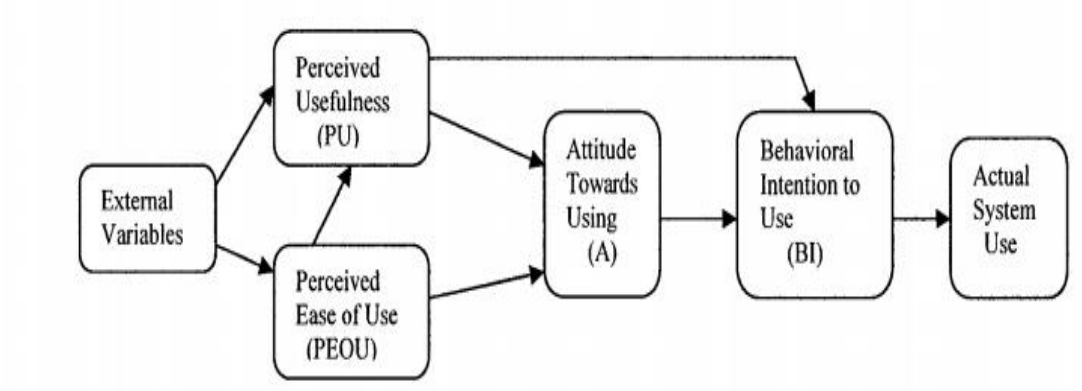


Figure: 2.6 TAM Model (F. D Davis, 1989)

The limitations of TAM model are still evident, despite the prominent role it plays in technology adoption studies. The main one is that behavioural factors of the

organizations in adopting technology while ignoring concerned with internal organizational factors that can hinder in technology implementation.

Technological-Organizational -Environmental (TOE) theory was proposed by Tornatzky and Fleischer (1990) to solve this issue by specifying three different contexts used to determine firm capability to implement a new technology. First, the technological context refers to internal and external characteristics of technologies relevant to the firm, including existing technologies presently used by the firm and other technologies characteristics available in the market (Teo, et al., 2009). Second, the organizational context refers to the descriptive measures about firm's size, scope and resources available internally. The environmental context finally refers to external forces where the firm conducts its business including competitors, access to suppliers for resources and dealings with government (Tornatzky and Fleischer, 1990). These three contexts not only influence a firm's intent to adopt an innovation but also impact on organizational performance (Zhu et al., 2004). According to Mohamad and Ismail (2009) the two theories - Diffusion of Innovation theory by Rogers (1995) and Technology Acceptance Model by Davis (1989); together with Technological-Organizational-Environmental (TOE) by Tornatzky and Fleischer, 1990) are highly applicable in predicting the adoption of new technology.

The TOE framework has been used by a number of studies in different domains of Information Systems (IS), Electronic Data Interchange (EDI), Information and Communication Technology (ICT) innovations, Electronic Business (E-Business), Electronic Resource Planning (ERP) as well as in Electronic Commerce (E-Commerce). This theory has also been used successfully by several authors (Oliveira and Martins, 2010; Ardura and Artola, 2010; Teo, et al., 2009; Salwani et al., 2009; Scupola, 2009; Pan and Jang, 2008; and Lin and Lin, 2008).

Roger (1995) proposed the Diffusion of Innovation model stressing on several indicators of the technology adoption or the diffusion of innovations. Diffusion refers to the process by which an innovation is communed via certain channels over a period of time among the members of a social system. An innovation meanwhile represents the new idea, practice, or object. Communication itself is referred to a procedure in which participants generate and share information with one another to attain a joint

understanding (Rogers, 1995). The Diffusion of Innovation model has shown in Figure 2.7.

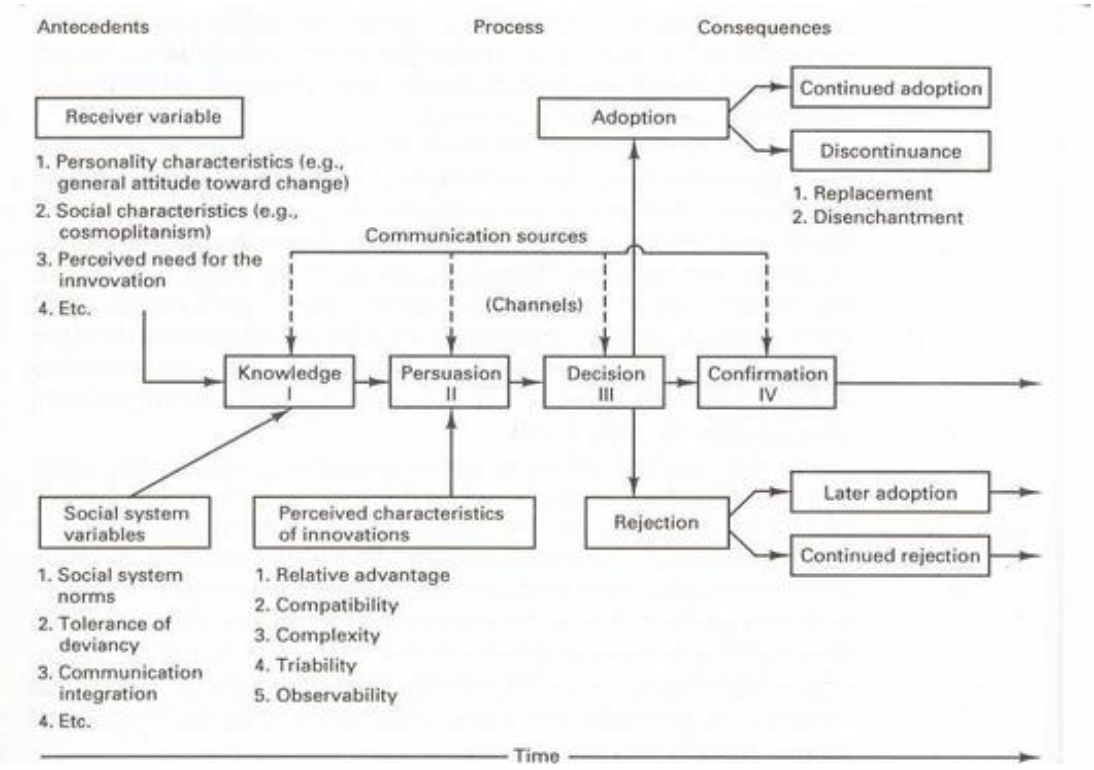


Figure: 2.7 Diffusion of Innovation Model (Roger, 1995)

The Diffusion of Innovation model has been widely used in EC studies (Azam, and Quaddus, 2009., Alam et al., 2007., Sathye and Diana, 2001., Kendall et. al., 2001., Tan Teo, 2000., Agarwal and Prashad, 1999., Bajaj and Nidumolu, 1998). However, the attributes that predict success in the implementation of this technology is scarce in DOI models. DOI model focused on the factors of the attitude or behaviour to adopt a technology.

Simpson and Docherty (2004) believed that the major barrier in implementation and usage of EC is due to a lack of awareness by organizations. Awareness and understanding of technology may be the prime issues in determining how best technology fulfils business operations. Awareness management support is essential in technology implementation, as without the support and approval of top management, technology implementation is likely impossible (Klein et al., 2001; and Fu et al., 2004).

Teo et al. (2009) investigated several positive impediments factors to the implementation of EC applications. They explained that firm size, top management support, perceived indirect benefits and business partner influence affect EC implementation and usage. A study by Gunasekaran et al. (2009) also discussed critical factors for e-procurement implementation including top management support, insufficient financial support, lack of skill and knowledge, and immaturity of technology. These factors may influence organizations to implement technology.

Williams et al. (2006) mentioned eight factors that may inhibit EC implementation, namely lack of supplier's readiness, system integration, implementation costs, inadequate technological infrastructure, insufficient skilled staff, lack of management support, lack of supplier interest and auditability risk. Organizational readiness for implementing EC is very important as its absence can create difficulties in EC implementation (Huber et al., 2004 and Williams et al., 2006).

A study by Angeles and Nath (2007) found several factors that also hinder EC implementation including lack of infrastructure, immaturity of suppliers, software immaturity, immaturity of marketplace services and immaturity of consulting services. As for EC implementation, organizations IT infrastructure may help in technology adoption (Wu et al., 2003., Carayannis and Popescu, 2005). Organizations with better IT infrastructure can handle the adoption of IT applications (Kohli and Jaworski, 1990). Organizational readiness and IT infrastructure are essential for the successful IT adoption (Iacovou et al., 1995).

Pires and Stanton (2005) developed a research framework addressing drivers and potential impediments related to the EC process. The potential impediments identified were risk, uncertainty, inefficiencies from suppliers, culture change and staff resistance. Chan, J (2002) mentioned some leading factors that influence EC adoption and usage, namely relative advantage, complexity, compatibility, security, organizational readiness, electronic business maturity level, dependency on trading partner, and perceived industry pressure. Compatibility is useful for knowing the existing values and need of technology for the organization benefits (Rogers, 2003). IT compatibility readiness in turn could help organizations to go for EC usage and

implementation. Beside IT compatibility, IT expertise is also one of influencing factors for EC implementation. Organizations without IT expertise seem to be unwilling to take risk of technology adoption (Yu et al., 2008). In other word, experts to handle and operate day to day operations are `needed to operate a new technology.

A study by Yu et al. (2008) identified some possible barriers to EC including availability of resources, lack of system standards and negative impacts of trust. However, instead of these important factors, organizational e-readiness on EC implementation is more determined by Government laws and regulations and resource availability. Lack of sound laws and regulations was deemed to be a major barrier to EC adoption (Khatibi, 2003). Meanwhile the availability of resources is essential in technology adoption (Harland et al., 2007; Engstrom et al., 2008; Teo et al., 2008). According to Swanson (1994) sufficient resources are necessary for the adoption of technology. For this, firms without financial resources will face crucial challenges to implement EC. While, Lee et al. (2007) pointed out that learning capacity and knowledge management effectiveness are vital for the successful implementation of E-business. Furthermore, the authors argued that the organizations must have well designed and planned a knowledge management system to maintain e-business strategies and manage back office efficiency, customer intimacy and efficiency of coordination with business partners.

Zhou and Li (2010) introduced an e-marketing capability by examining several market and technology orientation factors. The authors found that a better orientation of marketing and technology capabilities significantly contributef to online marketing. They also added that the organizations with the higher level of market and technology orientation in online business environment will contribute to a better business performance. Environmental conditions such as market turbulence and competitive intensity are moderating factors between e-marketing capability and business performance.

Tom R. Eikebrokk and Dag H. Olsen (2007) argued that the successful implementation and usage of e-business require an efficient strategic planning by organization. Strategically flexible and sound firm attains better outcomes from its e-

business investments. Furthermore, the authors argued that IT management, system and infrastructure, IT business process integration, sourcing and alignment are also key factors in the success of e-business applications. According to Crespo (2008), innovative capacity of a firm and innovative capacity customers may have a strong influence on EC implementation and lead the customer to shop online.

2.6.1 Resource-Based View of the Firm

The Resource Based View (RBV) begins by defining a firm's resources as "…those assets that are tied semi-permanently to the firm" (Wernerfelt, 1984, p. 173). According to the RBV, unique assets such as patents and reputations are perceived to be much more important than others, and competitors invariably find them difficult to replicate, thus serving to differentiate their possessors (Barney, 1991).

The theory is based on the view that the firm is made up of a number of resources controlled by managers and helpful to those who need these resources. The RBV suggests that the vital role of resources and capabilities is to gain competitive advantage and positively impact a firm's overall business performance (Barney1991). RBV posits that competitive advantage comes from identifying and determining the value of a firm's resources.

Resources can be either tangible or intangible. Tangible resources refer material or substantial. In other words, they comprised an actual physical existence such as land, buildings, manufacturing plant, and equipment. While intangible resources are invisible, not perceptible by touch and have no physical existence. This includes brand names, reputation, patents, copyrights, technology, and other intellectual property.

Consistent with Hult and Ketchen's (2001), it can be argued that business resources, human resources and technology resources constitute unique resources independently, but rather they collectively contribute to the creation of a capability (Ordanini and Rubera 2010., cf. Day, 1984). Past research suggested that each element is adequate to offer strength but together they can help a firm to be uniquely competitive. RBV

provides the theoretical basis for the model's expectation that the higher-order positional advantage will positively affect performance.

T.S.H. Teoa and C. Ranganathan (2004) suggest that resources have two main attributes - uniqueness and inimitability that enhance the value of a firm. Further they define that resources must have a combination of low inimitability and high uniqueness. However, the earlier study of Barney (1991) advocates that if the resource has four strategically important key characteristics e.g. valuable, rare, inimitable and non-substitutable, it would positively affect on competitive advantage and ultimate firm performance. The following are the definition of those key characteristic according to Barney (1991):

Key Characteristics	Definitions
Rare	A resource of specific firm that hardly matches for its competitor
Inimitable	Resources that can only be causes of persistent competitive advantage if firms that do not hold these resources cannot attain them
Valuable	The value of the resource that delivers to a firm
Non-substitutable	There should be no tactically correspondent valuable resources that they themselves are neither rare nor incomparable.

According to RBV, the resource can be either a person or a specific asset that cannot be easily transferable or imitable. Firms that hold the resources well suited to the environment perform more efficiently. A firm's resources also need to change to be relevant over environmental changes. However, theoretical norm of RBV judgment verified that resources generate different performance results depending on the complex process in which a firm integrates the cumulative effect. In the support Ortega (2010), proposes that RBV approach and competitive strategies must be combined within the firm to result more sustainable performance. Marketing and

strategic management literature suggests that firms create capabilities to convert resources into outcomes based on their marketing strategies and such capabilities that are linked to their business performance. However, Mahoney and Pandian (1992) states that a firm gains a competitive advantage not because of possessing superior resources, but involving firm's idiosyncratic ability making better use of its resources. There is an absence of the relation between resource possession and resource exploitation (Barney and Arikan, 2001; Priem and Butler, 2001). Priem and Butler (2001) criticized RBV literature by arguing that there is a lack of understanding about the knowledge of where, when and how resources may be utilized to meet market challenges and get the competitive advantage. To solve this issue Teece et al. (1997) place further model of dynamic capability.

2.6.2 Dynamic Capability View (DCV)

Where the resource-based view stresses the nature of resources and the characteristics that make the resources strategically vital, dynamic capability focuses on how these resources integrate, reconfigure and deploy either to maintain their market significance or to meet the new market demands. Dynamic capabilities emphasize firm processes which utilize resources aligned with the changing environment.

Teece, Pisano and Shuen (1997) launched Dynamic Capability Theory (DCT) in the strategic management literature. According to the authors, dynamic capability focuses on integrating, reconfiguring, aligning and the deployment of the specific resources in the changing environment of business. This viewpoint has been illustrates how firms build up and sustain competitive advantage and profitability is an expansion of the RBV of the firm. The RBV affirms that valuable, rare, inimitable and non-substitutable resources allow businesses to maintain a competitive advantage (Barney, 1991; Wernerfelt, 1984), while the DCT stresses on management roles in adopting, integrating and redesigning organizational skills and resources. So derived from the explanations the firm's dynamic capability refers to adopting, integrating and reconfiguring the resources to renew or develop competences to gain the competitive advantage with the changing business atmosphere (Li et al., 2006).

Teece et al., (1997) explain that capability is a resource base but not a resource itself. It refers to the integration and reconfiguration of bundles of tangible and intangible resources recombined to sustain the competitive advantage and accomplish market changes. More specifically, capability is a unique kind of ability that cannot be simply built with the organizational resources and it is not only intangible but also indirectly symbolizing the ability of an advanced skill of a firm to mingle the resources specifically in a specific business environment. This advanced skill ensures the firm to combat the future challenges as well.

Rapid changes in the business environment encourage firms to develop capabilities that provide an increased chance of survival to sustain competitive advantage. In other words, fast changing environments push firms for making dynamic capabilities for their survival in the competition brought by the emerging economies (Zhou and Li, 2010). However, Winter (2003) pointed out that dynamic capabilities differs establishes by a focus on organizational change, yet change is also possible without capabilities. Helfat et al. (2007), argue that capability is the capacity of an organization to purposefully create, extend or modify its resource base. In the related study, dynamic capability refers to the ability of a firm to utilize its resources effectively to sustain competitive advantage (Menon, 2008).

Gibson and Birkinshaw, (2004) argues that capability reflects a firm's ability to regenerate, reconFigure, and integrate the resources to effectively meet the fast paced environmental and business changes. However, the integration of physical, human, information, knowledge and relational resources are useful to create several unique and firm specific capabilities (YewWong,NoorlizaKaria, 2010). Industry competitive intensity pursues to create marketing capabilities that leads to a better performance and to compete in a turbulence environment (O'Cass and Weerawardena, 2010).Idiosyncratic resources alone are insufficient to ensure better outcomes, it depends on how the firm allocates and utilizes the resources.

Table 2.3: Summary of the Dynamic Capability Definitions

Dynamic Capability Definitions	Reference
Capability is a resource based but not a resource itself, it refers to the integration and reconfiguration of bundles of tangible and intangible resources that are recombined to sustain the competitive advantage and accomplish market changes	Barney (1991)
Dynamic capability focuses on integrating, reconfiguring, aligning and the deploying the specific resources in the changing environment of business	Teece, Pisano & Shuen (1997)
Dynamic capabilities differ from ordinary capabilities by the focus on organizational change; yet change is also possible without capabilities.	Winter (2003)
Capability reflects a firm's ability to regenerate, reconFigure, and integrate the resources to effectively meet the fast faced environmental and business changes.	Gibson and Birkinshaw, 2004
Dynamic capabilities are the combinations of the specific and identifiable organizational processes such as the aligning of organizational routines and strategies development	Eisenhardt et al (2000)
Capacity of an organization is to purposefully create, extend or modify its resource base.	Helfat et al. (2007)
Capability refers to the ability of a firm is to purposefully utilize its resources effectively to sustain competitive advantage with the changing business environment	Menon (2008)

DCV is concern primarily with activities that allow repeatable and consistent performance and capacity to develop better outcomes. Conversely, the effectiveness of the dynamic capabilities reveals that organization must deploy the resources on time within the environmental change - depending on the experience and the ability of the firm's experimentation of positioning the resources. The development of dynamic capabilities on the other hand requires an internal course of actions and exertions by a firm.

In the past few years the concept of dynamic capability has widely emerged in various streams of research. Eisenhardt et al. (2000) argued that dynamic capabilities are the combinations of specific and identifiable organizational processes such as the aligning of organizational routines and strategies. These authors also pointed out that the dynamic capabilities are unique in nature. It on the other hand has commonalities across firms and more fungible, harmonized and substitutable. Consequently, a dynamic capability lies in the organizational ability to transform routines into value creating strategies. Further they defined the conceptions of dynamic that shown in table 2.4.

Table 2.4: The conceptions of dynamic capabilities (Source: Eisenhardt et al, 2000)

	Traditional view of dynamic capabilities	Re-conceptualization of dynamic capabilities
Definition	Routines to learn routines	Specific organizational and strategic processes by which managers alter their resources base
Heterogeneity	Idiosyncratic	Commonalities with some idiosyncratic details
Patterns	Detailed, analytic routines	Depending on market dynamism, ranging from detailed, analytic routines to simple and experiential ones
Outcomes	Predictable	Depending on market dynamism, predictable or unpredictable
Competitive Advantage	Sustainable competitive advantage from dynamic capabilities	Competitive advantage from valuable, rare, substitutable and fungible dynamic capabilities
Evolution	Unique path	Unique path shaped by learning mechanism such as practice, codification, mistakes and pacing

Menon (2008), defined five different processes of dynamic capability namely, sensing, learning, reconfiguration, coordination and integration. According to Pavlou & Sawy (2006), sensing represents an organizational ability to sense the market environment and its changing dynamism. Learning reflects the ability of the organization to generate new knowledge and form thinking processes to enhance and utilize organizational resources. Reconfiguration involves the commitment of the

organization to renew the configuration of existing resources to meet with the changing environment. According to Helfat et al., (2003), reconfiguration refers to the inventive redeployment of existence resources. Crowstone (1997) described coordination as organizational commitment to allocate the task-oriented resources for obtaining specific goals. Finally, integration represents the amalgamation of the resources on how the combinations of bundling resources act in ways that provide utmost ability to meet the new challenges and to achieve the specific goals.

Wang and Hsu (2010) examined high technology firms from 2002 to 2007 to identify the impact of dynamic capability of research and development and product on performance. The authors found a significant impact of dynamic capability on performance and also identified that governance and competitive posture significantly influenced dynamic capability and performance as moderating variables.

Luo (2000) argued that dynamic capabilities play a vital role in attaining competitive advantages especially in an international business expansion and globalization. Further, the author discussed three characteristics of dynamic capabilities - capability possession, deployment and upgrading (Figure 2.8). Capability possession represents technological, global expansion, managerial and operational activities. Deployment refers to allocation and upgrading represents dynamic learning.

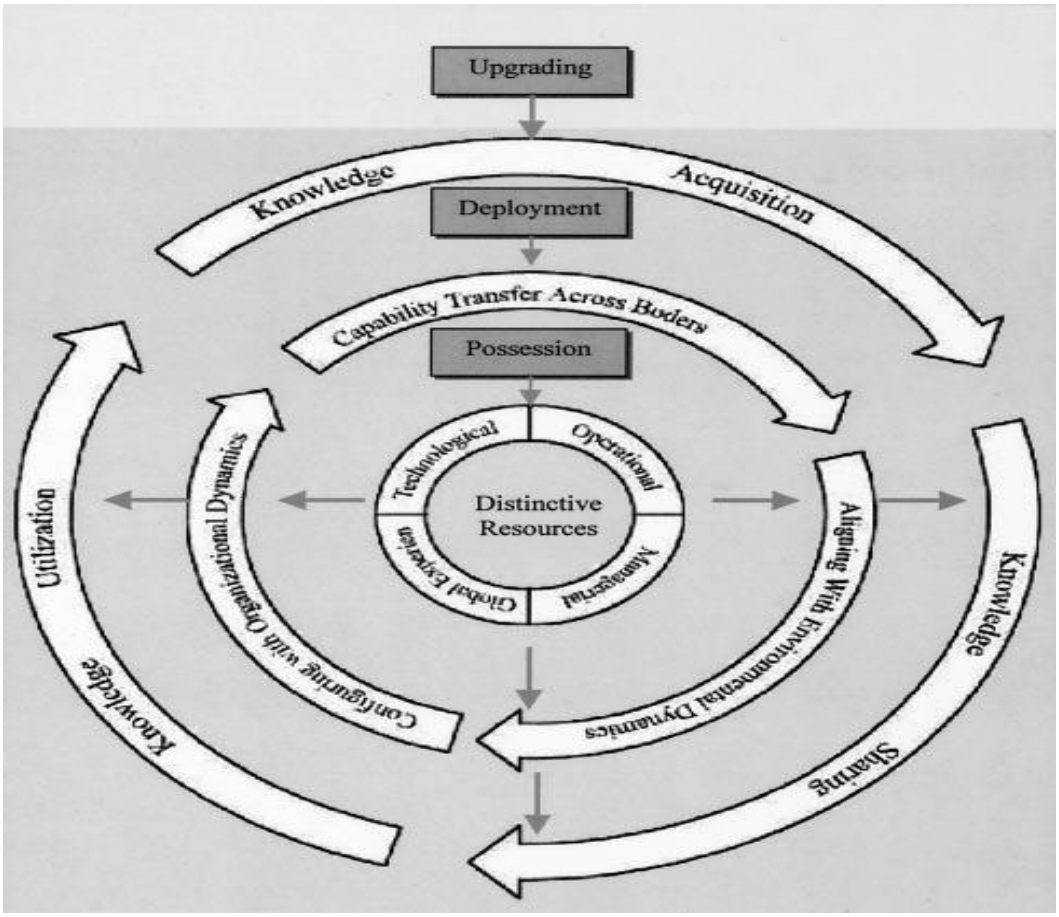


Figure 2.8: Upgrading process of Distinctive Resources (Luo, 2000)

The author pointed out that resources alone are not capable of generating competitive advantages and that success goes to firms constantly exploit and build capabilities for internal and external operations in response to new market changes and then transform the experience and learning into critical competence, as shown in Figure 2.9.

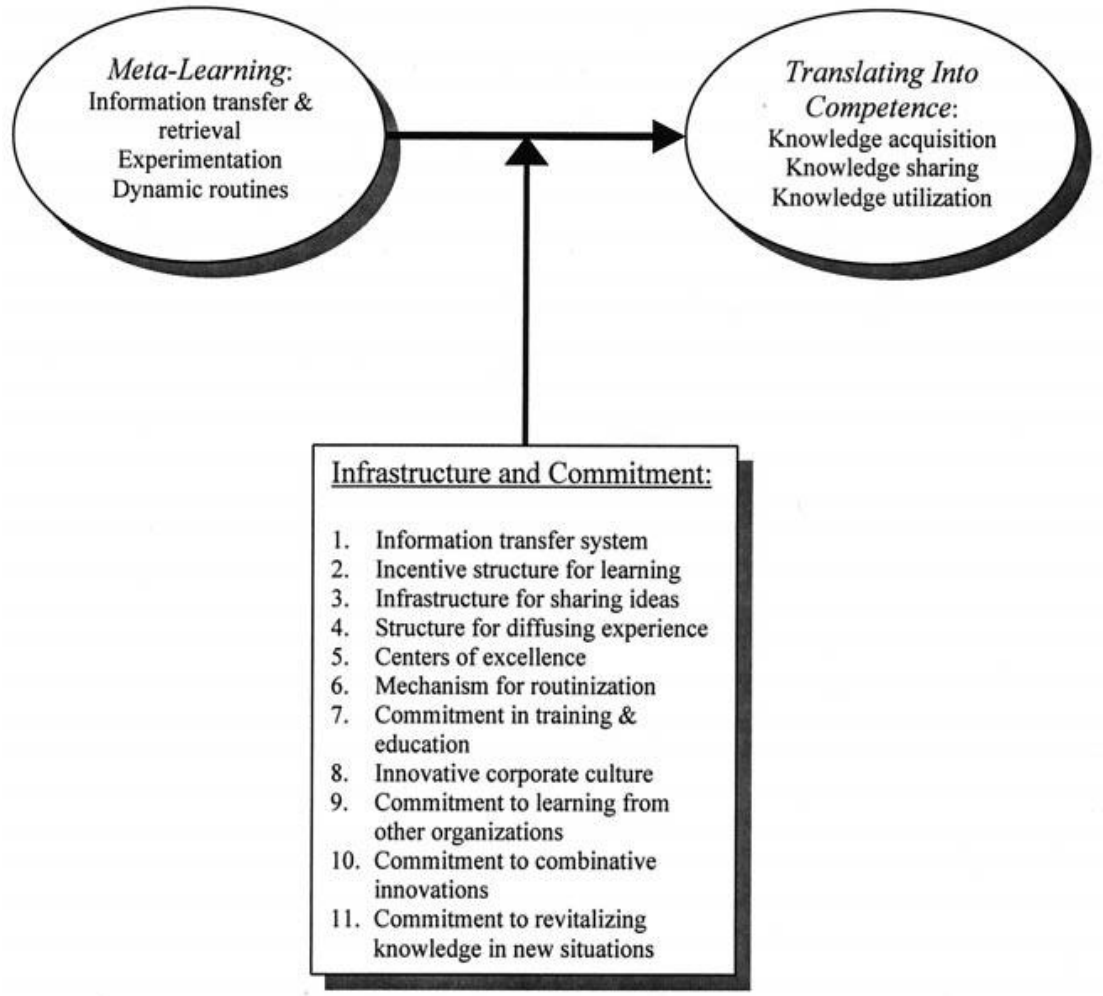


Figure 2.9: Features of Dynamic Capability (Luo, 2000)

The impact of capabilities on firms' performance has been widely discussed in strategic management literature (Winter (2003), Teece, Pisano & Shuen (1997), Gibson and Birkinshaw, (2004). However, the conceptualization and operationalisation of the capability of EC have not been established yet and the empirical evidence about EC capability is scarce. This study therefore develops and empirically investigates an EC capability in online business environment and explores its relationship with the business performance.

2.6.3 Resource-Based and Dynamic Capability View of EC

As discussed earlier, RBV and DCV have been introduced to highlight the importance of organizational resources. Numerous capabilities have been developed for the

success of IT implementations and to achieve a better firm's performance in the field of IT/IS, strategic management and marketing. Businesses around the world require dynamic capabilities for technology evolution, complex marketing and complex strategic webs.

These concepts have mostly been adopted in IT/IS and strategic management research streams. Where numerous capabilities have been developed for IT/IS functions to derived its impact on firm's performance. Superior IT capabilities provide better and sustainable benefits to the firm (Santhanam, R., & Hartono, E. 2003).

Charles R.Gowen and William J. Tallon (2005) proposed a dynamic capability model that posits four constructs namely technological intensity, Six Sigma factors (technical and human resources), electronic business applications and competitive advantage. According to their study, technological intensity and six sigma factors contribute significantly in e-business environment. However, other organizational resources did not confine in their study such as business resources. The model has shown in Figure 2.10.

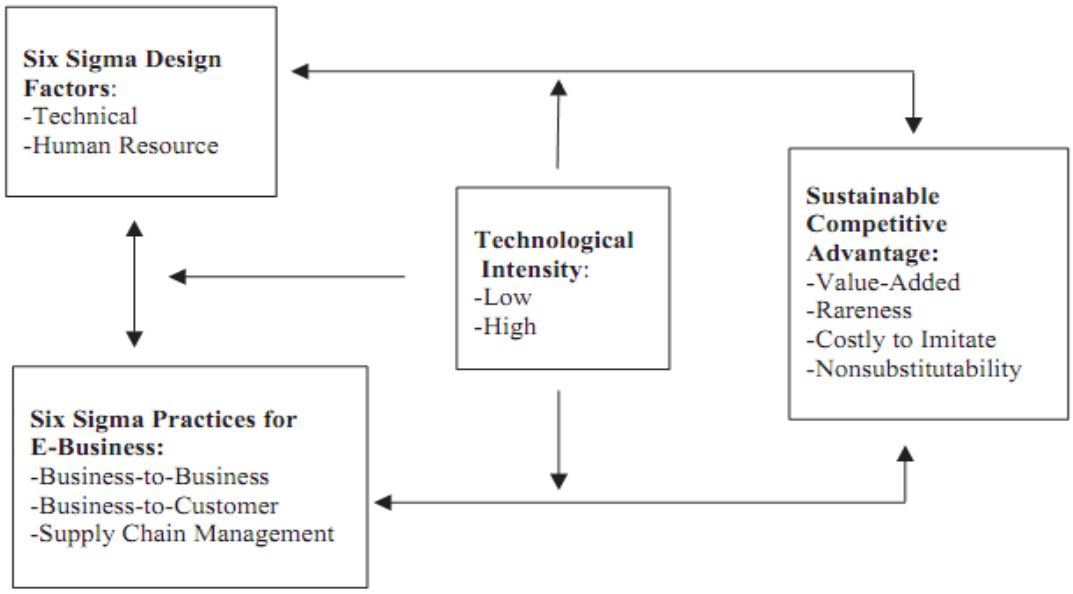


Figure 2.10: Sources: Charles R.Gowen and William J. Tallon (2005)

Ordanini and Rubera (2010) argue that IT-related innovations such as EC application are important for businesses to improve firm's performance. Furthermore, they developed a theoretical framework to understand the influence of business and IT

resources on the potential of IT innovation (EC) that leads to firm performance as shown in Figure 2.11.

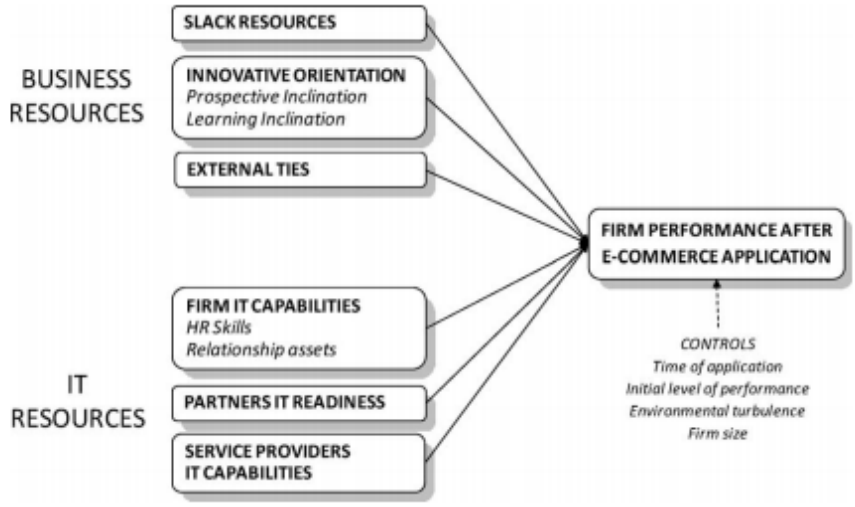


Figure 2.11: Source: Ordanini and Rubera (2010)

However, Real et al, (2006) examined the effects of IT and organizational learning on business performance, as well as on the creation of technological idiosyncratic competencies. They noted that IT is not capable of preserving a competitive advantage in itself, it must work together with business and human aspects that justify co-specialized strategic assets, such as organization learning and technological dynamic capabilities. The integration of IT and a firm's attributes likely contribute to market value in the EC environment.

Ortega (2010) argued that in the dynamic and turbulence business situations, technological capabilities have a significant influence on firm performance. As IT deployments are the key predictors of the firm, IT could enable a sustainable competitive advantage (Tian et al, 2010). Lee and Slater (2007) pointed out that long-term dedication and effort in attaining new technologies will highly attract skilled human resources, and entrepreneurial top management, Wong and Karia (2010) developed a theoretical framework that comprises physical, human, informational, knowledge and relational resources structuring and deployment for a sustainable competitive advantage.

Leonard-Barton (1995) suggests four dimensions for creating a capability, including values and norms, technical system, managerial system and skill and knowledge base

of the firm. It clearly shows that capability is a process of an outstanding ability to master the challenges and dilemma of turmoil business environment and to meet with market demands.

Similarly, Tsai (2004) determined the attributes of the technological capability of a firm and furthermore measured stock perspective that shows a positive impact on firm performance. According to his study, technological capability provides an opportunity to enhance firm performance and sustain competitive advantage.

The literature in this area is disjointed and assorted. Capabilities are ingrained in progressions, importantly to understand and determine the attributes, types and performance implication on the time of capability development. However there is no attention paid in the literature to recognizing EC capability as one of the applications of IT. Recently, Zhu (2004) has proposed a firm level framework of EC capability and IT infrastructure value in the context of electronic business at as shown in Figure 2.12, but not confining other attributes such as organizational resources that may lead to a higher level of EC capability and firm performance.

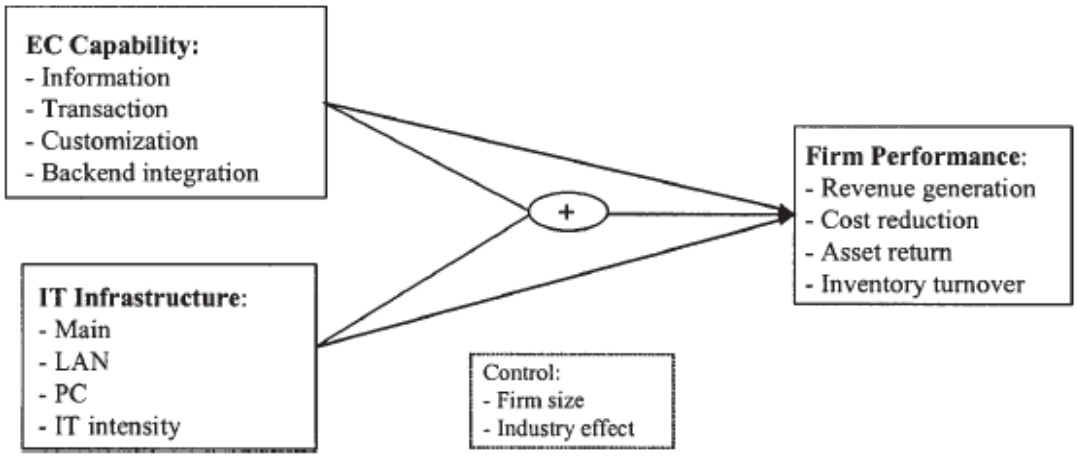


Figure 2.12: Source: ZHU (2004)

Zhu (2004) has described EC capability by four dimensions: information, transaction, customization and back-end integration, basic website functionalities. Vitari and Claudio (2010) propose a framework to generate EC capability by using three sources: organizational process, firm's history and assets. However, Teoa, and Ranganathan (2004) argue that IT resources must complement business and human

resources to manage IT tools and application efficiently. A range of researchers has successfully used the resource-based and dynamic capability view to illustrate cases in EC strategy (Montealegre, 2002), alliances and the adoption of information systems and technology (Caldeira and Ward, 2003). Additionally, Zott (2003) stated that IT is not capable of preserving the firm's competitive advantage by itself; it must be complemented with other resources that make a capability to sustain competitive advantage.

2.6.4 Business resources

Business resources represent a group of organizational resources essential for a successful operation of business processes. It includes competencies for strategic planning, assigning, coordinating and administering business strategies. The increased usage and implementation of IT and its far-reaching impacts on firms and industries are pushing organizations for the organized IT and business planning (Venkatraman and Raghunathan, 1990). Teo (2004) argued that strategic planning is vital in recognizing opportunities for using IT to support business strategies and to efficiently deal with the IT function in the firm (Lederer and Sethi, 1996). Firms require proper planning that can cultivate innovations (Raghunathan and Raghunathan, 1991). Strategic planning then pushes the firms' ability to effectively manage innovative applications and also provide an overall direction for business plan to a firm. The capacity of strategic planning, re-designing, reconfiguring and utilizing of organizational resources lead the firms to minimize IT and business planning barriers (Teo and Ang, 2001) which is a vital competence that can extensively add to the successful implementation and usage of IT in a firm. The combination of business and IT strategy is found to have a significant contribution to organizational performance (Cragg et al., 2002; Teo and King, 1997). Technologies like EC have enabled organization and individuals from different geographical zones to work together. Strategic flexibility, new channels of communication and effective team management are vital for developing IT competences.

Organizations are progressively moving from conventional business formations to more digital structures. With IT innovations, EC has achieved prominent attraction (Muller et al., 2003). EC provides a prominent way for communication across a variety of organizations. While, business resources provide cross-functional teams and ability to manage ad-hoc formations efficiently. The ability of managing digital business structures also enhances competences and helps to meet the market demands that brought by market turbulence environment. Technology like EC have enabled organizations and individuals from different geographical zones to work together, business resources such as strategic flexibility, new channels of communication and effective market orientation are vital for developing IT competences (Chatfield and Bjorn-Anderson, 1997).

2.6.4.1 Innovative Capacity

Innovative capacity refers to the propensity of an organization to provide its support to generate new ideas, and deploy experimentation to bring novel and creative procedures that may result in generating new processes, product and services (Lumpkin and Dess, 1997).

Schumpster (1934) was one of the pioneers of this concept. In 1934 he argued that innovation is a key element in business success. They further described innovation as a creative distracting process that creates wealth when the existing structures of the market are interrupted by the inclusion of new products and services. Innovation is a key element of business because it brings the principal means through which the firm can find out new business opportunities. Rogers (1995) described innovation as an object that perceives to be new. According to Naraynan (2000), innovation is a process and output of a viable solution to any technological hurdle and customer needs.

Kenny and Reedy (2003) defined innovation as a process of the adoption of new products and services to gain competitive advantage, stating that it also involves identifying the requirements of customers. The measurement of the innovative capacity of a firm is a critical process. Ample research has been conducted on strategic planning, marketing, IT and IS innovations. Muller et al. (2003) proposed a

model to identify the innovative capacity within a firm. It combines multiple dimensions including resources, capability, leadership views and processes of innovation.

According to Muller et al (2003),

"Resource view is an innovative capacity of firm that overlooks and allocates the existing business resources strategically for new business opportunities".

"Capability view evaluates the level or the extent of an organization's culture to support the deployment of the resources into the opportunities for business renewal".

"Leadership view refers to what extent a firm supports innovation. According to this view an organization evaluates the leaders' participation in proactive and innovative activities. More precisely it does analyze the involvement of the leaders in formal processes to encourage innovation and to gain the firm's innovative goals.

Processes or innovation processes refer to firm's structure such as incubators, innovation markets, project funds, and innovation enticements. However, innovative capacity of firms could vary on how they develop and commercialize innovations. Meanwhile some researchers have argued that new initiatives can be successfully commercialized if it is separated from the core organization (Christensen, 1997). Recently most of the studies have emphasized on a better combination of the new initiatives with the rest of the organization to gain a sustainable competitive advantage (Govindarajan & Trimble, 2005).

Gulati & Garino, (2000) argued that when organizations seek to be swift by leveraging IT platforms, the need for amalgamation between the operations of the organization and the new initiatives are important because of the need to manage the efficient exchange from the old business model to the new business model. Therefore, the researchers assumed in current study that the level of innovative capacity is important for the conversion of conventional business to digital business operations.

2.6.4.2 Market Orientation

Market orientation refers to the ability to sense and respond to customer needs and corresponds to firm level resource that organizations use to develop marketplace strategies (Day and Nedungadi, 1994) and to meet the organizational exterior environment (Slater and Narver, 1994). Further Slater and Narver (2003) described that market orientation consists of customer orientation, competitive orientation and inter-functional coordination with long term focus and profit focus. In contrast, Pelham and Wilson (1996) argued that, the ability of a firm, to outperform less market oriented competitors is based on its ability to develop long term superior customer value.

A firm in proposing a market orientation developed a positive reception for understanding current and potential customer needs. It also proposes superior customer value; pursuing the methodical combinations and sharing of information concerning potential customers and competitors, and to counter customer requirements and competitor actions in order to build up opportunities and prevent threats (Hunt and Morgan, 1995; Kohli and Jaworski, 1990; Narver and Slater, 1990).
Technological advancement enables the firms to interact with customers in a more advanced and efficient way. It has been noted that customer relationship management enables the firms to deal with the customers more effectively and efficiently (S. H. Chien et al., 2008). Technology provides a support to the implementation of relational information processes, which focus on holding and using customer information for rapid and efficient response to customers (Jayachandran et al. 2005). Further, he found that relational information processes are positively influenced by customer retention and satisfaction.
Numerous empirical efforts have been taken for the consequences of market orientation as well, while the majority of research devotes to the relationship of market orientation and business performance (Diamantopoulos and Hart, 1993; Pitt et al., 1996; Ruekert, 1992; Slater and Narver, 1994). Most of the researchers directly linked market orientation to business performance. However, Webster (1988) argued that market orientation cannot influence business performance directly, and that there should be some mediating variables.

Recently, market orientation has been recognized as an important factor in outcomes of IT/IS marketing and e-business applications and implementation. In virtual organizations, the relationship with customers is an important asset. Market orientation, which reflects the organization's commitment and the continuing assortment of information, will amplify the influence (Chien et al., 2008). Wu et al. (2003) claimed that e-business adoption needs rich interactions with stakeholders and customers to manage a strong relationship.

2.6.4.3 Strategic Flexibility

Strategic flexibility can be conceptualized as the means through which an organization deploys strategy to handle market turbulent environment and to gain competitive advantage (Manu and Sriram, 1996). Strategic flexibility is frequently viewed as an important factor (Evans, 1991) and defined as the skill to acclimatize to environmental changes and incessantly build up strategies based on internal capabilities and external customer needs (Wheelwright and Hayes, 1985). Similarly, Young-Ybarra and Wiersema, 1999) described that strategic flexibility refers to the ability of constant reply to unanticipated changes, and to adjust to unexpected changes by an organization.

Harrigan (1985) viewed strategic flexibility as the ability of an organization to change its position in the market as well as its game plans, or to abandon its current strategies. On the other hand, Aaker & Mascarenhas (1984) defined strategic flexibility as the capability of the firm to adjust according to the unclear and rapid occurring environmental changes that have a significance effect on the firm's performance

According to Brown's (2003) argues that strategic flexibility is relevant to many circumstances. Actions taken in response to competitor, for instance, require a firm to be strategically flexible so that changes can be made in time.

Whilst there is no universally accepted definition of strategic flexibility, it is obvious that the concept differs from traditional strategic planning which typically involves

the consideration of a set of options which fall within narrow limits and yields predictably defined results. The concept of strategic flexibility is further explicated by According to Hayes & Pisano (1994) as follows:

> "In a stable environment, competitive strategy is about staking out a position and manufacturing strategy focuses on getting better at the things necessary to defend that position. In a turbulent environment, however, the goal of strategy becomes strategic flexibility. Being world-class is not enough; a company also has to have the capability to switch gears … relatively quickly and with minimal resources."

Brown (2003) espoused that many industries are increasingly characterized by instability and volatility and as such, firms need to have the capability to change their strategic options in order to withstand environmental changes and uncertainties. This perception is presented earlier by Mascarenhas (1982), Harrigan (1985), Hitt et al., (1998) with their contention that firms in dynamic, uncertain environments must maintain strategic flexibility. On the other hand, Evan (1991) asserted that a company could possibly adopt four maneuvers: 1) offensive maneuver 2) defensive maneuver, 3) proactive maneuver or 4) reactive maneuver. Whilst each maneuver provides the means to achieve strategic flexibility, its choice is contingent upon whether the aim of the firm is to create and seize an initiative or to guard against predatory moves by competitors or to correct past mistakes arising through changes in the environment. Additionally, reactive maneuvers can be sub-divided into: 1) offensive or exploitive measures that seek to reap opportunities and leverage advantages brought about by a crisis and 2) defensive corrective maneuver focused on mitigating damage and learning from mistake.

O'Regan and Ghobadian (2005) explained these characteristics to provide ample understanding on the types of strategic typology. According to these authors, a defender type organization competes to maintain existing markets by strongly emphasizing on price, quality and delivery that follow and will tend to be a reactor, consequently countering to a market based on examining others experiences with a

short-term preference. The prospector typed company will progressively attempt to find the opportunities to counter the changing external environment efficiently. This type of organization will be inclined by an analyzer to effectively and efficiently compete with full analysis of directional strategy.

Strategic flexibility has been widely used in marketing and strategic management research streams. (Zhang, 2001). Strategic flexibility allows a firm to react to environmental changes. Strategic decisions in organization are taken for an efficient response in changing business environment for obtaining sustained competitive advantage (Young-Ybarra and Wiersema, 1999). While, this needs the flexibility of a firm that handle market changes effectively (Grewal and Tansuhaj, 2001). Digital business environment also brings changes in business operations and the firms must be strategically flexible to handle those changes. Therefore, current study proposes that strategic flexibility is an important factor to handle EC business operations efficiently.

2.6.5 Human resources

Human resource capabilities refer to the personnel and stakeholders employed by an organization, and the knowledge, skills and capabilities they bring to the organization. In the other words, human resources are considered to be a collective representation of individual knowledge and skills. They contribute to a firm‘s market value and becomes a component of the firm’s intellectual capital (Glaser et al, 1988). It is also discussed in the capability-based perspective, where resources and capabilities have been argued by the knowledge and skills of individuals (Grant and Romanelli, 2001) Human resources are considered to contribute to capabilities and to the endurance of competitive advantage. From a resource-based perspective, many researchers argue about the output and performance of the resources in the firm.

Top management support and managerial skill related to IT are vital requirements for the successful usage and implementation of IT applications in organizations. Top management support and skill are not only essential in managing IT activities

efficiently in the firm, but also necessary in ensuring the investment adequacy in IT applications and infrastructure (Yu-hui, 2008). Teo (2003) argued that knowledge is considered to be a significant asset of an organization. A significant body of literature on organizational learning and knowledge management emphasizes on the generation, utilization and the deployment of suitable organizational knowledge to enhance competitive advantage. The internal knowledge capacity of an organization establishes an organization skill handle market changes. Boynton et al. (1994) pointed out that IT managerial skill represents a combination of IT-related and business-related knowledge possessed and exchanged between IT managers and business unit.

It is imperative that top management in an organization possess both IT and business knowledge for a successful alignment of IT and business (Teo and King,1997). IT implementation and usage in organizations are significantly influenced by the degree of managerial IT knowledge (Boynton et al., 1994). In fact, Teo and King (1997) argued that business ability of the IT management is a key factor that fosters a superior amalgamation between business and IT planning. Therefore, managerial IT knowledge refers to a vital resource that contributes to the successful implementation and usage of IT success.

The successful utilization of IT resources needs a considerable amount of managerial IT knowledge that can be enhanced via practices and trainings. IT personnel require achieving knowledge on technological innovations and business-related issues.
The capability of an organization to uphold an IT-knowledgeable team is vital for the better outcomes of IT investments.

2.6.5.1 Managerial Expertise

Managerial expertise refers to the level of knowledge and skill of the managers. It is one of the most prominent factors of human resources. The primary structure of capabilities in new organizations is the prior work experience of individuals. Prior managerial expertise plays an important role in the development of capabilities and the utilization of the resources.

Reuber (2003) has examined the characteristics of management expertise and its development through managerial experience. The author identifies four characteristics of managerial expertise, namely task specificity of experience, multiple types of experience, depth versus breadth of experience and the impact of experience over time. The term "expertise" refers to a possession of a prepared body of theoretical and practical knowledge that can be voluntarily accessed and used with better observing and self-directive skills (Glaser et al, 1988).

Managerial role is an important factor of the development and evolution of capabilities. Prior research described the key role and influence of managerial expertise on the development of firm's capabilities (Levinthal, 1995), where expertise and effort can differ in the development of capabilities in different firms (Amit and Schoemaker, 1993). However knowledge is critical to the evolution of firm's capabilities and must be extracted from the individuals within firms. Grant and Romanelli (2001) argued that building new capabilities in the firms is linked to the prior work experience of individuals. Most of the companies hire experienced individuals to improve business operations and gain a competitive advantage in online business environment. According to Wu et al., (2007) firms with high levels of IT technical expertise is expected to achieve better firm performance than firms with lower levels of technical expertise. Yu-hui, (2008), has been pointed out that without robust IT expertise organizations may not want to take risk of technology adoption. Therefore, this study attempts to elaborate on the importance of individual skills and experience for the improvement of business performance and more importantly in the EC operations.

2.6.5.2 Top Management Support

The role of top management is widely considered to comprise of two main features: business opportunity recognition and value creation. A commitment of top management to innovative projects plays an important role in the creation of firm value. For its involvement in the projects, decision making, responsibility meeting for

customer needs and to look over to the competitors, top management support is considered vital to the firm's value creation.

Jaworski and Kohli (1993) found that the amount of emphasis which senior managers place on market orientation influences both the acquirement of, and responsiveness to, information and that market turbulence entails risk-taking on the part of senior managers. It has been noted that a managerial attitude toward change represents the extent to which senior managers are in favour of change (Damanpour, 1991). Therefore, their willingness to change and acceptance of the need for change are crucial for successful implementation of market orientation. Without top management support, managers are potentially sending a wrong signal to their employees and customers alike.

The priority for a market-oriented firm is to constantly deliver superior value to its customers based on understanding of customer needs and market trends (Slater and Narver, 1995). Top management support has been identified as a key factor in the successful innovation firm's level efforts. Prior research suggests the valuable role of top management support for innovation and business performance (Yu-hui, 2008; and Teo, et al., 2009). Top management can utilize and deploy resources that positively affect business functions, and also help to remove the obstacles that can be hindered in project success. Most of the researchers argued that top management can lead, encourage and form the innovation processes that lead to better performance (Kawalek et al., 2003; Gunasekaran and Ngai, 2008; and Kurnia, 2008).

Consequently, a higher amount of top management support usually is assumed to be linked to enhanced project performance. Management support encourages in developing high quality policies and practices for the successful implantation of IT/IS applications (Kawalek et al., 2003). Top management support is essential in overcoming barriers and resistance to change (Teo et al., 2009), without the support and commitment of top management it is impractical to successfully implement E-commerce technologies (Klein et al., 2001; Lee et al., 2007; Yu-hui, 2008; and Fu et al., 2004), in most of the organizations. Top management support is a critical issue for the successful implementation of any IT-system (Kawalek et al., 2003; Gunasekaran

and Ngai, 2008; and Kurnia, 2008). The success of IT projects is critically determined by the commitment of top management in the IT initiative in which the efforts of top management are essential at any firm for the betterment of business process and performance. Therefore, the following hypothesis is established to investigate the relationship between top management support and EC capability.

2.6.5.3 Learning Capacity

Learning capacity refers to the knowledge management and knowledge sharing level in the organization.Techniques on knowledge management have received considerable attention in studies of successful organizational structure. The leverage of knowledge inside and between the organizations has a significant impact on business performance. Human capital and relational capital are also deemed to be two key indicators for the improvement of a product development performance through the learning capacity of the organization. Organizational learning capacity is defined as an ability to understand and share knowledge in the organization for the improvement of business process and the enhancement of competitive advantage (Hsu and Fang, 2009). The utilization of organizational learning capability is useful for the successful implementation of EC. An organization requires well planned knowledge management communications to maintain knowledge that enhances the efficiency of business process (Lee et al, 2007). Organization learning capacity refers to a change in the firm's potential behavior, thus resulting in knowledge building that potentially influences the organization's behavior. Huber (1991) described the process that comprises organizational learning capacity, namely knowledge acquisition, information distribution, information interpretation and organizational memory. Learning capacity can be measured when the memories and experience are shared by the individuals in an organization (Schulz, 2001). This then allows the organizations to build new information systems. Organizational learning and management strategies have been considered as an effective and efficient means to the successful implementation of EC technology (Lee et al, 2007).

2.6.6 IT resources

In the current study, IT resources refer to hardware, software, communications, and IT applications. Over the past few years, information technologies have become broadly accessible to most organizations and most of the firms are using IT to compete in fast paced business environments. Competing through IT has gained wide acceptance and offered more advantages to the organizations. However, a firm which has achieved any impermanent advantage through IT usage may quickly lose the benefits if a competitor selects to perform similar tools or hire any of the persons involved with the advantaged firm's IT application (Mata et al., 1995). Most of researchers agree that IT is a key enabler for business process redesign in organizations (Hammer and Champy, 1993; Davenport, 1993). IT resources can facilitate automation, monitoring, analysis and synchronization to maintain renovation of business processes.

The information communication technologies such as Internet, electronic data interchange and networking technologies can facilitate firms to build useful business relationships with its suppliers and customers. Numerous studies on flourishing IT-based inter organizational systems verify the better outcomes and confirm that the combination of IT resources can provide the ample opportunities to the organization (Chatfield and Bjorn-Anderson, 1997; Fredrickson and Vilgon, 1996; Klein, 1996; Johnston and Vitale, 1988).

Mata et al. (1995) pointed out five characteristics of IT resources including customer switching costs, access to capital, proprietary technology, technical IT skills and managerial IT skills. The authors argued that the managerial ability of an organization to use IT is the only attribute that could possibly foster any sustainable advantage from IT investments. Furthermore they argued that IT management skills, often available heterogeneously among firms, could provide a distinct advantage. This suggestion is reinforced by Bharadwaj (2000) who found that firms with high IT-capability perform better than other firms. In other words, although IT resources are neither distinctive nor inimitable in their own right, a firm can produce a superior performance with a blend of IT resources and complementary business and human resources. The ability to efficiently incorporate IT resources with process reengineering initiatives can direct to improvements in organizational performance.

However, IT resources not only improve internal organizational processes across a firm's value chain, but also extend the business globally (Bensaou and Venkatraman, 1996; Tarn and Wen, 2002).

2.6.6.1 IT Infrastructure

The IT infrastructure of a firm refers to a set of tools and resources which provides a platform or foundation to the business applications (Broadbent et al., 1999). It is the foundation of implementing any technologies in organization and also has often been identified as a successful predictor of IT adoption (Kohli and Jaworski, 1990). According to Yu-Hui (2008) organizations without robust IT infrastructure seemingly are unwilling to take a risk in adopting technology.

Over the last three decades, increasing numbers of firms have significantly invested in IT/IS to improve the efficiency of the business and to achieve the higher level of competitive advantages. A successful adoption of EC relies on a reliable IT infrastructure (Wang, 2010). Organizational readiness and IT infrastructure have often been identified as important factors for a successful IT adoption (Iacovou et al., 1995). Basically IT infrastructure means the required IT tools which may be the networking system, computer equipment, software, hardware systems, and etc that significantly help in E-procurement implementation. IT infrastructure has been considered to be a positive factor for technology adoption in various studies of researchers (Wu et al., 2003; Carayannis and Popescu, 2005; Harland et al., 2007; and Kaliannan et al., 2009). In this regard, a sound IT infrastructure of any organization shows a positive relationship of organizational e-readiness for E-procurement implementation.

2.6.6.2 EC resources

In the current study EC resources are the abilities that provide information, facilitate transactions, offer customized services and integrate the back-end fulfilment According to Zhu et al. (2003) order cycle consists of several steps that can be characterized into four phases: information-gathering activities, transaction activities,

fulfillment activities, and customer service activities. EC resources at this point can be viewed as a firm's ability to utilize, reconFigure and deploy resources to manage and support these order cycle activities. In this current study EC resources are conceptualized in four magnitudes: information, transaction, customization, and back-end integration.

Informational, one of the common levels of EC resources, by most of the organizations is found to provide useful information about the company and its products and services. For instance, in online websites, the customers making an order for direct purchase online require the availability of a product catalog (Zhijun and Shenghua, 2008). Informational level of EC includes company information, product line, product information, search, navigation, product review, and store locations (Zhu et al., 2003).

Transactional, is the second level of EC resources. In this level the customers can conduct online selling and purchasing activities, In other words, the second level of EC resources is to assist online transactions. The features of this level include placing orders on the website, tracking the status of the order, and facilitating the alignment between the online and physical channels by other competences (Zhu et al., 2003).

Customization, it improves customer interaction in which firms often use as a source of interactivity. Customization is a third level of EC resources that helps in many ways of online activities such as customer relationship management (CRM). The interactive character of the Internet permits organizations to directly interact with customers through online channels and offer personalized information and customized products/ services. The key features of customization include configuration, content personalization, account management, real-time support, CRM and return.

Integration is in which EC enables organizations to create a tight electronic integration to facilitate coordination, fulfilment, and inventory management in back offices and with external partners (Zhijun and Shenghua, 2008). Integration is essential in the EC businesses by collectively fitting the pieces and linking the contrasting systems and disjointed resources. As a result, integration is enabling firms

to achieve better return from EC investment. This magnitude of EC resources refers to integrating the Web-based front system with corporate databases and back-end IS, facilitating fulfilment and logistics management with suppliers and distributors via the Internet and sharing inventory data with suppliers. By examining the extent of information-based integration with suppliers, this magnitude of EC resources represents the networked connections that extend the firm to the outer world along the supply chain.

It has been recognized that there might be some dissimilarities among companies in terms of the characteristics of products and the requirements of customers that foster certain extra challenges for the design of strategies. IT has a major influence on commercial activities and accelerating the adoption of EC among industries (Chang and Wong, 2010). Organizations have been utilizing IT systems to streamline and automate the procurement process (Vaidya et al., 2006). The usage of IT significantly contributes in carrying out procurement function successfully in the shape of EC technologies. It is assumed that the higher level of EC resources generates and develops the efficient EC capability.

Chapter 3

METHODOLOGY

3.1 Chapter Overview

This chapter presents the design of the study with a brief explanation of conceptual and structural models, hypotheses and measures of the research variables. It is about the discussion of the design of empirical methodology process to be implemented in the testing of the developed hypothetical model. Correspondingly, it focuses on what, why and how questions pertinent to the selection of research methodology and their outcomes regarding the reliability, validity and generalizability of the undertaken research.

After brief overview of the model, this chapter presents the research method of this study to answer the research questions. This then highlights a review of the research methods of this study including the target population, sampling procedure, sample size, factor development, data collection techniques, instrument development, reliability, pre-testing and introduction of data analysis procedures.

3.2 Philosophical Stance

The overall theoretical perspective as well as methodology in essence is based on a philosophy that is referred to "sociological positivism" (Burrell & Morgan, 1979, p. 7). The term positivism describes as the application of scientific theory, models and methods knowing only facts and observable phenomena. Schlevogt (1998) argued that "sociological positivism" that embraces the positivistic approach for truth is simply an ideal. This argument is supporting the recognition of the limitations for applying a

positivist methodology research in the real world. As argued by Sarantakos (1993), most of the researchers follow some kind of positivistic methodology in a reflection of a purely positivistic theoretical perspective or in the context of another theory. In sum, Schrag (1992) concluded that "despite the attacks leveled against it, positivistic paradigm is hard to avoid."

In this current study, a positivist paradigm is followed. The primary objective of positivist approaches is motivated by the aspiration to find out practical generalizations (Johnston, 1986). To start with, the exploratory stage which essentially subjects the researcher to the need for an thorough assessment and review of existing literature joined with a period of time required for the attainment of facts, data and Figures of the examined industry. Evidently, the exploratory phase takes place prior to the development of the theoretical framework. The following phase is regarded as the core phase whereby the research procedure takes on the positivist paradigm. Consistent with what was prescribed by McNeill & Townley (1986), this current study stands for the hypothetic-deductive approach. Emanating from the critically reviewed literature and considering the specific contributions that this current study intends to make, four research questions and hypothesized conceptual model are developed by generating four main and ten sub-hypotheses. The model is an integration of constructs which will be the basis of investigation in relation to the data collected through a survey amongst the manufacturing industries around Malaysia. Using Statistical Package for the Social Science (SPSS), Version 16, the data were analyzed for a descriptive statistics and the hypothesized conceptual model will be similarly analyzed using the structural equation modeling (SEM) technique for the hypotheses testing and the software used was AMOS, Version 18.0.

3.3 Theoretical Framework

A theoretical framework is the basis for which research questions and objectives of a study are premised (Miles & Huberman, 1994). Subsequent hypotheses or propositions are developed for which data collection is intended to find affirmation for either their support or rejection. Sekaran (2003) states that a theoretical framework functions as a conceptual model that explicates how one theorizes or makes a logical

sense of the relationships amongst several factors that have been deemed to be important to the problem. Author further explains that theory flows logically from the documentation of previous research in the problem area. Integrating one's logical beliefs with published research therefore is crucial in developing a scientific basis for investigating the research problem. However, such an effort must be confined within the boundaries and constraints governing the situation.

Reflecting a large literature base, Research Model as depicted in Figure 3.1 is necessarily broad and permits a very large number of research investigations and will answer research question, as outlined in Section 1.5 and followed by hypotheses.

A conceptual framework is able to explain the specific linkages and the causal relationships of the constructs investigated in the study and as such understanding of the dynamics of the phenomenon that is being investigated to be more systematic (Sekaran, 2003). Drawing from the specifics of the conceptual framework, hypotheses can be formulated and tested through several suitable statistical techniques to verify the validity of the theory as suggested by the researchers.

Hence it is vital that a conceptual framework is developed so that the research problems being addressed can be untangled and more importantly, acceptance and rejection of the hypotheses can be determined. The links between the constructs represent a set of hypotheses that the research must establish a priori. In Chapter 5, these hypotheses will be tested using Structural Equation Modelling techniques which are able to determine whether they are supported or rejected.

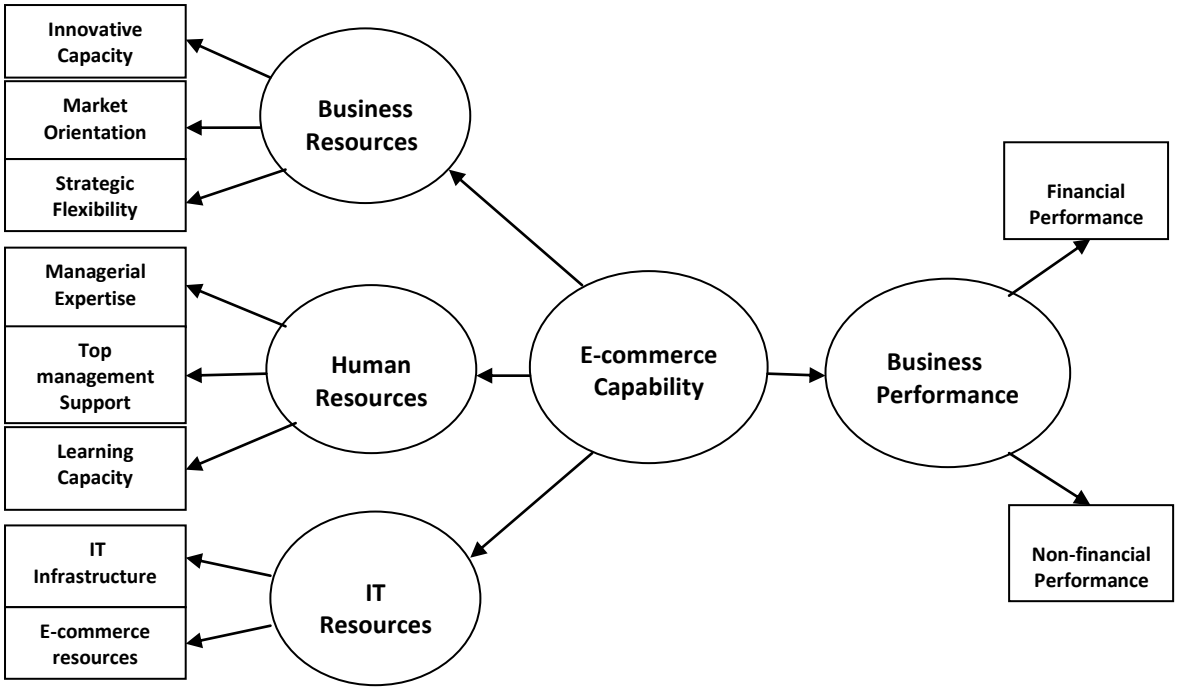


Figure 3.1: Proposed Framework

3.4 Hypothesis

H_1: A higher level of EC capability positively influences on business performance.

H_{1a}: A higher level of EC capability positively influences on financial performance.

H_{1b}: A higher level of EC capability positively influences on non-financial performance.

H_2: A higher level of business resources leads to a higher level of EC capability.

H_{2a}: A higher level of Innovative capacity leads to a higher level of EC capability.

H_{2b}: A higher level of Market Orientation leads to a higher level of EC capability.

H_{2c}: A higher level of Strategic Flexibility leads to a higher level of EC capability.

H_3: A higher level of human resources leads to a higher level of EC capability.

H_{3a}: A higher level of Managerial Expertise leads to a higher level of EC capability

H_{3b}: A higher level of Top-management support leads to a higher level of EC capability.

H_{3c}: A higher level of learning capacity leads to a higher level of EC capability.

H_4: A higher level of IT resources leads to a higher level of EC capability.

H_{4a}: A higher level of IT Infrastructure leads to a higher level of EC capability.

H_{4b}: A higher level of EC resources leads to a higher level of EC capability.

3.5 Factors Development

The research framework consists of several factors that depict in table 3.1, the observed variables, first and second order factors. The proposed model tests the underlying factors of EC capability and a relationship between EC capability and business performance. The observed variables consist of innovative capacity, market orientation, strategic flexibility, managerial expertise, top management support, learning capacity, IT, EC applications, financial performance and non-financial performance. The first order factors in turn include business resources, human resources, IT resources and business performance. The second order factor on the other hand consists of only EC capability and does not have its own set of measured items; while EC capability is represented by the first order business, human and IT resources factors. Consequently, business performance is defined by the observed financial and non-financial performance variables. Innovative capacity, market orientation and strategic flexibility represent business resources, human resources represented by the observed managerial expertise, top management support and learning capacity variables. Similarly, the technology resources underlined by the IT resources and EC resources observe variables.

Table 3.1 Variable and Factor Descriptions

Observed variables	First Order Factors	Second Order Factors
V1– Innovative Capacity	Business Resources	EC Capability
V2 – Market Orientation	*	*
V3 – Strategic Flexibility	*	*
V4 – Managerial Expertise	Human Resources	*
V5 – Top Management Support	*	*
V6 – Learning Capacity	*	*
V7 – IT Infrastructure	IT Resources	*
V8 – EC Resources	*	*
V9 – Financial Performance	Business Performance	Not applicable
V10 - Non-financial Performance	*	Not applicable

3.6 The Research Design

The Information System researchers have a wide selection of research designs from which they can choose the most appropriate one to solve their research problems. The type of research method should be chosen based on the type of information required, the availability of resources, the level of academician control over the selection and assignment of subjects, and the ability to manipulate the variables of interest.

In this research design, several key steps are included to validate the proposed framework. These steps that shown in Figure 3.2, represent time horizon of the study, target population, sampling and design, and reliability of the survey instrument. Each one of these steps will be explained briefly in forthcoming sections of the chapter.

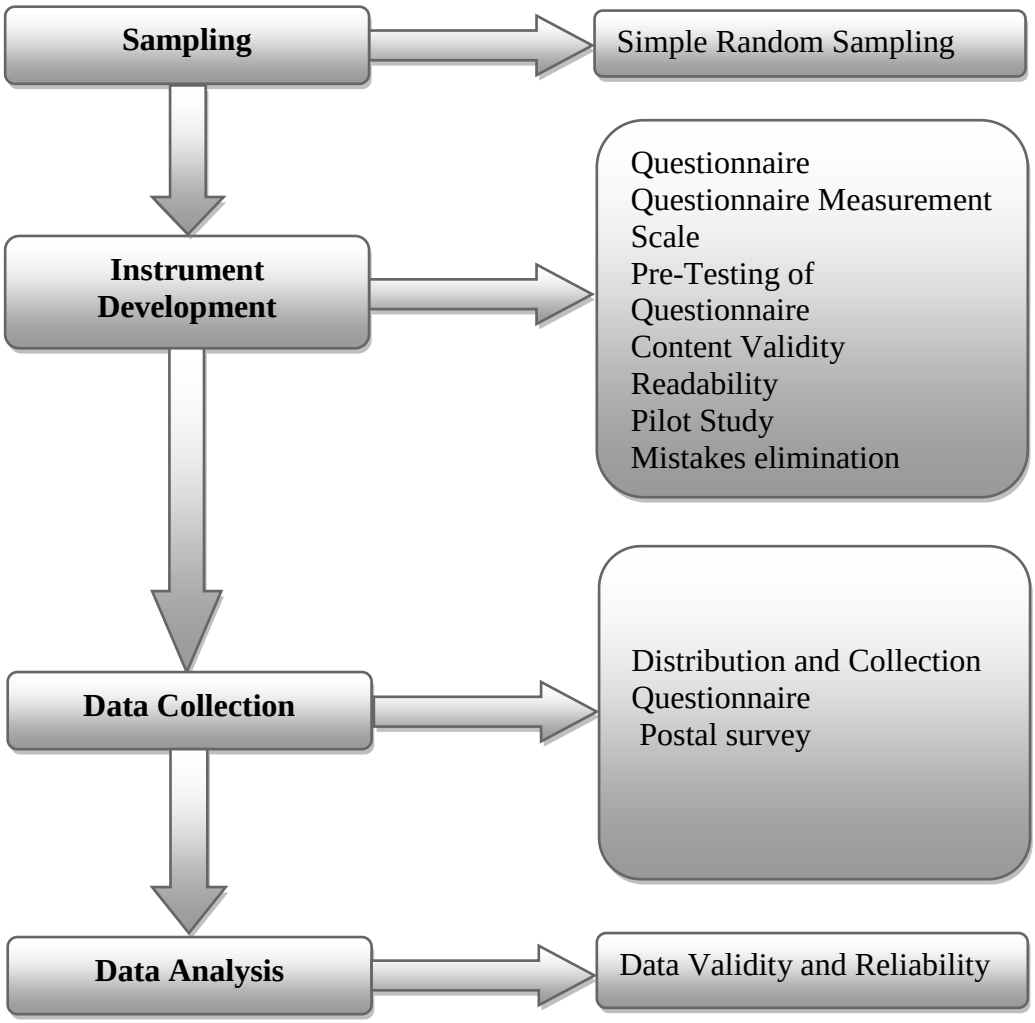


Figure 3.2: A Research Design

3.6.1 Cross-Sectional Research

In this study, data is obtained only once or in one shot known as cross-sectional design. On other hand, longitudinal research takes much time that may cause the situation changes over the time (Malhotra, 1996). According to (Churchill, 1995) a longitudinal research may create some serious problems of representative sampling and response biases. The data gathering phase in such research is longer and respondent may refused to cooperate in collection phase. This research work contrastively is more cost-effective and time saving than a longitudinal one (Sekaran, 2003). Hence the data of this research has been collected only in one shot, started from March 2010 to the end of August 2010.

The above discussions encourage this current study to prefer data collection consistent with that of a cross-sectional research and it is considered to be satisfactory to provide valid information.

3.6.2 Non-Experimental Research

This study follows a non-experimental approach. Kerlinger (1986) described non-experimental research as a systematic empirical investigation in which the researcher has no direct control of independent variables in that their demonstrations have already occurred or inherently are not manipulated. The non-experimental research of this current study determinedly is to attain high levels of internal and external validity. This is attributed to the fact that an experimental research tends to control, randomly assign and manipulate - contributing to lower external validity and more significantly creating artificiality (Churchill, 1995; Malhotra, 1996).

3.6.3 Survey Research

It has been recognized that the most common method of generating primary data is survey approach (Zikmund, 2003). Notwithstanding some researchers' (Kerlinger, 1986; Malhotra, 1996) argued that non-experimental research designs consist of both observation and survey; current study therefore has followed a survey research approach. Survey is described by Groves et al. (2004, p. 2) is as follows:

> "a systematic method for gathering information from (a sample of) entities for the purposes of constructing quantitative descriptor of the attributes of the larger population of which the entities are members."

Malhotra (1996, p. 130) defines survey as:

> "…interviews with a large number of respondents using pre-designed questionnaire."

Behaviours and experiences can sufficiently be evaluated by means of observation, the reasons underlying these behaviours and experiences cannot be disentangled through observational methods (Parasuraman, 1997; Weiers, 1988). Besides, Churchill (1995), Malhotra (1996), Parasuraman (1997) and Weiers (1988) pointed out that observational method can lead to biases arising from researchers' subjectivity due to their interpretation of the observed behaviour and experience. Having reviewed the strength of survey method, this current study will therefore adopt it for data collection.

3.6.4 Sampling frame

Sampling refers to a procedure where a sufficient number of elements are selected from the population (Sekaran, 2003). Sampling techniques provide a range of methods to collect data from a subgroup that reduces the amount of data (Saunders et al., 2003). Additionally, this technique also saves time and assigns population for data collection in more manageable way (Saunders et al., 2003).

Sampling techniques can be classified into probability and non-probability sampling (Churchill, 1995; Malhotra, 1996). Figure 3.3 shows the major sampling methods.

In this study, a simple random sampling method is used to generate the samples necessary for quantitatively testing the scale items. (Lee and Lings, 2008) defined simple random sampling as a perfect random selection from a perfect list of all members of the population (the sampling frame). The choice for this method was to get an equal chance of selection of manufacturing industries. The proposed framework was meant to be applicable for all manufacturing industries, as when it

comes to generalization, simple random sample technique is mostly used (Sekaran, 2003, p. 279).

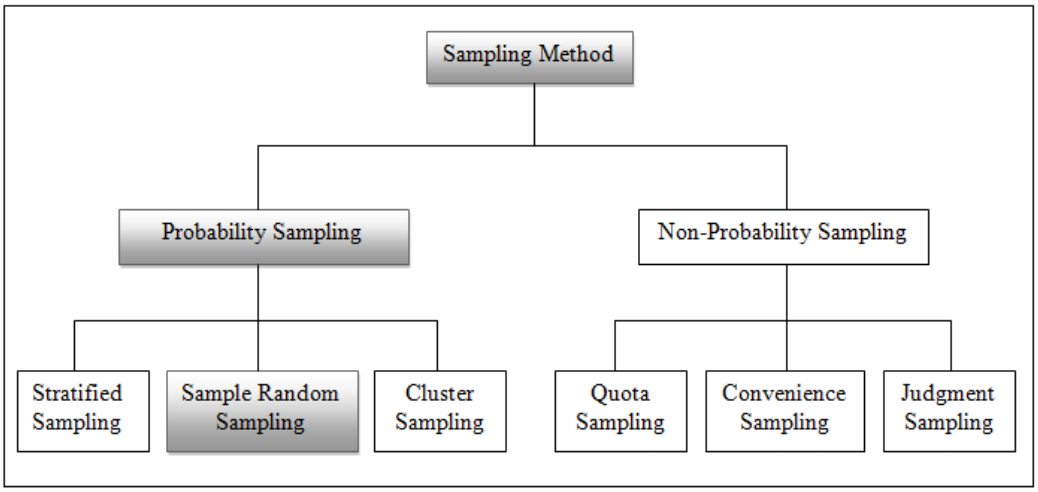


Figure 3.3 Sampling Procedure (Churchil, 1996)

3.6.5 Population and Respondents

An important task for researcher in doing survey is to carefully define the population of interest prior to data colleting. In general, population is a collection of elements about which the researcher wishes to make an inference. Most of the survey in research tends to involve the selection of a sample from a population rather than to study the population entirely due to the complexity and vast expense.

In current study manufacturing firms are randomly selected from the population of manufacturers available at local online directory www.701panduan.com.my. The advantage of using this online directory was the availability of the industry type, URL, E-mail address, company address, contact numbers, payment methods and geographical locations. The respondents are screened for the criteria of this study which are based on whether a firm is a manufacturing firm and uses any EC application (at least one). Initially 500 top manufacturing firms were randomly

generated by the online directory in the online random generator tool as shown in Appendix E. After screening the firms based on criterion, 27 firms were then dropped from the sample size for not using any EC applications. The sample size of this study is also influenced by the structural equation modelling (SEM)that could require 200 or more than 200 respondents to for better estimation of goodness of fit (Hair, 2003). An online research randomizer (http://www.randomizer.org) generator was used to give each respondent of the population an equal chance of inclusion in the sample.

The population were approached through personally administered questionnaire and postal survey approach, in which 287 complete responses were received from 473 sample sizes. The total response rate is 59.5%, acceptable for data analysis (Sekaran, 2003; Gunasekaran and Ngai, 2008).

3.6.6 Choice of Data Collection

The data collection for research survey is administered in two methods. The methods reflect quantitative approach self-administered and postal survey approach. As discussed above the method of investigation for this study is quantitative method, which is self-administered. The detail for self-administered questionnaire method is discussed below with a literary justification.

3.6.6.1 Self-Administered Questionnaire

According to (Saundars et al., 2007), self-administered survey comprises of three different methods. However, in some studies the mode of self-administered is left to the respondent's preference to choose. The three forms of self-administered questionnaire are as follows:

1. Online Questionnaire where the research instrument is sent and returned through e-mail
2. Postal Questionnaire where the research instrument is sent to respondents through mail and then returned by the post
3. Delivery and Collection Questionnaire where the research instrument is delivered by hand to each respondent and collected later by the respondent

3.6.6.2 Postal Questionnaire

This questionnaire mode is the best administered to cover wide geographical area for survey (Sekaran, 2003). However the response rate of postal questionnaires is low, but a 30% response rate is considerably acceptable (Sekaran, 2003). Author also founds that the response rate can be improved by sending the follow-up letters, small some incentives and providing stamped return envelops with self-addressed.

Some instructions and techniques, which are useful for researcher in postal questionnaire (Saunders et al., 2007) are presented as follows:

- Ensuring the printed letters and envelopes are properly addressed with the questionnaires.
- Making a pre-survey contact either by email, post or by phone to confirm about questionnaire sending.
- Making a first follow-up remainder letter after one week for all recipients
- Sending the second follow-up remainder to those who have not responded after three weeks.
- Posting out the third follow-up letters when the response rate is low.

3.6.7 Distribution and Collection Questionnaire

Distribution and collection questionnaire is the preferred mode of administration of the questionnaires for this current study. This mode of administration, sometimes referred to “drop off and collect survey”, is somewhat similar to postal questionnaire (Hair, 2003) where the researcher delivers the questionnaire and at a later stage collects it.

There are other reasons that justify the choice for distribution and collection technique such as the affirmation that all questions are answered, the assurance that the questionnaire is received by the respondent as it is hand-delivered. Additionally, it can create opportunity to interact with the leaders in order to explain and persuade them to participate in the survey. In turn, they will forward the questionnaire to their down

lines and ensure that the selected down lines are in compliance with the quota. However, in current study, self administered method and postal survey as well as online survey approach were carried out to collect data. According to Dillman (2000) mix mode method could possibly increase the response rate.

Furthermore the respondents were contacted through email as well as telephone calls. In the first stage all the respondents were contacted for the distribution of the questionnaire through a direct-contact. After personally administering the questionnaire, the next stage is to take the questionnaire back from the respondents. Since the main objective of the research is to investigate the EC capability and business performance relationship, every effort is made to contact the upper level management such as CEO, IT manager, Director and Business mangers. The respondents were initially contacted for the appointment to complete the survey. The appointment is pleaded for 20 minutes time slot. Prior calls were made two days before the appointment as a confirmation.

3.7 Method of Investigation

Method of investigation for survey research is categorized into two approaches - qualitative and quantitative method. Blaxter et al. (2002) points out that qualitative research is more concentrated on non-numeric data and exploring information in depth rather than breathe. This approach also more concentrated on words and not experimentally examining or measuring in terms of quality, amount, intensity or frequency (Bryman, 2004). However, the second approach is quantitative method, designed to collect data in a form suitable for statistical analysis, non reactive, representative and using standard measures (Cresswell, 2003).

A study by Burns (2000) identified the following four main characteristics of quantitative research approach:

- Control- An approach where an answer of the research question is addressed
- Operation Definition – A method where the description of the variables are addressed

- Replication – A study where similar population and methodology are repeated to obtain equal results
- Hypothesis Testing – A process to systematically prove or disprove the hypothesis.

Based on the above literary justification and its suitability with present research study, a quantitative method will be performed in this research.

A quantitative investigation constantly attempts to explore some characteristics, fundamental properties and empirical boundaries (Horna, 1994) and serves to answer two research questions by determining the quantity at first and the frequency of events or phenomenon then. Simply, Nau (1995) argued that quantitative investigation is addressing two questions as the investigation direction, i.e. How much and How often The main argument against the quantitative method slander in its collapse to determine deeper underlying meaning and explanations (Jones, 1997) of issues being studied, even when the findings are significant, reliable and valid.

3.8 Measurement of Items

As item generation is concerned, the central issue, perceived to be a major concern to all researchers, is the question of its content validity - basically reflecting the minimum psychometric requirement for measurement adequacy. IT refers to the first step in construct validation of a new measure (Schriesheim et al., 1993). Content validity has to be constructed into the measure through the development of items. Any of the measure consequently and adequately must capture the specific domain of interest without any irrelevant content (Hinkin, 1995).

3.8.1 Specification of Construct Domain

The specification of the construct domains was advocated by reviewing the literature followed by some discussions with the manufacturing firm's practitioners and key informants who are equally familiar with the different concepts related to the

conceptual model of this current study. The following section will briefly describe the two different approaches.

3.8.1.1 Literature Study

Churchill & Iacobbuci (2002) advocated that the fastest and most economical means in assessing prior research propositions is by conducting a literature search. The literature review has enabled this current study to generate certain validated items as well as validated scale to measure the above-mentioned constructs. Due to the unavailability of some items, validated items and newly constructed items were used.

3.8.1.2 Key Informant Survey

A key informant survey was also purposively conducted for capturing additional information. Some of the key informants included the Chief Executive Officer, Marketing Director and General Manager of the selected manufacturing companies as well as Key leaders that were also approached to get some relevant information. Generally, they were all supportive of the survey. With years of experience, they were found to be very conversant with the concepts of EC and organizational resources.

3.8.2 Item Generation

Hinkin (1995) pointed that the most significant part of developing good measures is the item generation. It concerns with that some of the measures used in many studies may actually lack content validity. Moreover, the way researchers report the item generation process may be harmful to its validity due to the keeping out of vital information regarding the foundation of measures. Hinkin (1995) pointed out that the prerequisite for new measures is the organization of a different links between items and their theoretical domain. Espousing the process must be made clearly and briefly.

The next section will discuss two main sources of information for the generation of items as follows:

3.8.2.1 Literature Study

The literature review as discussed in chapter 2 was two-sided as apart from reviewing the literature for the purpose of identifying research propositions. It has benefited for being able to recognize a variety of factors that could chip in to the current study in addressing the problem of this research. The factors derived from the literature as shown in Appendix E were then analyzed in pilot study to incorporate the most important factors in the proposed model. These factors are grouped into four major parts: business resources, human resources, technology resources and business performance. The range of measurement scales for each construct was derived from the literature review. Whilst the majority of the items are available, there are some items needed to be developed for this study. Table 3.2 summarizes the sources of information from which the pool of items were finally generated and modified to match with current scenario.

Table 3.2 Sources of Construct Measurement

No	Construct Name	Item	Source
A	Business Resources		
1	Innovative Capacity	7	Muller et al. (2003)
2	Market Orientation	7	Slater and Narver (2003), (Chien et al., 2008)
3	Strategic Flexibility	5	Brown (2003), (Zhang, 2001)
B	Human Resources		
1	Managerial Expertise	8	Reuber (2003), Wu et al., (2007)
2	Top Management Support	6	(Teo, et al., 2009)
3	Learning Capacity	5	(Lee et al, 2007), (Hsu and Fang, 2009)
C	IT resources		
1	IT Infrastructure	5	Jaworski & Kohli (1993), Ordanini and Rubera (2010)
2	EC resources	6	ZHU (2004)
D	Business Performance		
1	Financial Performance		Kaplan and Norton (1992), Kaplan and Norton (2001)
2	Non Financial Performance	9	Kaplan and Norton (1992), Kaplan and Norton (2001)

3.8.2.2 The Instrument and Scale Development

This section presents the instrument used in this study. The instrument is based on the previous validated measure with major modification and some newly developed questions that represent the observed variables of the research model. The instrument is designed to answer the research questions. The construct is further divided into the following four different sections.

- Section A contains the respondent's general information, company background and demographics of the company.
- Section B focuses on the measurement of the observed variables of business resources first order factor. This section contains the measured items of innovative capacity, market orientation and strategic flexibility.

- Section C covers the measurement of the observed variables of human resources first order factor. It contains the measured items of managerial expertise, top management support and learning capacity.
- Section D finally represents the observed measurement of the observed variables of technology resources first order factor. This section contains the measured items of IT resources and website resources.

The scale used in this study is generally depicted as 7-point Likert scale, a perceptual scale that measures the extent to which respondent agrees with the statement. 7-Likert scale provides more variance and it is also providing a mid-point that increases reliability (Hair, 2005). The values used for Likert scale in this study are:

1 = strongly disagree

2 = disagree

3 = somewhat disagree

4 = neutral

5 = somewhat agree

6 = agree

7 = strongly agree

3.9 Items of observed variable of business resources factor

This section presents an overview about items of observed variables of business resources factor.

3.9.1 Innovative capacity

The observed innovative capacity variable refers to the ability of an organization to support and generate new ideas (Muller et al, 2003). In this study the innovative capacity is measured by the innovative approach of an organization towards processes. Based on this concept, the innovative capacity measured by four (4) items is presented in Table 3.3

Table 3.3: Items of Innovative capacity

Items
1. Our company is proactive in developing new technologies and customer applications.
2. Our company is proactive in the innovations of products/services.
3. Our company is proactive in the innovations of processes
4. Our company is proactive in the innovations of its organization.

3.9.2 Market Orientation

The observed market orientation variable refers to the extent of the ability of a firm to sense and respond to customer requirements and counter new challenges accursed by the market turbulence environment (Day and Nedungadi,1994). In this study market orientation is conceptualized by the firm's ability to sense or respond to the customer requirements and competitor actions. Market orientation is measured by six (6) items as shown in Table 3.3.

Table 3.3: Items of Market Orientation

Items
1. Our Firm uses market research studies
2. Our Firm segments its online customers
3. Our firm offering the customer retention programs to attract more customers
4. Our firm maintains personalized relationship with each customers
5. Our strategy to achieve competitive advantage is based on the comprehension of customer needs.
6. Our firm often examines costumers and market segmentations where our competitors are ahead.

3.9.3 Strategic flexibility

The observed strategic flexibility variable is defined as the ability and the skill of a firm to adjust to environmental changes and continually build up strategies based on internal capabilities and external customer needs (Wheelwright and Hayes, 1985). In this study strategic flexibility refers to the strategic approach to

deal with the adoption of EC applications. Strategic flexibility is measured by six (6) items as presented in Table 3.5.

Table 3.5: Items of Strategic Flexibility

Items
1. We redesigned our process management to fit EC
2. We redesign our marketing and sales process to fit EC
3. We have clearly identified our EC projects priorities
4. Our EC planning is integrated with overall business plan.
5. We have a long term strategic plan for EC.
6. We actively research the best Web practices of other Web sites to bring new changes.

3.10 Items of Observed Variables of Human Resources Factor

This section presents a brief discussion about the items of observed variables of human resources factor.

3.10.1 Managerial Expertise

Romanelli (2001) defined managerial expertise as the level of knowledge and skill of the managers. In this study managerial expertise in turn is denoted as the manager's experience and knowledge about the ICT and EC applications. Managerial expertise is measured by five (5) items as shown in Table 3.6.

Table 3.6 Items of Managerial Expertise

Items
1. Our management has extensive experience in ICT usage.
2. Our organization always acquires sufficient number of ICT personnel.
3. Managers in Our company understand how employees from all functions can contribute to deliver customer value.
4. Our managers are capable to fit EC in the culture of Our company.
5. Managers in our company have extensive experience of online business processes.

3.10.2 Top Management Support

In this study the observed top management support variable refers to the commitments of upper-level management in adopting and using information communication technologies. Top management can utilize and deploy resources that positively affect business functions, and also help to remove the obstacles that can be hindered in project success. Top management support is measured by five (5) items as presented in Table 3.7.

Table 3.7: Items of Top Management Support

Items
1. As a top management we have clearly shown our involvement in EC activities.
2. Our top management reacts quickly to the action of our competitors.
3. Our top management always concerned about meeting customer's needs.
4. Our top management is aware of the benefits of EC.
5. Our top management is capable of integrating firm's resources to utilize EC value.

3.10.3 Learning Capacity

Learning capacity is defined as an ability to comprehend and share the knowledge in the organization for the enhancement of business process and ornamental competitive advantage (Ya-Hui Hsu, Wenchang Fang, 2009). In this study the observed learning capacity variable is presented as the ability of a firm to effectively utilize the knowledge management and knowledge sharing. Learning capacity is measured by six (6) items as presented in Table 3.8.

Table 3.8: Items of Learning Capacity

Items
1. Information about our customer is communicated freely throughout our company
2. In our company sales people share a lot of information about the competition.
3. In our organization knowledge can easily acquired from experts and co-workers.
4. In our organization knowledge can be acquired easily through formal documents and manual.
5. In our organization it is easy to get face-to-face advice from experts
6. Our firms often use the knowledge management and knowledge sharing approaches.

3.11 Items of Measured Variables of IT Resources Factor

This section presents the brief overview of the items of measured variables of IT resources factor.

3.11.1 IT Infrastructure

IT Infrastructure of a firm are defined as the potential of hardware, software, communications, IT applications and IT personnel. In this study the observed IT resources variable refers to the IT infrastructure of the firm. IT resources are measured by eight (8) items as shown in Table 3.9.

Table 3.9: Items of IT Infrastructure

Items
1. Our firm's IT infrastructure efficiently support EC
2. Our firm is well computerized with high internet connectivity
3. Our firm is concerned with getting most up-to date IT applications
4. We have formal strategic plan for EC
5. We have set of clear priorities for our EC projects.
6. We measure on a regular basis the effectiveness of EC projects.
7. Our company using IT for the rapid response of environmental pressure.
8. Our firm uses an external information network to identify our requirement for IT

3.11.2 EC Resources

The variable of observed EC resources is defined as the extent of the functionalities and richness of a firm’s website. In this study website resources refer to the different applications and functionalities of website used by an organization. Website resources are measured by six (6) items as presented in Table 3.10.

Table 3.10: Items of EC Resources

Items
1. Our website is publishing basic company's information with interactivity.
2. Our website is publishing basic company's information without interactivity.
3. Our website has a capability of accepting queries and form entry from users
4. Our website has a features of online transactions and it allows secure transactions
5. Our website facilitates suppliers, customers and other back office system

6. Our website loads quickly and it crashes infrequently

3.12 Items of Measured Variable of Business Performance Factor

This section presents a brief discussion of the items of measured variable of business performance factor.

3.12.1 Financial Performance

Financial performance of a firm means a return on investment, market share, sales projection and profit. In this study the observed financial performance variable is measured by the sales growth, return on investment, sales projection, market share and profit of the firm. Therefore, financial performance is measured by six (6) items as shown in Table 3.11.

Table 3.11: Items of Financial Performance

Items
1. Since we implement EC in our business, its affecting positively to achieve sales projection
2. Since we implement EC in our business our sales growth has been outstanding
3. Since we implement EC in our business, return on investment has improved dramatically
4. Since we implement EC in our business, return on investment has improved dramatically
5. Since we implement EC in our business, profit is relative to expectations
6. Since we implement EC in our business, our cost position is relative to expectations.

3.12.2 Non-Financial Performance

The observed non-financial performance variable refers to the firms efficiency in business processes, customer satisfaction, retain customer core, customer sales after services and product quality. It also generally determines the long-term goals and

enticements. The variable of this performance is measured by six (6) items as presented in Table 3.12.

Table 3.12: Items of Non-financial Performance

Items
1. Since we implement EC in our business, the customers are showing satisfaction.
2. Since we implement EC in our business, our firm is providing the rapid after sales services
3. Since we implement EC in our business, the delivery of products and services is relative to expectation
4. Since we implement EC in our business, our product quality has been improved
5. Since we implement EC in our business, our business is more reliable
6. Since we implement EC in our business, our firms retained the customer based.

3.13 Pre-testing

The Dillman's (2000) four-stage method, one of the effective methods for the validation of survey instrument, is employed for the pre-testing of survey instrument. Four stages have been employed to test the instrument. This method is fully discussed in the next section.

3.13.1 Stage-1 - Content validity

This section presents the process of content validity - a course of action to judge and determine the scales restraining items that are necessary to measure the variable of interest. Considering the unavailability of proper quantitative procedure to estimate content validity, the measurement can be performed by the judgment of the researcher and his advisors. The initial phase of the content validation was conducted by the researcher and his advisors over two months in which eight (8) versions were developed and modified. Then in the second phase, the content validation was made by one university professor, two senior lecturers and two doctoral students from Computer and Information Technology Department and Management and Humanity Department as well as one manager, an expert in the field of EC.

The questions asked from the respondents are as follows:

1. To review all necessary questions that has been included to assess the variable of interest if it needs some modifications and inclusions.
2. To suggest the unnecessary item removals in the instrument.
3. To identify the appropriateness of a scales used for the variables and factors.
4. To estimate the pitfalls of the sections used in the instrument.

Furthermore the researcher observed the respondent's behavior for any hesitation or confusions when reviewing the instrument. The corrections that had been commented by the respondents in this stage finally were made.

3.13.2 Stage Two: Readability

Stage Two was employed for the readability of the instrument in which the knowledgeable people were chosen to evaluate the following

1. The words used in the instrument are understandable.
2. The questions are equally interpreted by the respondents.
3. The professionalism of the presentation exists in the instrument.
4. The clarity and length are appropriate for all the respondents.

In this stage nine (9) respondents were involved comprising of one psychology professor as an expert in surveys, three master's degree students from computer, three doctoral students from Computer and Information Science Department and two managers. Modification of the instrument was conducted after the comments from Stage Two.

3.13.3 Stage 3: Pilot Study

After the completion of Stage 1 and Stage 2, pilot study was employed in Stage 3. The main objective of the pilot study is to revise and modify the survey to evade mistakes that harm the results. The modified instrument was administered in this stage. The instrument was administered to 21 firms located at Kuala Lumpur that had shown the agreement of participation. Stage 3 involved the following deeds.

1. Responses were checked to ensure the uniformity of answers' distribution.

2. Correlation test were employed for the evidence of multi-collinearity and to find out the most important factors.
3. Responses were scrutinized to recognize questions excluded by respondents,
4. Instrument was assessed for subjects that could harm the response rate.

The result of the instrument modification further is addressed to be the final instrument. The results from the pilot study are as follows:

1. Most of the respondent answered the questions of the instrument unanimously, while some complained about the length of some questions modified in the final instrument.
2. The Pearson correlation test was employed between the proposed factors. While the sample size in the pilot study was small, and the correlation achieved with each other and overall alpha was .79.
3. As the pilot study was conducted via self-administered questionnaire approach, no respondent was identified to skip the question.

3.13.4 Stage 4: Mistake Elimination

In the final stage the modified instrument was examined by one lecturer, two doctoral students and one manager, who were not involved in the previous stages. Dillman (2000) describes this stage as "to catch the silly mistakes". For this, some minor corrections were made in this stage.

3.14 Analysis

3.14.1 Descriptive Analysis

Descriptive statistics is employed to test the basic features of the data by using the statistical package for social science (SPSS) version 16. The main objective of the descriptive statistics is to check whether the data is ready for further analysis. It is a process of screening each item of the data, identifying the irrelevant or

unmatchable data from the data set, and reducing data as well as providing a simple summary of a data set.

Univariate and multivariate analysis are conducted in this stage to screen the data. In the univariate analysis all the three approaches, namely the distribution (frequencies), the central tendency (means) and the dispersion (standard deviation) are tested, as well as the skewness and kurtosis analysis.

3.14.2 Item Analysis and Scale Purification

This section will focus on how scale items used in this research are tested on a quantitative basis. The objective of this work out is to filter the original item pool which was specifically generated for this current study. Thus, items that are poorly performing in the constructs and violating the predicted factors can be eliminated. Item analysis and exploratory factor analysis as suggested by Churchill (1979) will be employed to ascertain their performance and appropriately clarify the scale.

The most frequently used analytic technique for data reduction and cultivating construct is factor analysis. This point is further confirmed by Hinkin's (1995) study with 71 per cent accounted the use of some types of factor analytical technique to obtain the scale. The earlier phases in the scale development process were intended at creating measures that exhibit validity and reliability. Whilst factor analysis, internal consistency and test-retest reliability present evidence of construct validity.

The potential lack of validity in the conclusions can be minimized by a research design that assembles in the opportunity for focus groups after the questionnaires results have been analyzed.

The association between reliability and validity is clear-cut and easily understood (Salkind, 2000). It goes like this: A test can be reliable, but not valid. However a test cannot be valid without firstly being reliable. In other words, reliability is an essential, but not enough, condition of validity.

3.14.3 Exploratory Factor Analysis

Factor analysis is a procedure whereby the sample of correlations amongst variables can be summarized and a large amount of variables can be shortened into a smaller amount of variables (Tabachnick & Fidell, 2001). Generally, there are two types of factor analysis: exploratory and confirmatory.

Consistently, as Sharma (1996) stresses, analysis can be used in two ways in the development and/or assessment of scales to evaluate concepts. At the outset, there is an approach referred to as exploratory factor analysis suitable for determining the magnitude or structure of a concept and the items to be used in evaluating the dimensions. The other approach is known as confirmatory factor analyses primarily carry to validate or confirm hypotheses on previously developed scales. In this study, exploratory factor analyses are used for each of the constructs of the models.

3.14.4 Validity Assessment

Sekaran (2003) suggests that validity test is about how well a developed instrument supposedly measures the concept. It also is important to note that reliability is a necessary but not sufficient condition of the test of goodness of a measure.

For instance, one could very reliably measure a concept establishing high stability and consistency but it may not be the concept that one had set out to measure. Validity ensures the ability of a scale to measure the intended concept. Salkind (2000) simply puts validity as the quality of a test doing what it is designed to do. As to the three aspects of validity, he underlines the premise that validity is in fact referring to the result or outcome rather than the test itself. Secondly, validity is in effect of a continuum of low to high validity and therefore cannot be seen as either validity or invalidity.

3.14.4.1 Construct Validity

Construct validity is a time-consuming and frequently inflexible type of validity to establish. It is the most attractive (Salkind, 2000) for most of researchers. Construct

validity is defined by (Salkind, 2000) as "the degree of the results of a test that are related to an underlying psychological construct. It links the practical components of a test score to some underlying theories or models". Furthermore, construct validity may be assessed using the contemporary analytical guidelines suggested by Anderson & Gerbing (1988), Hair et al., (2005) through the examination of factor structures and internal consistency. Exploratory factor analysis (EFA) can be conducted through principal component analysis (PCA) using varimax rotation. Factors with eigenvalues greater than 1 should be identified and items with factor loadings less than 0.5 should be deleted (Shi & Wright, 2001). Any items which are cross-loaded and their factor loadings are greater than 0.40 should be removed from the analysis. Reliability loadings are estimated by means of Cronbach's α to facilitate the assessment against the suggested α level of 0.70.

Despite the positive outcome of the exploratory factor analyses, Churchill (1979) cautions that there is a strong argument that additional evidence should be required after and further analyzed. As such, more thorough statistical techniques will be performed to confirm and verify the dimensions. In keeping with the suggestion, confirmatory factor analysis will be performed as a subsequence to the exploratory stage as recommended by Gerbing & Anderson (1988). It is therefore necessary that the 63 items of the 11 factors derived from the exploratory stage are used in a confirmatory factory analysis model so that the underlying dimensions can be verified using structural equation model. The outcome of this analysis and internal consistency of each scale are reported accordingly in Chapter 5.

3.14.4.2 Reliability Assessment

The most established definition of reliability is attributed by Nunnally (1978) who posits it as the extent of measurements of particular test repeatability. It clearly implies that the measuring procedure should create reliable results on repeated tests. The more reliable the results given by repeated measurements are, the higher the reliability of the measurement process will be.

The most suggested measure of internal consistency is provided by loading alpha (α) or Cronbach's (1951) alpha as it provides a good quality reliability estimate in most situations. The range is from 0 to 1. The nearer the value of α to 1 is, the better the reliability is then. If the value is low, it can be credited to the items that are too few or there is very little harmony amongst the items (Churchill, 1979). For the early stages of any research, Nunnally (1978) suggests that reliability of 0.5 – 0.6 is adequate although a loading of 0.7 or above is enviable (Hair et al., 2003).

3.15 Structural Equation Modelling

The following section will address the main statistical analysis technique specifically utilized for testing the formulated hypotheses of this current study.

In this stage the structural equation modelling (SEM) is conducted to test the hypothesized relationship between factors, lower order factors and higher order factor in the structural model. SEM, one of the most popular statistical approaches by the researchers for decades, examines the relationship between continues or discrete predictor variable (exogenous variable) and continues or discrete criterion variable (endogenous variable) by using several techniques (Hair, 2003). It also combines the analytical techniques of confirmatory factor analysis and regression to eliminate variance errors to accumulate the common variance of the variables. Based on Maximum likelihood and chi-square, structural equation modelling estimates the relationships of the paths in the model and provides several fit indices (Mayer et al., 2003). Using AMOS 18.0, structural equation modelling is conducted in this study to confirm the research model and identify the fit indices. The confirmatory factor analysis was conducted to relate the variables to the factors in the initial phase. The proposed paths of the variables to the latent factors were tested in this phase. In the second phase the SEM was used to find out the relationship between the first order and second order factors. In this phase the direct and indirect affects of the proposed casual relationship were tested. According to (Hair, 2003), multiple indices should be executed to test the model fit. The dimensions of fit indices used in structural equation modelling include

Chi-square, Degree of freedom, Goodness of fit index (GFI), Root Means Square Error Approximation (RMSEA) and Non Normed Fit Index (NNFI).

Additionally, SEM is a statistical methodology that takes on hypothesis testing (i.e., confirmatory) approach of the multivariate analysis (Hair et al., 2005). Tabachnick & Fidell (2001) stated that SEM can be viewed as a confirmatory technique for model testing. In addition, MacLean & Gray (1998) assert that SEM normally engages the requirement of an underpinning linear regression-type model (incorporating the structural relationships or equation between unobserved or latent variables) along with a number of observed or measured indicator variables.

In this current study, unobserved or unmeasured second order variables are those which stand for the concepts or theoretical constructs that cannot be directly measured. Second order variables are principally unobservable; its capacity must be indirectly obtained (MacLean & Gray, 1998). Hence, SEM is able to provide an suitable and most professional estimation technique for chain of separated multiple regression equations simultaneously estimated (Hair et al., 2003).

Based on the revelation of SEM, the hypotheses of this current study will be tested by the SEM. SEM technique will be followed in two stages. A software which is referred to as Analysis of Moment Structures or AMOS 18 will be used in SEM for the data analysis and hypotheses testing for this current study.

3.16 Summary

This chapter presented the research framework which has been described briefly, specifically, the theoretical model for testing the relationship between the variables and their hypothesized relationships. A brief research design was discussed with their conceptual references stated where applicable, as well as the reasons for choosing self- administered questionnaire for data collection. Following this, target population, sampling development, design and construction of the questionnaire, pretesting of

questionnaire, reliability and validity testing of survey instrument are explained in detail.

The forthcoming chapter discusses in detail the data analysis and findings will be given in the next chapter.

CHAPTER 4

PRELIMINARY ANALYSES

4.1 Chapter Overview

Presenting the results of the development of EC capability and its relationship with business performance, this chapter primarily aims to report the findings of the exploratory data analysis e.g. reliability testing, descriptive analyses and factor analysis. The model with four major hypotheses and eleven sub-hypotheses were proposed and these hypotheses depicted several important relationships between variables. The first part establishes the demographic profile of the respondents and the descriptive statistics of the constructs. The second part will examine the descriptive statistics and the third one will analyze the factor analysis using SPSS 16.

4.2 Demographic Profile of Respondents

The demographic profile of the respondents is presented in this section, intentionally to provide an insight into their composition, gender, occupational background and academic background as well as company background. Additionally, this section will provide a summary on the basic statistics pertaining to each of the constructs examined in this current study. The presentation of detailed information on sample descriptive statistics in cross-sectional research is in line with the recommendation by Brislin, et al. (1973). It would help in highlighting features supposed to influence the results or more importantly, their interpretation should be presented. The response rate and respondent characteristics included as well as certain features of the companies in the sample to highlight its characteristics.

Based on respondent gender, the percentage of male was higher than that of female respondents. According to demographics statistics, out of 287 respondents of this survey, 162 were males representing 56.4% of the overall respondents whereas 125 were females representing 43.6% of the overall respondents.

4.2.2 Education

Education of the respondents is one of the evaluating tools to see the knowledge of respondents on current technologies applications. In this study, the majority of respondents hold bachelors degree with 143 out of 287 respondents, representing 49.8%. The second majority degrees of respondents were Master and Diploma, 87 and 49 representing 30.3% and 17.1% respectively. Only 8 respondents were PhD holders, representing 2.8%. The percentage of education level in manufacturing industries above with a domination of bachelors and masters degree, still reflects a positive response in education level among manufacturing industries respondents, and correspondingly shows a positive contribution of respondents in survey feedback.

4.2.3 Position

Investigating the position of respondents in organization is important, as a good position in organization will reflect positive and reliable information. The position is categorized into CEO, Director, General Manager, IT Manager and Business Manager. The positions of respondent were dominated by CEO and Director with 68 and 64, representing 23.7% and 22.3% respectively. The rest of positions were general manager, IT manager and business manager with 53, 54 and 48, representing 18.5%, 18.8% and 16.7% respectively. Overall, this percentage shows a balance of respondents from different rankings in the organizations and capable to response.

Table 4.1

Summary on Respondent's Demographics

Full Time Employees		Frequency	Valid%
Gender	Male	162	56.4
	Female	125	43.6
Education	PhD	8	2.8
	Master	87	30.3
	Bachelor	143	49.8
	Diploma	49	17.1
Position	CEO	68	23.7
	Director	64	22.3
	General Manager	53	18.5
	IT Manager	54	18.8
	Business Manager	48	16.7

4.3 Companies Background

While studying organizations resources towards EC capability, its worthiness to investigate the nature of business, operations, full-time employees, EC experience, annual online transactions and average annual revenue. These are the core areas where the potential and capabilities of organizations in implementing technology can be evaluated and forecasted

4.3.1 Nature of Business

Manufacturing industries were the focus of this study. It is found that there are various natures from such industries. In this research, the details of manufacturing industries were asked in the questionnaire. Most of the companies in the survey belonged to the ones on electronic industries, semi conductor, steel industries, machinery industries, food and beverage industry and automotive industries.

4.3.2 Operating Business

To see whether the company is operating domestically or globally, operating business also became the one point asked in the questionnaire. More than half of the companies were engaged domestically, while almost 40% of them were globally operated. In the survey, 59.4% manufacturing industries were operating locally, whereas the companies with global business operation were representing 40.6%. This percentage likely shows a high competition, indicating that those firms must have potential and ready to adopt technology.

4.3.3 Full-time Employees

Investigating full-time employees can provide a clear picture of organizations about their operations and also help to forecast organizations capabilities for technology implementation. In this research, the highest representing manufacturing industries fall between 100 and 200 (25.8%). The second highest full-time employees were found less than 50, (20.9%). These two highest Figures are representing small, medium and large organizations. The third highest frequency goes to large organizations which are 200 to 300 employees (18.8%). A summary of full-time employees has been depicted in Table 4.2.

Table 4.2

A summary of full time employees

Full Time Employees	Frequency	Valid%
Less than 50	60	20.9
50-100	55	19.2
100-200	74	25.8
200-300	54	18.8
300-500	26	9.1
More than 500	18	6.3

4.3.4 EC Experience

Most of manufacturing industries have a procurement department that is in charge of purchasing and selling goods and services online. In this regard it is important to

investigate the EC experience. Most of industries have 3 to 5 years experience in usage of EC technology representing 45.3%. Another range of firm's EC experience falls between 1 - 2 and less than 1 year, representing 25.8% and 15% respectively. This shows that each industry has EC experience in purchasing and selling of goods and services through online means. A summary of procurement staff has been exhibited Table 4.3

Table 4.3

A Summary of Firm's EC Experience

EC Experience	Frequency	Valid%
Less than 1 year	43	15
1-2 years	74	25.8
3-5years	130	45.3
5-10	32	11.1
More than 10	8	2.8

4.3.5 Average Annual online Transactions

Average Annual online Transactions in organization is one of significant factors to investigate their EC usage. Organizations with high Average Annual online Transactions contribute and invest more in technology adoption and usage. In this research, the highest Average Annual online Transactions of organizations falls between RM 200,000- RM 500,000, representing 32.4%. Average Annual online Transactions have been mentioned in Table 4.4.

Table 4.4

A Summary of Firm's Average Annual online Transactions

Annual average Transactions	Frequency	Valid%
Less than RM 100,000	50	17.4
RM 100,000- RM 200,000	66	23
RM 200,000- RM 500,000	93	32.4
RM 500,000-RM1Million	54	16.8
RM1Million-RM10Million	20	7
More than 10Million	4	1.4

4.3.6 Average Annual Revenue

Organization revenue is also the significant factor to investigate their financial position. Organizations with high annual revenue more contribute for investment in technology adoption. In this research, the average annual revenue of organizations falls between RM1Million-RM10Million, representing 19% and 18.3% respectively. Another range of revenue is between RM10Million-RM50Million, representing 14.8% and 9.2% respectively. This range of revenue shows good average annual revenue of organizations. These types of organizations can easily adopt technology. The summary of firm's average annual revenue has been mentioned in Table 4.5

Table 4.5

A Summary of Firm's Average Annual Revenue

Annual average revenue	Frequency	Valid%
Less than RM 500,000	17	6
RM 500,000-RM1Million	33	11.4
RM1Million-RM10Million	75	26.1
RM10Million-RM25Million	83	29
RM25Million-RM50Million	58	20.2
RM50Million-RM1Billion	8	2.8
More than 1Billion	11	3.8

4.4 Reliability of the Constructs

As mentioned in the chapter 3, to analyze the reliability of the survey instrument, Cronbach Alpha test has been used. According to Nunnaly (1978) and Joreskog and Sorbom (1989), the value of .70 is an acceptable for Alpha reliability. The results show an above-acceptable value of Cronbach Alpha reliability. The results of the Alpha Reliability are shown in Table 4.6

The Cronbach's alphas for the constructs were computed using the scale reliability procedure in SPSS and presented in Table 4.6 below. The reliabilities of most constructs in this present study fall within an acceptable range (0.701 to 0.878).

The data analysis is carried out using the Statistical Package for Social sciences (SPSS for Windows version 16.0). The instrument total number of respondents for

this research is (No. of Cases 287). Based on this data, the reliability of the survey instrument has been used to test the Cronbach's Alpha. According to Nunnaly (1978) and Jöreskog and Sörbom (1989), .70 is an acceptable Alpha reliability value. The Alpha reliability less than .70 has been excluded, only the results of above .70 have been accepted. The results of the Alpha Reliability are shown in Figure 4.6

The Cronbach's Alpha reliability is just applied to the variables based on three distinctive dimensions. The first dimension has three variables representing 13 items and Alpha greater than 0.70, which shows the reliable data for analysis. The second dimension has three variables, representing 17 items. The two variables Cronbach's Alpha is more than 0.80, representing 0.865 and 0.823 respectively. The last dimension for technology resources and business performance has 2 factors with 14 and 12 items representing more than .70 Cronbach's Alpha.

The overall Cronbach's Alpha reliability of this data is 0.932 with 56 items, which shows the reliable data for analysis.

The results of the Cronbach's Alpha Reliability are shown in table 4.6

Table 4.6 Cronbach's Alpha Reliability

Variables	No. of Items	Cronbach's Alpha
Business Resources		
• Innovative Capacity	4	0.731
• Market Orientation	6	0.775
• Strategic Flexibility	3	0.742
Human Resources		
• Managerial Expertise	5	0.865
• Top-management Support	6	0.722
• Learning Capacity	6	0.823

Technology Resources and Business performance • IT Resources • EC Resources • Financial Performance • Non-financial Performance	 8 6 6 6	 0.738 0.768 0.726 0.722
EC Capability		
Overall variables items and reliability	56	0.932

4.5 Descriptive Statistics of Constructs (Means and Normality Distribution Testing)

The summary of the descriptive analysis on 4 constructs is shown in this section by providing a commentary on the outcome of the descriptive analysis. By looking at the individual item of all the constructs and providing its interpretation, points of discussions can be generated for a better understanding on its implications. For the normality distribution testing the skewness and kurtosis were performed. All the items have shown the acceptable loading and can be used in further analysis.

4.5.1 Business Resources

Business resources construct was operationalized using three dimensions as follows:

4.5.1.1 Innovative Capacity

The first factor that the researchers intend to analyze is the innovative capacity of the firms. To understand this factor, the researchers have grouped the related questions of the innovative capacity in the questionnaire. The purpose of this factor is to understand the innovative activities of the firms. In details, researchers would like to understand the level of innovations of the firms. For this purpose the descriptive

statistics has been carried out to analyze this factor. The results of descriptive statistics have shown in Table 4.7 and Table 4.8.

Table 4.7 Descriptive Statistics for Innovative Capacity

	N	Minimum	Maximum	Mean	Std. Deviation
inc1	287	1	7	5.44	1.244
inc2	287	1	7	5.48	1.208
inc3	287	2	7	5.64	1.109
inc4	287	2	7	5.59	1.182
Valid N (listwise)	287				

Table 4.7 presents that the respondents are showing that their companies have a clear vision for innovation and most of the companies have adopted innovative processes. Item inc3 has the highest mean of 5.64 implying that the respondents are of the opinion that within the context of innovative capacity, the company is continuously involved in the innovations. It clearly shows that companies are invariably developing innovative products, processes and organizations that meet the customer requirements.

Innovative capacity factor was also analyzed for skewness and kurtosis to see whether the data is normally distributed. Table 4.8 shows all of the normally distributed items are as all the four items are closer to zero.

Table 4.8 Normality distribution testing of Innovative capacity

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
inc1	287	-.657	.144	.246	.287
inc2	287	-.611	.144	.127	.287
inc3	287	-.523	.144	-.229	.287
inc4	287	-.707	.144	.229	.287
Valid N (listwise)	287				

4.5.1.2 Market Orientation

In general, market orientation is determined by the strategies developed by the firm to meet the market and customer requirements. To validate this factor, researchers have developed the set of questions representing market orientation of the firm in the questionnaire. The purpose of this factor is to understand the strategic position of the firms that is developed to meet the requirement of market and customers. The results of this factor has been tabulated in Table 4.9 and Table 4.10

Table 4. 9 Descriptive Statistics for Market Orientation

	N	Minimum	Maximum	Mean	Std. Deviation
mor1	287	2	7	5.51	1.220
mor2	287	2	7	5.36	1.217
mor3	287	2	7	5.49	1.273
mor4	287	2	7	5.76	1.220
mor5	287	1	7	5.33	1.276
mor6	287	1	7	5.50	1.234
Valid N (listwise)	287				

Table 4.9 indicates that most of the respondents agreed that their firms are always concerned in making strategies to meet the challenges of market turbulence environment. All the items of this factor obtained more than 5 points of means. It shows that the firms are very concerned in the development of better market orientation in online business environment.

Table 4.10 meanwhile represents the skewness and kurtosis of the items of the market orientation factor. All the items are closer to zero which shows the normally distributed data.

Table 4.10 Normality distribution testing for Market Orientation

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
mor1	287	-.635	.144	.020	.287
mor2	287	-.415	.144	-.506	.287
mor3	287	-.469	.144	-.576	.287
mor4	287	-.875	.144	.449	.287
mor5	287	-.518	.144	-.002	.287
mor6	287	-.813	.144	.763	.287
Valid N (listwise)	287				

4.5.1.3 Strategic Flexibility

In general, strategic flexibility is defined as a skill to acclimatize to environmental changes and incessantly build up strategies based on internal capabilities and external customer needs (Wheelwright and Hayes, 1985). For the validation of strategic flexibility factor, the related questions to measure this factor have been developed by researchers in the questionnaire purposively to understand the skill utilization by the firms to meet the challenges and accomplish opportunities in market turbulence environment. Table 4.11 and Table 4.12 show the descriptive statistics results of the strategic flexibility factor.

Table 4.11 Descriptive Statistics for Strategic Flexibility

	N	Minimum	Maximum	Mean	Std. Deviation
stf1	287	1	7	5.39	1.341
stf2	287	2	7	5.98	1.117
stf3	287	2	7	5.55	1.175
stf4	287	1	7	4.92	1.313
stf5	287	1	7	5.17	1.215
stf6	287	1	7	5.28	1.161
Valid N (listwise)	287				

It is found that the organizations have a concern with the development of better strategic flexibility of the firm. All items results of this factor obtained more than 5 points in mean analysis except stf4 indicating that most of the companies have a plan of developing better strategic flexibility to meet the new business challenges as shown in Table 4.11. Table 4.12 represents the skewness and kurtosis analyses in which all items show the acceptable points indicating the normally distributed data in the data set.

Table 4.12 Normality distribution testing for Strategic Flexibility

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
stf1	287	-.804	.144	.474	.287
stf2	287	-1.043	.144	.665	.287
stf3	287	-.521	.144	-.318	.287
stf4	287	-.504	.144	.470	.287
stf5	287	-.572	.144	.612	.287
stf6	287	-.295	.144	-.051	.287
Valid N (listwise)	287				

4.5.2 Human Resources

4.5.2.1 Managerial Expertise

Managerial expertise factor determines the skills of the management of the firm. In this research this factor in turn is explored as a predictor in adopting EC technologies. Several questions related to managerial expertise factor for validation were then grouped in the questionnaire to validate. The purpose of this factor is to understand the extent of importance of the managerial expertise for the adoption and implementation of new technologies. The results of this factor are tabulated in Table 4.13 and Table 4.14.

Table 4.13 Descriptive Statistics for Managerial Expertise

	N	Minimum	Maximum	Mean	Std. Deviation
mge1	287	1	7	4.95	1.174
mge2	287	1	7	5.08	1.111
mge3	287	1	7	4.94	1.247
mge4	287	1	7	5.04	1.173
mge5	287	1	7	4.85	1.173
Valid N (listwise)	287				

Most of the respondents highlighted the importance of managerial expertise for the usage and adopting new technologies as shown in Table 4.13. Mge2 has a high mean representing that most of the organizations acquired sufficient number of ICT experts. This then can help the companies in meeting the challenges of new technologies.

The items of the managerial expertise factor were also analyzed for normality distribution testing and the results of the skewness and kurtosis show that all the items are normally distributed in data set.

Table 4.14 Normality distribution testing for Managerial Expertise

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
mge1	287	-.825	.144	.591	.287
mge2	287	-.744	.144	1.077	.287
mge3	287	-.708	.144	.548	.287
mge4	287	-.658	.144	.424	.287
mge5	287	-.577	.144	-.262	.287
Valid N (listwise)	287				

4.5.2.2 Top Management Support

Due to its involvement in the projects, decision making, responsibility for customer needs and competitor's analysis, top management support as well as its commitment in general plays a vital role to the firm's value creation. Hence top management support considerably could be one of key predictors for the firm's EC usage and implementation. Similar with the previous factor, the researchers to validate this factor also developed questions to measure this factor in the questionnaire survey; the results of descriptive statistics which are tabulated in Table 4.15 and Table 4.16.

Table 4.15 Descriptive Statistics for Top Management Support

	N	Minimum	Maximum	Mean	Std. Deviation
tms1	287	1	7	5.77	1.220
tms2	287	1	7	5.72	1.264
tms3	287	1	7	5.51	1.170
tms4	287	2	7	5.53	1.140
tms5	287	1	7	5.41	1.200
tms6	287	1	7	5.52	1.214
Valid N (listwise)	287				

Table 4.15 indicates that all items of the top management support this factor that has high means and the respondents are agreed that top management is vital in technology implementation and usage. Therefore, their organizations are considering this factor as a key element for technology implementation and usage.

The items of the top management support factor were also analyzed for normality distribution and have obtained the acceptable skewness and kurtosis as shown in Table 4.16.

Table 4.16 Normality distribution testing for Top Management Support

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
tms1	287	-.907	.144	.566	.287
tms2	287	-.839	.144	.443	.287
tms3	287	-.728	.144	.657	.287
tms4	287	-.553	.144	-.076	.287
tms5	287	-.501	.144	.159	.287
tms6	287	-.806	.144	.693	.287
Valid N (listwise)	287				

4.5.2.3 Learning Capacity

The utilization of organizational learning capacity would be useful for the successful implementation of EC to enhance business performance. At this point, an organization requires well planned knowledge management communications to enhance the efficiency of business process. Intentionally to highlight the knowledge management process in the usage of IT applications, this factor is validated through a group of related questions in the questionnaire. Table 4.17 and Table 4.18 respectively tabulate the descriptive results of this factor.

Table 4.17 Descriptive Statistics for Learning Capacity

	N	Minimum	Maximum	Mean	Std. Deviation
lrc1	287	1	7	5.72	1.287
lrc2	287	1	7	5.30	1.485
lrc3	287	1	7	5.33	1.500
lrc4	287	1	7	4.76	1.623
lrc5	287	1	7	5.15	1.629
lrc6	287	1	7	5.26	1.624
Valid N (listwise)	287				

Table 4.17 shows the agreement of the respondents with the importance of the firm's learning capacity for the usage and implementation of technology. All of the items of learning capacity have obtained more than five points of means analysis except item lrc4 clearly indicating that the firm's learning capacity is contributing to the usage and implementation of IT applications.

Further, Table 4.18 shows the skewness and kurtosis of the items for measuring learning capacity in which all of the items have obtained the acceptable skewness and kurtosis as a clear indication that the items entirely are normally distributed.

Table 4.18 Normality distribution testing for Learning Capacity

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
lrc1	287	-.974	.144	.748	.287
lrc2	287	-.706	.144	.131	.287
lrc3	287	-.816	.144	.294	.287
lrc4	287	-.441	.144	-.347	.287
lrc5	287	-.704	.144	-.113	.287
lrc6	287	-.825	.144	.011	.287
Valid N (listwise)	287				

4.5.3 IT Resources

4.5.3.1 IT Infrastructure

Information technology commonly appeared as a resource that substantially contributes to the organizations that significantly contributes to the development and the usage of technologies. The researchers in this study grouped the items to measure this factor in the questionnaire survey. The results of this factor are tabulated in the Table 4.19 and Table 4.20.

Table 4.19 Descriptive Statistics for IT Infrastructure

	N	Minimum	Maximum	Mean	Std. Deviation
itr1	287	1	7	5.20	1.593
itr2	287	1	7	5.34	1.186
itr3	287	1	7	5.39	1.144
itr4	287	1	7	5.45	1.242
itr5	287	1	7	5.48	1.206
itr6	287	2	7	5.67	1.119
itr7	287	2	7	5.63	1.178
itr8	287	2	7	5.52	1.223
Valid N (listwise)	287				

Table 4.19 clearly shows that the respondents are in agreement with the contribution of IT infrastructure. As all items have obtained more than five points of mean analysis, it can be indicated that the factor, i.e. IT applications, and its contribution in the development and implementation of the technologies is important.

The factor has also been analyzed for the normality distribution testing to see whether the data is acceptable for further analysis. The results of the skewness and kurtosis also indicate that all the items are normally distributed in the data set as shown in Table 4.20.

Table 4.20 Normality distribution testing for IT Infrastructure

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
itr1	287	-.716	.144	-.067	.287
itr2	287	-.654	.144	.562	.287
itr3	287	-.489	.144	.400	.287
itr4	287	-.658	.144	.255	.287
itr5	287	-.614	.144	.163	.287
itr6	287	-.534	.144	-.254	.287
itr7	287	-.740	.144	.293	.287
itr8	287	-.637	.144	.021	.287
Valid N (listwise)	287				

4.5.3.2 EC Resources

EC resources are considered as a key factor for the implementation and usage of this technology. The purpose of this factor is to see the level of website and EC applications used in the firms for conducting online business. To validate this factor, the researchers developed items to measure EC resources in the questionnaire. The descriptive statistics results for this factor are presented in Table 4.21 and Table 4.22.

The results in Table 4.21 are clearly shown that the companies are well equipped with the applications of EC technologies. All the items of this factor obtained more than five points of mean analysis that provides the evidence of the usage of many applications for conducting online business.

Table 4.21 Descriptive Statistics EC Resources

	N	Minimum	Maximum	Mean	Std. Deviation
ecr1	287	2	7	5.38	1.214
ecr2	287	2	7	5.49	1.262
ecr3	287	2	7	5.76	1.219
ecr4	287	1	7	5.32	1.275
ecr5	287	1	7	5.52	1.203
ecr6	287	1	7	5.37	1.326
Valid N (listwise)	287				

Table 4.22 is about the skewness and kurtosis statistics, which has been carried out for the normality distribution testing. The results then indicate that all the items are normally distributed in the data set and can be used for further analysis.

Table 4.22 Normality distribution testing for EC Resources

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
ecr1	287	-.431	.144	-.480	.287
ecr2	287	-.456	.144	-.561	.287
ecr3	287	-.865	.144	.441	.287
ecr4	287	-.484	.144	-.091	.287
ecr5	287	-.679	.144	.311	.287
ecr6	287	-.758	.144	.436	.287
Valid N (listwise)	287				

4.5.4 Business Performance

Business performance was operationalized using two scales.

4.5.4.1 Financial Performance

In general, financial performance of a firm refers to the firm's return on investment, market share, sales projection and profit. In this study the financial performance is measured by the sales growth, return on investment, sales projection, market share and profit of the firm (Kaplan and Norton, 1992, Kaplan and Norton, 2001). Again, the research for validating this factor developed the related items in the questionnaire survey; results of which are shown in Table 4.23 and Table 4.24.

It is found that all items for the financial performance factor shown in Table 4.23 obtained more than five points of mean analysis, obviously showing that after the implementation of EC technology, the firms have significantly improved their financial performance indicators.

Table 4.23 Descriptive Statistics for Financial Performance

	N	Minimum	Maximum	Mean	Std. Deviation
fpr1	287	2	7	5.98	1.114
fpr2	287	2	7	5.56	1.181
fpr3	287	1	7	4.95	1.307
fpr4	287	1	7	5.16	1.223
fpr5	287	1	7	5.25	1.156
fpr6	287	1	7	5.24	1.177
Valid N (listwise)	287				

Normality distribution testing was carried out to see whether the data is normally distributed in the data set. Table 4.24 shows the skewness and kurtosis for the items of financial performance factor and the results show the normal distribution of all items in the data set meaning that all items can be used for the further analysis.

Table 4.24 Normality distribution testing for Financial Performance

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
fpr1	287	-1.020	.144	.591	.287
fpr2	287	-.519	.144	-.341	.287
fpr3	287	-.522	.144	.542	.287
fpr4	287	-.545	.144	.543	.287
fpr5	287	-.277	.144	-.054	.287
fpr6	287	-.282	.144	.010	.287
Valid N (listwise)	287				

4.5.4.2 Non-financial Performance

Non-financial performance refers to the firm's efficiency in business processes, customer satisfaction, retaining customer core, customer sales after services and product quality (Kaplan and Norton, 1992, Kaplan and Norton, 2001). Non-financial performance is usually measured for the long term goals and incentives. Generally non-financial performance has no intrinsic value to be measured while its indicators provide information on future performance not enclosed in contemporary accounting measures. In this study validation of this factor is performed by grouping the items in the questionnaire to measure non-financial performance factor. The descriptive statistics of non-financial performance factor has been shown in Table 4.25 and Table 4.26.

From the Table 4.25, it is clearly shown that after implementing EC technology, companies are achieving better non-financial indicators. The significant contribution of EC to the firm's non-financial indicators can be indicated from all items of this factor obtaining more than five points.

Table 4.25 Descriptive Statistics for Non-financial Performance

	N	Minimum	Maximum	Mean	Std. Deviation
nfp1	287	2	7	5.25	1.129
nfp2	287	2	7	5.29	1.198
nfp3	287	2	7	5.21	1.116
nfp4	287	1	7	5.31	1.247
nfp5	287	2	7	5.32	1.232
nfp6	287	1	7	5.39	1.255
Valid N (listwise)	287				

The non-financial performance factor has also been analyzed for the normality distribution testing. The skewness and kurtosis of all items show that the data is normally distributed in the data set. Normality distribution testing has shown in Table 4.26.

Table 4.26 Normality distribution testing for Non-financial Performance

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
nfp1	287	-.161	.144	-.403	.287
nfp2	287	-.136	.144	-.732	.287
nfp3	287	.089	.144	-.871	.287
nfp4	287	-.598	.144	.293	.287
nfp5	287	-.510	.144	-.258	.287
nfp6	287	-.685	.144	.431	.287
Valid N (listwise)	287				

4.4 Factor Analysis

4.6.1 Business Resources Factor Analysis

After conducting reliability analysis to assess the reliability of the scale used to measure the variables of interest, it is also important to conduct factor analysis. In this case the business resources variables for each item were analyzed for factor detection. Table 4.27 shows three variables with 14 items in business resources construct. All items of innovative capacity have achieved the acceptable loading. However, the item mor6 and mor4 of market orientation factor and stf2 and stf1 of strategic flexibility factor have achieved low loading. Thus, these items will not be used in further analysis.

Table 4.27

Results of Factor Extraction and Factor Loading

Items	Innovative Capacity	Market Orientation	Strategic Flexibility
inc2	.852		
inc1	.835		
inc3	.803		
inc4	.759		
mor2		.789	
mor3		.740	
mor1		.729	
mor5		.754	
mor6		.684	
mor4		.649	
stf5			.738
stf6			.720
stf4			.718
stf3			.712
stf2			.681
stf1			.537

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

4.6.2 Human Resources Factor Analysis

Similar with business resources, human resources variables in this case for each item on it are significant to be analyzed for factor detection. There are three variables with 17 items in human resources construct as mentioned in Table 4.28. In the managerial expertise factor, mge4 and mge5 have achieved the acceptable loading, yet the remains have achieved the low ones. Tms2 and tms1 of top management support factor have achieved low loading and the rest has achieved an acceptable loading. The third factor, learning capacity factor's items have achieved an acceptable loading except lrc1.

Table 4.28

Results of Factor Extraction and Factor Loading

Items	Managerial Expertise	Top management Support	Learning Capacity
mge3	.799		
mge4	.736		
mge5	.589		
mge2	.588		
mge1	.551		
tms4		.809	
tms3		.785	
tms5		.737	
tms6		.716	
tms2		.618	
tms1		.600	
lrc6			.854
lrc3			.851
lrc5			.833
lrc2			.810
lrc4			.760
lrc1			-------

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

4.6.3 IT Resources Factor Analysis

While performing reliability analysis of technology resources, a factor analysis was performed to assess the accurate items for further analysis. IT resources factor has two variables, namely IT Infrastructure and EC resources with 8 and 6 items respectively. All three variables depicted in Table 4.29 are considered accurate for further analysis except itr1, ecr3 and ecr6.

Table 4.29

Results of Factor Extraction and Factor Loading

Items	IT Infrastructure	EC Resources
itr5	.836	
itr4	.826	
itr6	.803	
itr7	.778	
itr8	.761	
itr3	.790	
itr2	.790	
itr1	-----	
ecr5		.760
ecr4		.758
ecr3		.617
ecr6		.615
ecr1		.819
ecr2		.726

4.6.4 Business performance Factor Analysis

The factor analysis helps to extract the inconsistency of items for further analysis. Business performance factor possesses two variables namely financial and non-financial performance which both of them are measured by 12 items. In financial performance variable, frp5 and fpr4 have achieved the acceptable loading while all of

the non-financial items have achieved the acceptable loading except nfp3 and nfp1. These two items have been extracted for further analysis.

Table 4.30: Results of Factor analysis and Factor Loading

Items	Financial Performance	Non-financial Performance
fpr4	.715	
fpr5	.714	
fpr6	.654	
fpr2	.644	
fpr3	.568	
fpr1	------	
nfp4		.816
nfp5		.809
nfp6		.762
nfp2		.752
nfp3		.591
nfp1		-----

Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization.

CHAPTER 5

STRUCTURAL EQUATION MODELING

5.1 Chapter Overview

This chapter focuses on the process of the multivariate analysis using structural equation modelling by using AMOS software package Version 18.0. The confirmatory factor analyses or measurement modelling and structural modelling or hypotheses testing are discussed in this chapter. The first step is the data preparation process which includes the screening as a process of checking on problems that might affect legitimacy of hypotheses testing.

The measures generated from the above analysis were validated by performing confirmatory factor analysis (CFA) in particular by using a data analysis process with a two-step approach as in SEM analysis. Initially, issues related to unidimensionality, reliability and validity for all constructs were discussed. The final step of the data analysis revolves around the issue of overall fit to the hypothesized model and measures the measurement models and relationship between the variables. The last section then tests the structural model and research hypotheses.

The SEM literature pinpoints several indices that can be used to evaluate the goodness of fit of a specified model to the observed data. In view of the fact that researchers do not agree on a single optimal test or even a composite of optimal tests to assess model fit (Maruyama, 1998), they invariably report several indices: chi square (χ^2), chi square divided by degrees of freedom, goodness of fit or GFI (Bentler & Bonett, 1980); adjusted goodness of fit, or AGFl (Bagozzi & Yi, 1988), root mean square residual or RMR and root mean square error of approximation index or RMSEA (Steiger, 1990).

5.2 Structural Equation Modeling (SEM)

The procedure of carrying out the SEM analysis in current study was inspired by the seven-step processes of SEM (Hair et al., 2003). This guideline was further complimented by another guideline which is attributed by Tabachnick & Fidell (2001).

Invariably, each construct represents a latent variable composed of a set of separate indicators. Testing of the research hypotheses typically amounts to a process of investigating the relationships between second order constructs that can act as dependent and independent variables.

Therefore, SEM is the most appropriate technique for investigating the Hypothesized Model. In fact, SEM is a widely used tool in academic research (Baumgartner & Homburg, 1996; Hair et al., 2003; Steenkamp & van Trijp, 1991). Two basic advantages of using SEM as opposed to more traditional analysis technique are: first it is able to represent the interrelated latent concepts and to account for measurement error in the estimation process and second it allows to estimate multiple and interrelated dependence relationships. Unlike multiple regression analysis, SEM can estimate several equations at once. Hence, it allows modelling of complex relationships which is not possible with any of the other multivariate techniques available (Fornell & Larcker, 1981; Hair et al., 2005; Steenkamp & Van Trijp, 1991).

5.2.1 Evaluations of Measurement Model

Confirmatory factor analysis (CFA) was performed for four sub-models each of which represents a grouping of related set of constructs which are also an integral part of the models. Typically, CFA for the entire full measurement model is avoided to eliminate the possibility of violating the rule of thumb that the ratio of sample size to number of free parameters has been set at 5:1 (Bentler & Chou, 1987). Similarly,

some researchers (Wetzels, Ruyter & Birgelen, 1998) suggest that the conceptual model should be disintegrated into groupings of related variables especially in cases where the hypothesized model integrates a large number of items and as a result of which the ratio of 5:1 guideline is difficult to meet and thus, being violated unless they are split. As the case is for this present study, a large pool of items has been assembled and in consequence, CFA was performed separately for the four measurement models. The four measurement models are duly structured as follows:

1) Measurement Model 1 depicted in Figure 5.1 comprises of a group of three collectively referred to business resources as: 1) Innovative capacity, 2) market orientation, 3) strategic flexibility.
2) Measurement Model 2 depicted in Figure 5.2 comprises of a group of three collectively referred to human resources as: 1) Innovative capacity, 2) market orientation, 3) strategic flexibility.
3) Measurement Model 3 as shown in Figure 5.3 comprises of the components of the IT resources as: 1) IT infrastructure, 2) EC resources.
4) Measurement Model 4 depicted in Figure 5.4 comprises of a group of two collectively referred to business performance as: 1) financial performance, 2) non-financial performance.

The procedures which will be executed next are outlined as follows:

1) CFA will be conducted on the individual congeneric measure (shown in Appendix B) of each of four measurement models; those are from Measurement Model 1 to Measurement Model 4. This procedure is intended to establish unidimensionality of the parameter estimates, the statistical significance of the parameter estimates and overall fit as recommended by Byrne (2001). Some items may have to be deleted once found to be ill-fitting.
2) The results of the analyses of four measurement models (Measurement Model 1 to Measurement Model 4) are tabulated from Table 5.1 to Table 5.8 respectively.
3) The sub-models were examined to determine their unidimensionality, reliability and convergent validity.
4) Discriminant validity of the overall model were examined and tabulated in

Table 5.9.

The next discussions are on the treatment of the four measurement models and the analyses of the results of CFA of the components of the four sub-groups, that is, Measurement Model 1, Measurement Model 2, Measurement Model 3 and Measurement Model 4 and finally, the results of CFA on the overall model.

5.2.1.1 Measurement Model 1

The measurement model for this present study was specified based on the results of the exploratory factor analysis as discussed in the last chapter. The summary of the results of the confirmatory factor analysis (CFA) for the individual congeneric measures which constitute Measurement Model 1 is tabulated in Table 5.1. The CFA results for each measure are presented to show the fit indices, standardized loading and its critical ratio. The CFA results presented in Table 5.1 are an extract of the text output to establish that some of the regression weights of the congeneric measures were marginal and not allowed to be part of measurement model. Here are three congeneric measures which were evaluated: 1) innovative capacity 2) market orientation, and 3) strategic flexibility. All of them are regarded as "over-identified" because each of them has more than three indicators.

Evidently, the results as summarized in Table 5.1 establish that there is a support for convergent validity as all the loadings are statistically highly significant. Besides, all the goodness-of-fit statistics suggest that the proposed model represents a marginal fit to the observed data. The results indicate that the fit of the data to the proposed model is not conclusively adequate. In view of the sample size (n = 287), it is expected that despite χ^2 being significant, evidence shows that this statistic is sensitive to sample size.

Table 5.1 Congeneric Measures in Measurement Model 1

No	Congeneric Measures		Standardised Regression (Loading)	Critical Ratio[b] (t-values)
A	Business resources			
1	Innovative capacity			
inc 1			0.754	-------
inc 2			0.799	14.008
inc 3			0.858	15.011
Inc 5			0.838	14.706
	Goodness-of-Fit Statistics			
	χ^2	7.671		
	Degree of Freedom	2		
	P	0.022		
	χ^2/df	3.835		
	RMR	0.023		
	GFI	0.989		
	AGFI	0.943		
	IFI	0.992		
	CFI	0.992		
	RMSEA	0.095		
2	Market Orientation			
mo r2			0.758	--------
mo r3			0.772	12.375
mo r1			0.835	12.575
	Goodness-of-Fit Statistics			
	χ^2	151.542		
	Degree of Freedom	9		
	P	.000		
	χ^2/df	16.838		
	RMR	.839		
	GFI	.624		
	AGFI	.360		
	IFI	.792		
	CFI	.789		

	RMSEA	.226	-	
3	Strategic Flexibility			
Stf4			0.588	--------
stf6			0.750	8.659
Stf5			0.803	8.457

	Goodness-of-Fit Statistics	
	χ^2	.000
	Degree of Freedom	9
	p	0.000
	χ^2/df	.000
	RMR	0.000
	GFI	.915
	AGFI	.802
	IFI	.867
	CFI	.880
	RMSEA	0.151

a. Innovative Capacity

The results as summarized in Table 5.1 show a support for convergent validity as all the loadings were statistically highly significant which will be included from Measurement Model 1. While the fit indices are not within or above the acceptable levels except for GFI (above 0.90), the congeneric measure is considered marginal.

b. Market Orientation

The results as summarized in Table 5.1 shows that there is a support for convergent validity as all the loadings were statistically highly significant. Additionally, all the goodness-of-fit statistics suggest that the proposed model represents an inadequate fit to the observed data RMR (0.000), while GFI, AGFI, IFI, CFI are above 0.90.

c. Strategic Flexibility

The results as summarized in Table 5.1 show that there is a support for convergent validity as all the loadings were statistically highly significant. All the goodness-of-fit statistics in addition suggest that the proposed model represents an adequate fit to the observed data RMR that is 0.000, while GFI, AGFI, IFI, CFI are above 0.90. Thus, the proposed model is somewhat adequate.

The above three congeneric measures for the business resources factor were integrated as a sub-model of Measurement Model 1 (see Figure 5.1) to establish the model's overall fit, convergent validity, and construct reliability. A CFA was performed on the integrated sub-models. Items with below 0.70 for the loadings were not included in Measurement Model 1. Table 5.2 provides a summary of the results while Figure 5.1 is a graphical representation of the output path diagram for Measurement Model 1 which hypothesized a priori that:

1) The model is a three-factor structure at the first-order level only; connoting that all constructs are composed of one congeneric measure only.
2) The three constructs are inter-correlated, as indicated by two-headed arrows. 10 observed variables are represented by rectangles, meaning to be regressed onto their respective factor.

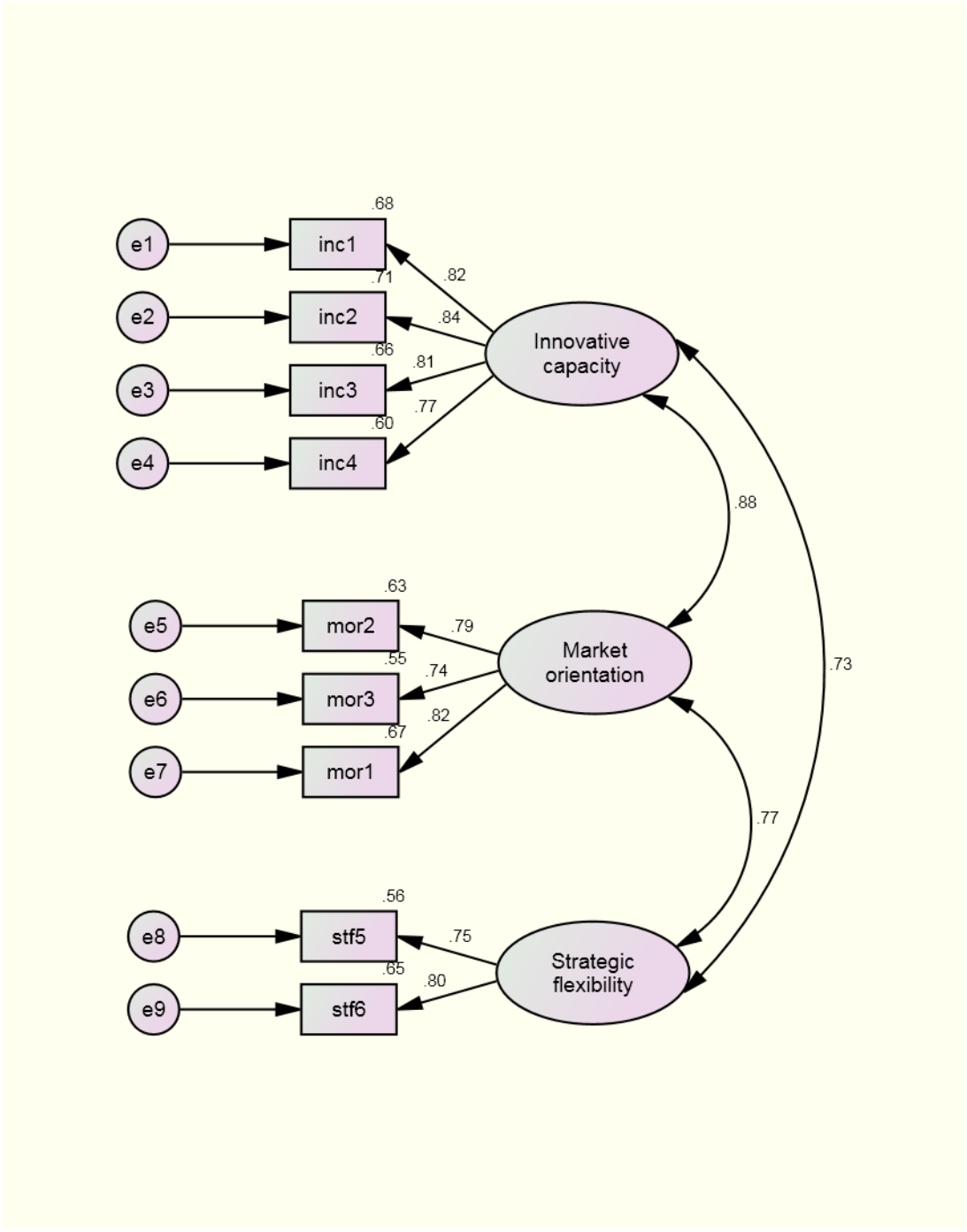


Figure 5.1 Measurement Model 1

Table 5.2 Summary of Results for Measurement Model 1

No	Congeneric Measures	Standardized Regression (loading)	Critical Ratio
B	Business Resources		
1	Innovative Capacity		
Inc4 Inc3		0.774 0.811	-------- 15.095
Inc2		0.844	15.809
Inc1		0.824	15.376
2	Market Orientation		
Mor1		0.820	--------
Mor3 Mor2		0.743 0.793	14.037 15.231
3 Stf6 Stf5	Strategic Flexibility	 0.805 .750	 -------- --------
	Goodness-of-Fit Statistics		
	χ^2	44.996	
	Degree of freedom	25	
	P	0.008	
	χ^2/df	1.800	
	RMR	0.037	
	GFI	0.969	
	AGFI	0.944	
	IFI	0.988	
	CFI	0.988	
	RMSEA	0.051	

5.2.1.2 Measurement Model 2

a. Managerial Expertise

Table 5.3 summarizes the results showing a support for convergent validity as all the loadings were statistically highly significant except for items mge1 and mge3 that will be excluded from Measurement Model 1. While the fit indices are not within or above the acceptable levels except GFI (above 0.90), the congeneric measure is considered marginal.

b. Top Management Support

As summarized in Table 5.3 the results show a support for convergent validity as all the loadings were statistically highly significant except for items tms2 and tms1. Additionally, all the goodness-of-fit statistics suggest that the proposed model represents a marginal fit to the observed data in which IFI and CFI are above 0.900. Hence, the proposed model was somewhat adequate.

c. Learning Capacity

The results as summarized in Table 5.3 shows that there is a support for convergent validity as all the loadings were statistically highly significant. Furthermore, all the goodness-of-fit statistics suggest that the proposed model represents an adequate fit to the observed data RMR that is 0.069 while GFI, AGFI, IFI, CFI are all above 0.90. Therefore, the proposed model is somewhat adequate.

Subsequent to the CFA on the three congeneric measures for managerial expertise, top management support and learning capacity, the three purified measures were incorporated as a sub-model of Measurement Model 1 as depicted in Figure 5.2 to enable the assessment of the model's overall fit, convergent validity, construct reliability. It was achieved by performing a CFA on the integrated sub-models. The summary of the results is shown in Table 5.3 and depicted in Figure 5.2. It is a graphical representation of the output for Measurement Model 1 which fundamentally hypothesized a priori that:

1) The model consists of three-factor structure at the first-order level only; connoting that all the constructs are composed of one congeneric measure only.

2) The three constructs (managerial expertise, top management support and learning capacity) are inter-correlated, as indicated by two-headed arrows. 13 observed variables are represented by rectangles and as such, they were regressed onto its respective factor.

Table 5.3 Congeneric Measures in Measurement Model 2

No	Congeneric Measures	Standardized Regression (Loading)	Critical Ratio[b] (t-values)
A	Managerial Expertise		
Mge2		0.794	--------
Mge4		0.595	9.516
Mge5		0.728	11.357
Mge3		0.581	9.305
Mge1		0.570	9.135
	Goodness-of-Fit Statistics		
	χ^2	40.628	
	Degree of Freedom	5	
	p	0.000	
	χ^2/df	8.126	
	RMR	0.077	
	GFI	0.948	
	AGFI	0.843	
	IFI	0.920	
	CFI	0.919	
	RMSEA	0.151	
B	Top Management Support		
Tms4		0.747	--------
Tms3		0.810	13.819
Tms5		0.828	14.105
Tms6		0.713	12.155
Tms2		0.576	9.728
Tms1		0.561	9.461
	Goodness-of-Fit Statistics		
	χ^2	107.374	
	Degree of	9	

		Freedom			
		p		0.000	
		χ^2/df		11.930	
		RMR		0.113	
		GFI		0.904	
		AGFI		0.777	
		IFI		0.884	
		CFI		0.883	
		RMSEA		0.187	
C	Learning Capacity				
lrc6				0.836	--------
lrc3				0.853	18.161
lrc5				0.849	18.034
lrc2				0.809	16.781
lrc4				0.761	15.364
	Goodness-of-Fit Statistics				
		χ^2		39.776	
		Degree of Freedom		5	
		p		0.000	
		χ^2/df		7.955	
		RMR		0.069	
		GFI		0.954	
		AGFI		0.863	
		IFI		0.967	
		CFI		0.966	
		RMSEA		0.150	

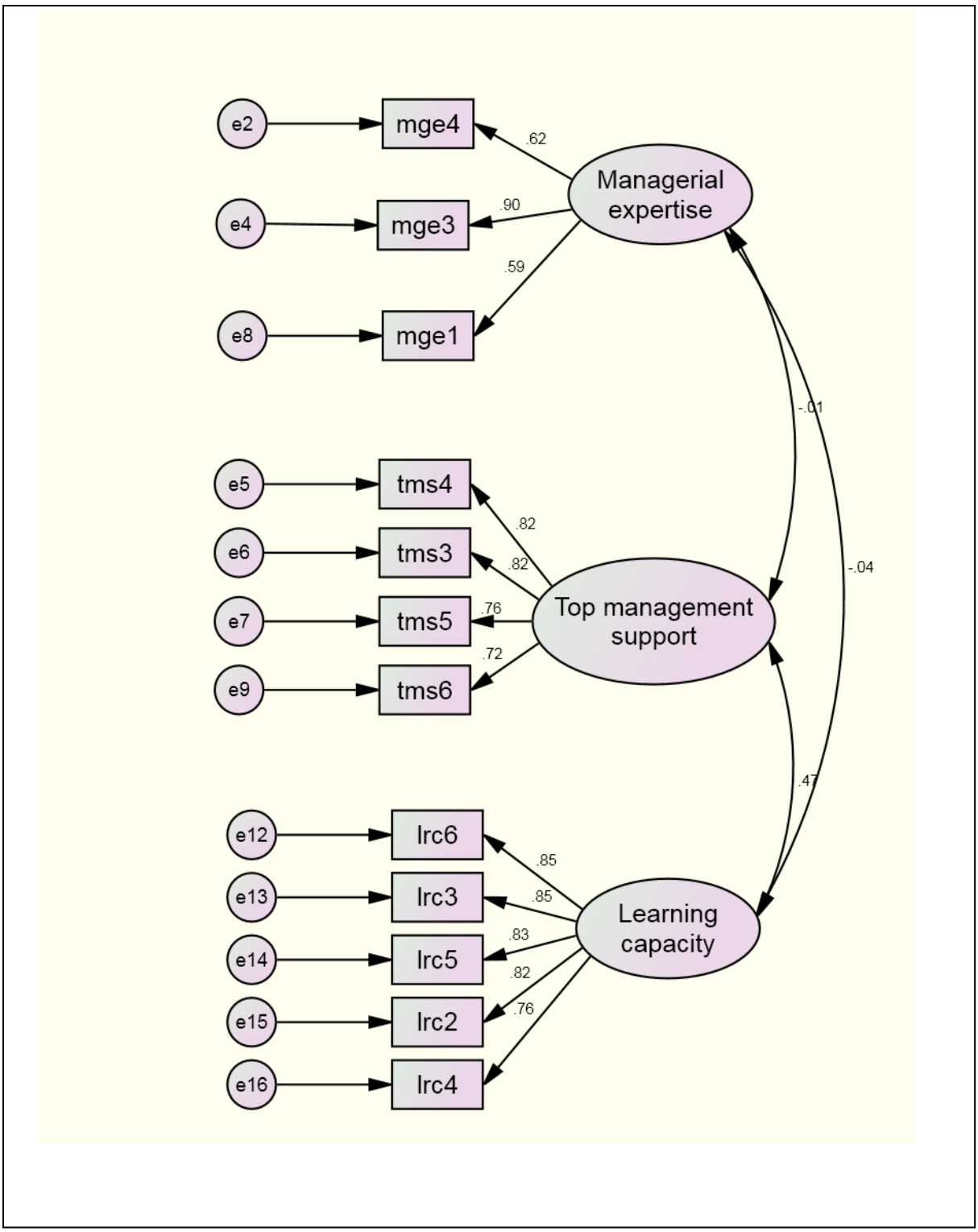


Figure 5.2 Measurement Model 2

Table 5.4 Summary of Results for Measurement Model 2 (Human Resources)

No	Congeneric Measures	Standardised Regression (Loading)	Critical Ratio
mge	Managerial Expertise		
Mge3		0.905	---------
Mge4		0.621	7.674
Mge1		0.586	7.501
tms	Top Management Support		
Tms5		0.760	---------
Tms3		0.822	14.126
Tms4		0.822	14.128
Tms6		0.718	12.234
lrc	Learning Capacity		
Lrc5		0.827	---------
Lrc3		0.853	17,920
Lrc6		0.850	17.817
Lrc2 Lrc4		0.816 0.762	16.801 15.234
	Goodness-of-Fit Statistics		
	χ^2	125.220	
	Degree of Freedom	51	
	p	0.000	
	χ^2/df	2.455	
	RMR	0.092	
	GFI	0.937	
	AGFI	0.904	
	IFI	0.961	
	CFI	0.961	
	RMSEA	0.068	

Table 5.4 shows that all indicators are falling on the posited underlying factors that were statistically significant whereas all critical ratios (t-values) were found to be

significant and greater than (±1.96) or (±2.58) at 0.05 level or 0.01 level respectively. All standardized loadings were greater than 0.60 thus showing evidence for convergent validity (Anderson & Gerbing, 1988).

The goodness-of-fit suggests that the measurement models represent a satisfactory fit to the data as evidenced by the fact that all the goodness-of-fit indices yielded an adequate fit justifying the support for the measurement model fit.

5.2.1.3 Measurement Model 3 [ITResources]

Table 5.5 tabulates the results of the CFA for each of three congeneric measures which will be subsequently integrated into the proposed Measurement Model 3 (IT resources). The two congeneric measures are: (1) IT infrastructure, and (2) EC resources.

Table 5.5 Congeneric Measures in Measurement Model 3 (IT Resources)

No	Congeneric Measures		Standardised Regression (Loading)	Critical Ratio[b] (t-values)
itr	IT Infrastructure			
Itr8			0.755	--------
Itr7			0.774	13.757
Itr6			0.802	14.311
Itr4			0,829	14.822
Itr5			0.843	15.087
	Goodness-of-Fit Statistics			
		χ^2		19.404
		Degree of Freedom		5
		P		0.002
		χ^2/df		3.881
		RMR		0.033
		GFI		0.975
		AGFI		0.926
		IFI		0.984
		CFI		0.984
		RMSEA		0.096
ecr	EC Resourcces			

Ecr6			0.676	---------
Ecr3			0.691	10.069
Ecr4			0.765	10.801
Ecr5			0.776	10.888
	Goodness-of-Fit Statistics			
		χ^2	2.250	
		Degree of Freedom	2	
		p	0.325	
		χ^2/df	1.125	
		RMR	0.020	
		GFI	0.996	
		AGFI	0.982	
		IFI	0.999	
		CFI	0.999	
		RMSEA	0.020	

a. IT Infrastructure

The results (Table 5.5) show a support for convergent validity as all the loadings were statistically highly significant. While the fit indices are not within or above the acceptable levels except GFI (above 0.90), the congeneric measure then is considered marginal.

b. EC Resources

Similarly, Table 5.5 summarizes the results showing a support for convergent validity as all the loadings were statistically highly significant. Additionally, all the goodness-of-fit statistics suggest that the proposed model represents a marginal fit to the observed data. IFI and CFI are above 0.900. The proposed model hence was somewhat adequate.

Subsequent to the CFA on the three congeneric measures for IT infrastructure and EC resources, the three purified measures were incorporated as a sub-model of

Measurement Model 1 as depicted in Figure 5.5 to enable the assessment of the model's overall fit and convergent validity. It was achieved by performing a CFA on the integrated sub-models. The summary of the results is shown in Table 5.5 and depicted in Figure 5.3. It is a graphical representation of the output for Measurement Model 1 which fundamentally hypothesized a priori that:

1) The model consists of two-factor structure at the first-order level only; this also connotes that all the constructs are composed of one congeneric measure only.
2) The two constructs (IT infrastructure and EC resources) are inter-correlated, as indicated by two-headed arrows. 14 observed variables are represented by rectangles and thus being regressed onto its respective factor.

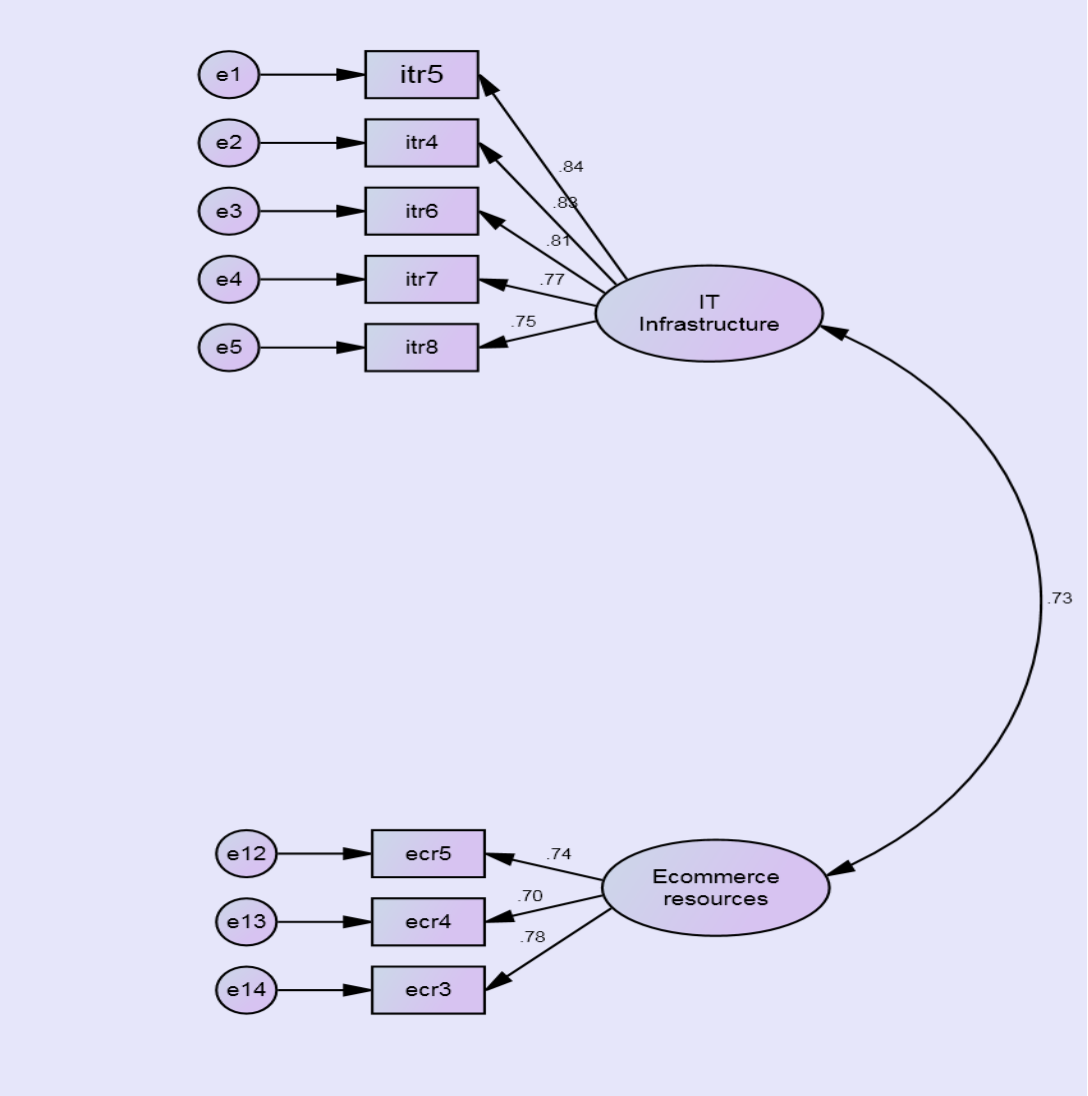


Figure 5.3 Measurement Model 3 (IT resources)

Furthermore as summarized in Table 5.6 the results also show a support for convergent validity as all the loadings were statistically highly significant. Moreover, all the goodness-of-fit statistics suggest that the proposed model represents an adequate fit to the observed data with the exception that χ^2/df is slightly above 3.000. The values for GFI, IFI and CFI were all above 0.900, indicating that the fit of the data to the proposed model was adequate.

Table 5.21b shows that all the indicators falling on the posited underlying factors that were statistically significant. The critical ratios (t-values) were found to be significant and greater than (±1.96) or (±2.58) at 0.05 level or 0.01 level respectively. Meanwhile, all the standardized loadings were greater than 0.60, indicating that some evidence of convergent validity does exist (Anderson & Gerbing, 1988).

Table 5.6 Summary of Results for Measurement Model 3 (IT Resources)

No	Congeneric Measures	Standardised Regression (Loading)	Critical Ratio
itr	IT Infrastructure		
Itr8		0.753	--------
Itr7		0.774	13.795
Itr6		0.806	14.421
Itr4		0.833	14.960
Itr5		0.837	15.033
ecr	EC Resources		
Ecr3		0.782	--------
Ecr4		0.700	11.266
Ecr5		0.739	11.774
	Goodness-of-Fit Statistics		
	χ^2		57.640
	Degree of Freedom		19
	p		0.001

	χ^2/df	3.034
	RMR	0.059
	GFI	0.956
	AGFI	0.917
	IFI	0.971
	CFI	0.971
	RMSEA	0.081

5.2.1.4 Measurement Model 4 [Business Performance]

Measurement Model 4 for business performance represents two underlying dimensions of business performance which are hereby referred to: (1) financial performance, and (2) non-financial performance.

Table 5.7: Congeneric Measures in Measurement Model 4 (Business Performance)

No	Congeneric Measures		Standardized Regression (Loading)	Critical Ratio[b] (t-values)
G	Financial Performance			
Fpr2			0.569	--------
Fpr3			0.588	7.735
Fpr6			0.627	8.067
Fpr5			0.750	8.903
Fpr4			0.758	8.940
	Goodness-of-Fit Statistics			
	χ^2	12.936		
	Degree of Freedom	5		
	p	0.024		
	χ^2/df	2.587		
	RMR	0.042		
	GFI	0.985		
	AGFI	0.954		
	IFI	0.981		
	CFI	0.981		
	RMSEA	0.071		

H	Non Financial Performance			
Nfp3			0.575	--------
Nfp2			0.686	9.170
Nfp6			0.767	9.823
Nfp5			0.822	10.193
Nfp4			0.823	10.197
	Goodness-of-Fit Statistics			
	χ^2	25.722		
	Degree of Freedom	5		
	p	0.001		
	χ^2/df	5.244		
	RMR	0.054		
	GFI	0.966		
	AGFI	0.899		
	IFI	0.969		
	CFI	0.969		
	RMSEA	0.115		

a. Financial Performance

The results as summarized in Table 5.7 are evidence that there is a support for convergent validity as all loadings were statistically highly significant except for item fpr2, fpr3, fpr6 which are slightly below 0.700 and will be excluded from Measurement Model 1. In the meantime, RMR, GFI, IFI and CFI were found to be acceptable. For this, the congeneric measure for business performance is considered marginal.

b. Non financial Performance

Equal to that of in financial performance, the results for non financial performance as summarized in Table 5.7 also shows a support for convergent validity for all loadings

were statistically highly significant except for items nfp2 and nfp33 and their values were below 60. Moreover, all the goodness-of-fit statistics suggest that the proposed model represents an adequate fit to the observed data as RMR is 0.060 and the values for GFI, IFI and CFI are above 0.900. Therefore, the proposed model was regarded as just adequate.

The next step after CFA, the two congeneric measures for financial performance and non-financial performance were incorporated as a sub-model of Measurement Model 4 as depicted in Figure 5.2 to make a way for the assessment of the model's overall fit, convergent validity, construct reliability. The assessment was again attained by performing a CFA on the integrated sub-models.

The model consists of two-factor structure at the first-order level only and connotes that all constructs are composed of one congeneric measure only.

1) The two constructs (financial performance and non-financial performance) are inter-correlated, as indicated by two-headed arrows. 8 observed variables are represented by rectangles and as such, these observed variables were regressed onto its respective factor.

Summarized in Table 5.8 the results demonstrate a support for convergent validity as all the loadings were statistically highly significant. Furthermore, all indicators falling on the posited underlying factors were statistically significant whereas all critical ratios (t-values) were found to be significant and greater than (±1.96) or (±2.58) at 0.05 level or 0.01 level respectively. All standardized loadings were greater than 0.60, signifying the existence of convergent validity (Anderson & Gerbing, 1988).

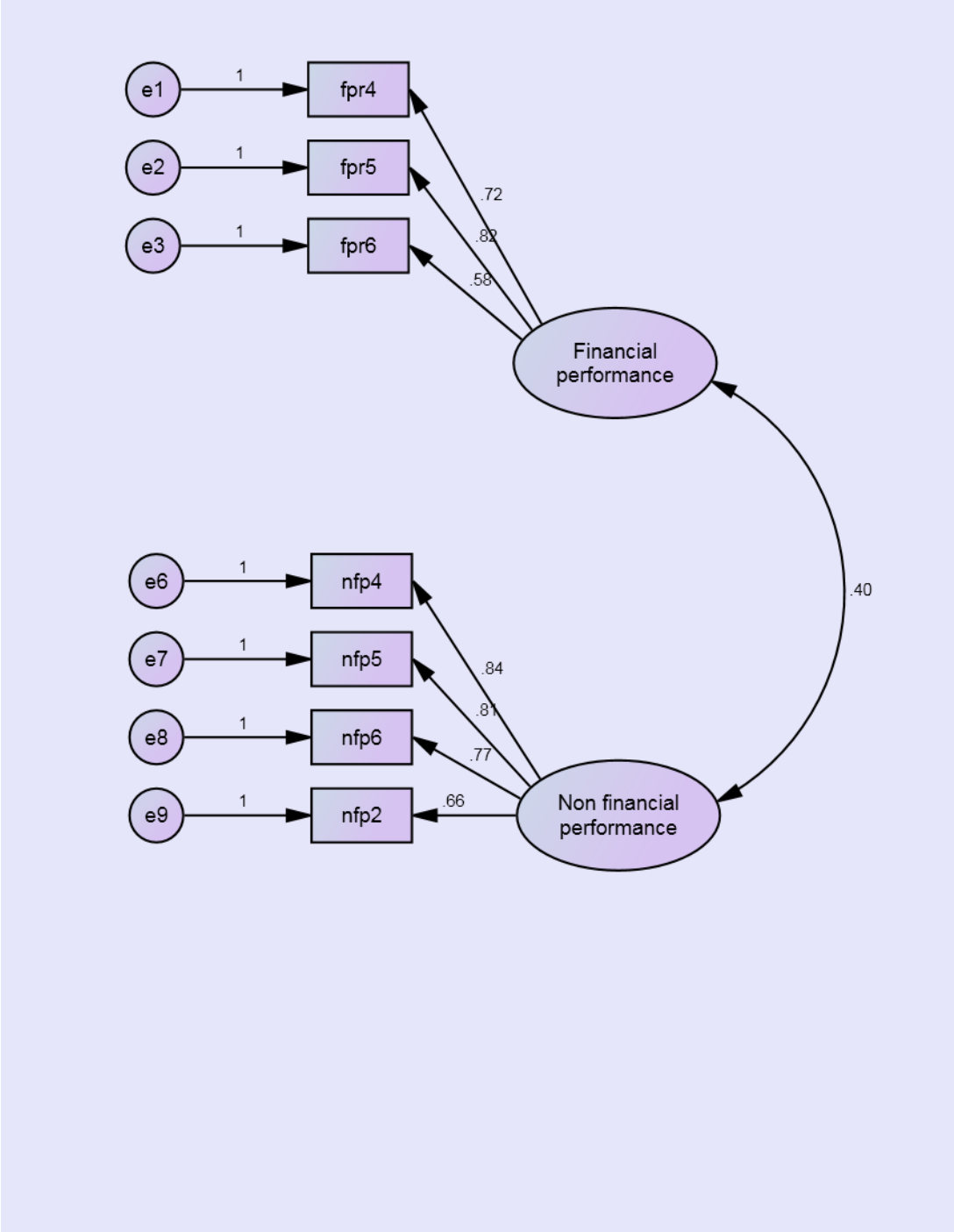


Figure 5.4 Measurement Models 4 (Business Performance)

Table 5.8 Summary of Results for Measurement Model 4

No	Congeneric Measures	Standardised Regression (Loading)	Critical Ratio
fpr	Financial Performance		
Fpr6		0.814	8.478
Fpr5		0.838	8.607
Fpr4		0.820	--------
Nfp	Non financial Performance		
Nfp2		0.659	--------
Nfp6		0.775	11.387
Nfp5		0.812	11.768
Nfp4		0.844	12.024
	χ^2		17.235
	Degree of Freedom		13
	p		0.189
	χ^2/df		1.326
	RMR		0.049
	GFI		0.984
	AGFI		0.965
	IFI		0.995
	CFI		0.995
	RMSEA		0.032

5.2.2 Summary of the Models

Table 5.9 Summary of the Models fit indices

No	Measures	Model 1	Model 2	Model 3	Model 4	Threshold Values
1	χ^2	44.996	125.220	57.640	17.235	-
2	Df	25	51	19	13	-
3	P	0.008	0.000	0.001	0.189	-
4	χ^2/df	1.800	2.455	3.034	1.326	Less than 3.000
5	RMR	0.037	0.092	0.059	0.049	Nearer to 0 the better
6	GFI	0.969	0.937	0.956	0.984	0.900 and above
7	AGFI	0.944	0.904	0.917	0.965	0.900 and above
8	IFI	0.988	0.961	0.971	0.995	0.900 and above
9	CFI	0.988	0.961	0.971	0.995	0.900 and above
10	RMSEA	0.051	0.068	0.081	0.032	0.030 to 0.080

5.3 Structural Model Evaluation

Illustrated in Figure 5.5 and Figure 5.6 the structural paths of the Hypothesized Model A and B were evaluated using SEM and the software to calculate the estimates was AMOS version 18. Essentially, SEM was adopted to test the several paths hypothesized in

the model. SEM is recognized as a more comprehensive and flexible approach to research design and data analysis than any other single statistical model in standard use by social and behavioral researchers (Hoyle, 1995). Additionally, SEM is capable of simultaneously including several observed and latent variables in the predicted paths.

5.3.1 Evaluation of the Hypothesized Model

The latent constructs and their observed indicators were established to have acceptable measurement properties. The next step in turn is to estimate and evaluate the full structural equation model. All hypotheses in this section are stated in a directional form. It is imperative that the results of the structural model estimation be verified to establish that there are no nonsensical or offending estimates (Hair et al., 2005) which occur when the error variances are negative, standardized loadings exceed to 1.0 or a very large standard error is associated with any estimated loading (Bollen, 1989). In the review of the structural model output for there were several offending estimates and low loading items were removed.

5.3.1.1 Structural Model A

Structural model A was tested to find out the hypothesized relationship between the factors and overall model fit. The initially hypothesized model A was not accepted as depicted in Appendix C and tabulated in Table 5.10. The chi-square was significant (chi-square = 1182.684; df = 519; p = 0.000, chi-square/df = 2.279 <3 and the model fit indices did not strongly support the fit of the overall model (GFI = 0.838; AGFI = 0.814; CFI = 0.893; NFI = 0.827; RMSEA = 0.064). Hair et al. (2005) stated that the poor fit of the overall model could be revised by investigating modification indices or the standard residuals. Moreover, as suggested by Anderson and Gerbing (1988), to improve the model fit, items related to problematic standard residuals (2.5 as a cut-off) or larger reductions of chi-square were identified and eliminated one by one. Table 5.10 presented the eliminated indicators in each test and the evidence of the overall model fit. An item dropped at first was from all variables with very low regression loadings. After eliminating 12 items the model again run to achieve over

all model fit. However in the second test, some of the indices were not achieved at acceptable threshold values. Furthermore, to achieve the acceptable model fit the model was run four times with eliminating some other low loading items of the variables as shown in table 5.5. Finally the model has achieved the acceptable threshold values shown in Figure 5.10.

Table 5.10 Overall Model Fit of Model A and the Revisions with Eliminated Items

SEM	Eliminated Item	Evidence of the Model Fit
1st	(Test1: 10 latent variables with 57 indicators)	□□chi-square = 1182.684; df = 519; p = 0.000, chi-square/df = 2.279 <3 □□GFI = 0.838; AGFI = 0.814; CFI = 0.893; NFI = 0.827; RMSEA = 0.064
2nd	(Test2: 10 latent variables with 45 indicators)	□□chi-square = 955.018; df = 455; p = 0.000, chi-square/df = 2.099 <3 □□GFI = 0.856; AGFI = 0.833; CFI = 0.909; NFI = 0.838; RMSEA = 0.059
3rd	(Test3: 10 latent variables with 39 indicators)	□□chi-square = 689.040; df = 316; p = 0.000, chi-square/df = 2.181 <3 □□GFI = 0.870; AGFI = 0.845; CFI = 0.914; NFI = 0.854; RMSEA = 0.061
4th	(Test4: 10 latent variables with 34 indicators)	□□chi-square = 580.293; df = 246; p = 0.000, chi-square/df = 2.359 <3 □□GFI = 0.878; AGFI = 0.851; CFI = 0.911; NFI = 0.911; RMSEA = 0.066
5th	(Test5: 10 latent variables with 30 indicators)	□□chi-square = 552. 911; df = 205; p = 0.039, chi-square/df = 1.414 <3 □□GFI = 0.916; AGFI = 0.908; CFI = 0.968; NFI = 0.982; RMSEA = 0.036

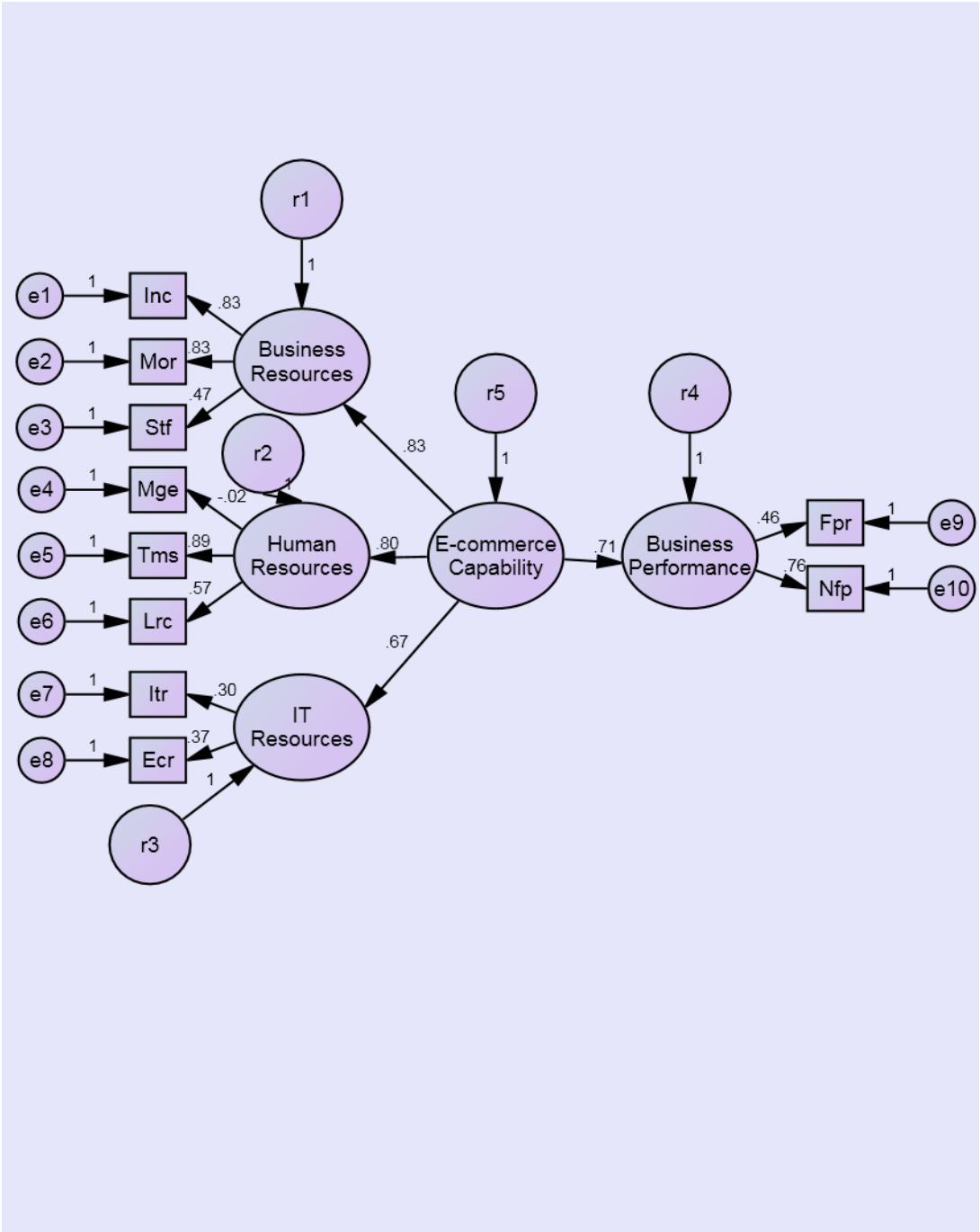


Figure 5.5 Secoond Order Factor Model

Table 5.11 Summary of Measurements for the Secoond Order Factor Model (Model A)

No	Structural Paths			Standardized loading	C.R	P	Label
1	Ecommerce capability	→	Business Resources	.83	2.560	***	Supported
2	Ecommerce capability	→	Human Resources	.80	7.667	.575	Supported
3	Ecommerce capability	→	IT Resources	.67	2.886	.627	Supported
4	Ecommerce capability	→	Business performance	.71	11.561	***	Supported

The estimated structural paths for the Final Hypothesized Model A are depicted in Figure 5.6 and tabulated in Table 5.12. The model illustrates the hypothesized relationships between latent constructs and their corresponding standardized path loadings. Statistically, the standardized loadings are used for comparing the relative strength of path loadings within the sample.

5.3.1.2 Structural Model B

Model B was also tested using structural equation modelling approach. The initially hypothesized model B was not accepted as shown in Table 5.12. The chi-square was significant (chi-square = 4770.449; df = 1643; p = 0.000, chi-square/df = 2.903 <3 and the model fit indices did not strongly support the fit of the overall model (GFI = 0.660; AGFI = 0.634; CFI = 0.710; NFI = 0.618; RMSEA = 0.078). To improve the overall model fit and to achieve the acceptable threshold values, the poor fit of the overall model could be revised by investigating modification indices or the standard residuals (Hair et al., 2005).

Table 5.12 presented the eliminated indicators in each test and the evidence of the overall model fit. An item dropped at first was from all the variables having very low regression loadings. After eliminating 12 items in the first test, the model again run to achieve overall model fit. However in the second test, some of the indices were not achieved at acceptable threshold values. Furthermore, to achieve the acceptable model fit the model was run four times by eliminating some other low loading items of the

variables. Finally the model has achieved the acceptable threshold values as shown in Figure 5.12.

Table 5.12 Overall Model Fit of Model B and the Revisions with Eliminated Items

SEM	Eliminated Item	Evidence of the Model Fit
1st	(Test1: 10 latent variables with 57 indicators)	□□chi-square = 4770.449; df = 1643; p = 0.000, chi-square/df = 2.903 <3 □□GFI = 0.660; AGFI = 0.634; CFI = 0.710; NFI = 0.618; RMSEA = 0.078
2nd	(Test2: 10 latent variables with 45 indicators)	□□chi-square = 3248.922; df = 118; p = 0.000, chi-square/df = 2.906 <3 □□GFI = 0.708; AGFI = 0.680; CFI = 0.761; NFI = 0.678; RMSEA = 0.078
3rd	(Test3: 10 latent variables with 39 indicators)	□□chi-square = 2411.396; df = 851; p = 0.000, chi-square/df = 2.834 <3 □□GFI = 0.746; AGFI = 0.717; CFI = 0.800; NFI = 0.723; RMSEA = 0.077
4th	(Test4: 10 latent variables with 34 indicators)	□□chi-square = 1399.922; df = 455; p = 0.000, chi-square/df = 3.077 >3 □□GFI = 0.799; AGFI = 0.757; CFI = 0.826; NFI = 0.763; RMSEA = 0.082
5th	(Test5: 10 latent variables with 30 indicators)	□□chi-square = 455. 911; df = 225; p = 0.000, chi-square/df = 2.687<3 □□GFI = 0.914; AGFI = 0.902; CFI = 0.940; NFI = 0.942; RMSEA = 0.074

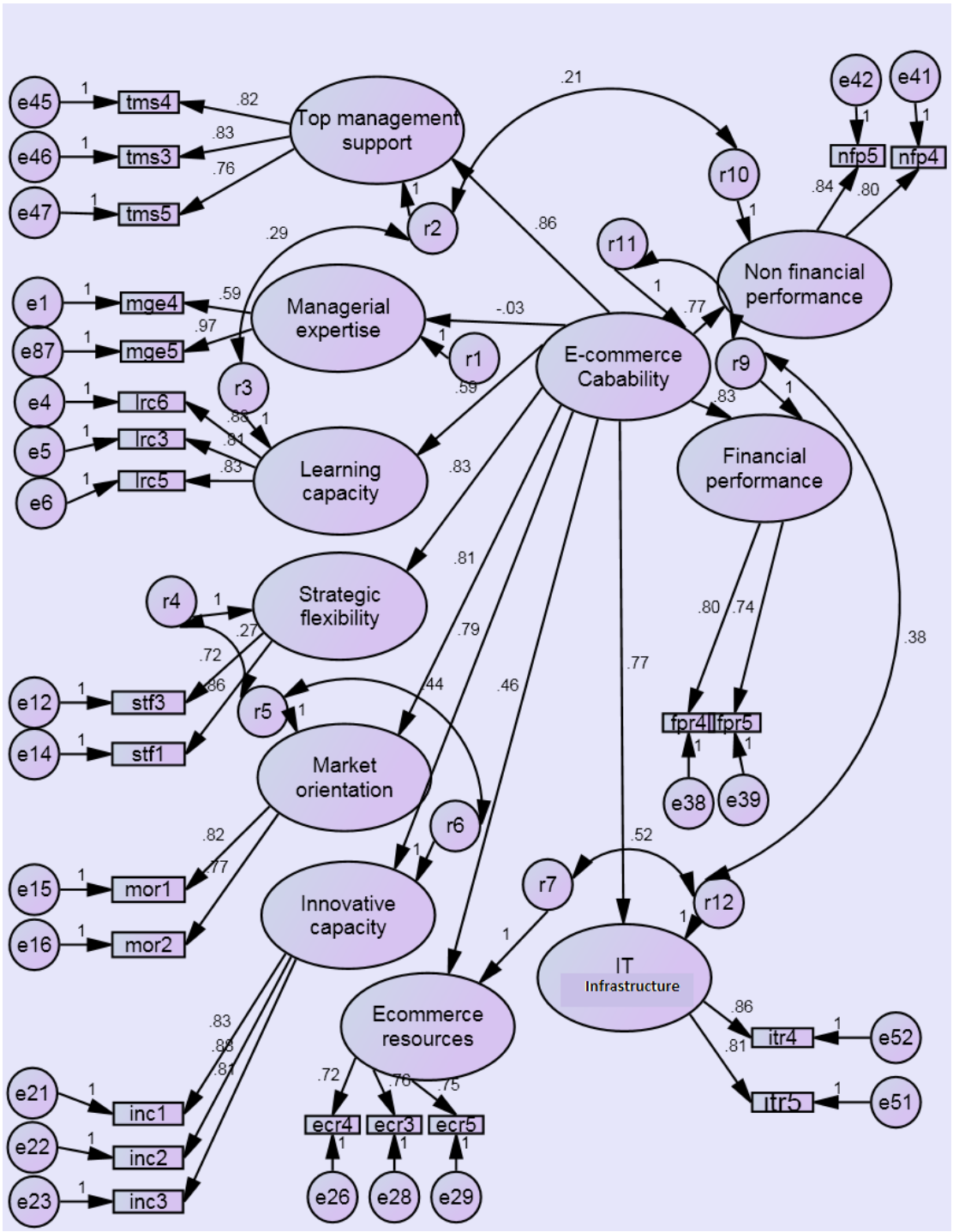


Figure 5.6 First Order Factor Model

Table 5.13 Summary of Measurements for the First Order Factor Model

(Model B)

			Standardized Loading	C.R.	P	Label
Top-management support	<---	EC Capability	0.86	10.685	***	Supported
Managerial expertise	<---	EC Capability	-0.03	-.547	.584	Rejected
Learning capacity	<---	EC Capability	0 .59	8.212	***	Supported
Strategic flexibility	<---	EC Capability	0.83	9.823	***	Supported
Market orientation	<---	EC Capability	0.81	9.988	***	Supported
Ecommerce resources	<---	EC Capability	0.46	2.858	.004	Supported
Innovative capacity	<---	EC Capability	0.79	10.520	***	Supported
IT infrastructure	<---	EC Capability	0.77	8.730	.174	Supported
Financial Performance	<---	EC Capability	0.83	9.345	***	Supported
Non-financial performance	<--	EC Capability	0.77	8.730	***	Supported

Table 5.13 summarizes the fit indices for Revised Hypothesized Model A and Model B which notably indicates an acceptable fit indices such as Goodness-of-fit index is above the threshold values.

Table 5.14 Fit Indices for the Final Hypothesized Model A and B

No	Measures	Final Model A	Final Model B	Threshold Values
1	χ^2	178.375	229.873	-
2	df	153	154	-
3	p	.079	.000	-
4	χ^2/df	1.166	1.493	Less than 3.000
5	RMR	.62	.100	Nearer to 0 the better
6	GFI	.946	.935	0.900 and above
7	AGFI	.926	.912	0.900 and above
8	IFI	.991	.973	0.900 and above
9	CFI	.991	.973	0.900 and above
10	RMSEA	.023	.040	0.030 to 0.080
11	ECVI	.940	1.099	

5.4 Examinations of hypothesis

This section will present the brief overview of the research hypotheses. As the hypotheses were generated by the four research questions, their interpretations will be accordingly presented in four parts, each of which refers to their respective status. Consistent with Dabholkar et al. (1996) proposition, critical ratio associated with each parameter will be the basis for the testing of the proposed hypotheses and should be greater than ±1.96. Each hypothesis is evaluated based on the standardized loading, its critical ratio, significance level and direction either positive or negative. The estimation of hypotheses demonstrated that 9 of the hypothesized links were significant whilst 1 was not. The following section will focus on the results of the hypotheses and the implications of the results will be discussed.

5.4.1 Part 1: Hypothesis H_1

Hypothesis H_1 which hypothesizes a significant relationship between EC capability and business performance is supported as the critical ratio of this hypothesis is 11.561 greater than ±1.96 at p = 0.000. Its standardized loading is 0.71.

H_{1a} that represents the higher level of EC capability leads to the higher level of financial performance is supported as the critical ratio of this hypothesis is 3.725 which is greater than ±1.96 at p = 0.000. Its standardized loading is 0.77.

Hypothesis H_{1b}, hypothesizing that the higher level of EC capability leads to the higher level of non-financial performance is supported as the critical ratio of this hypothesis is 5.345 which is greater than ±1.96 at p = 0.000. Its standardized loading is 0.82.

Table 5.15 Summarized Results for EC capability and Business performance

No	H	Statement of Hypotheses	Standardized Loading	Critical Ratio	p	Results
1	H_1	There is a significant relationship between EC capability and business performance	0.71	11.561	***	Supported
2	H_{1a}	the higher level of EC capability leads to the higher level of non-financial performance	0.77	3.725	***	Supported
3	H_{1b}	the higher level of EC capability leads to the higher level of non-financial performance	0.82	5.345	0.707	Supported

5.4.2 Part 2: Hypothesis H_2

Part 2 consists of one main hypothesis along with three sub-hypotheses. The hypotheses were analyzed using structural equation modelling and supported as shown in Table 6.1.

H_2 is supported as the critical ratio is 2.560 greater than ±1.96 at and with the positive standardized loading of 0.83.

H_{2a} hypothesizing that the higher level of innovative capacity leads to a higher level of EC capability is supported as the critical ratio of this hypothesis is 9.725 greater than ±1.96 at p = 0.000. Its standardized loading is 0.79.

The H_{2b} hypothesizing that the higher level of market orientation leads to a higher level of EC capability is supported as its critical ratio is 3.737 well above ±1.96. Its path loading is 0.81.

H_{2c} which hypothesizes that the higher level of strategic flexibility leads to a higher level of EC capability is supported as the critical ratio of this hypothesis is 9.725 greater than ±1.96 at p = 0.001. Its standardized loading is 0.83.

Table 5.16 Summarized Results for Business resources and EC capability

No	H	Statement of Hypotheses	Standardized loading	Critical Ratio	p	Results
1	H_2	A higher level of business resources leads to a higher level of EC capability.	0.83	2.560	***	Supported
2	H_{2a}	the higher level of innovative capacity leads to a higher level of EC capability	0.79	10.520	***	Supported
3	H_{2b}	the higher level of market orientation leads to a higher level of EC capability	0.81	9.988	***	Supported
4	H_{2c}	the higher level of strategic flexibility leads to a higher level of EC capability	0.83	9.823	***	Supported

This section also consists of the one main hypothesis (H_2) and three sub-hypotheses. All hypotheses were supported except H_2 as shown in Table 6.2.

5.4.3 Part 3: Hypothesis H_3

The hypothesis, H_3 which hypothesizes a significant relationship between human resources and EC capability is supported as the critical ratio of this hypothesis is 7.667 greater than ±1.96 at p = 0.000. Its standardized loading is 0.80.

H_{3a} which hypothesizes the higher level of managerial expertise leads to a higher level of EC capability is rejected since the critical ratio of this hypothesis is -.547 greater than ±1.96 at p = 0.000. Its standardized loading is -.03.

The hypothesis, H_{3b} which hypothesizes that the higher level of top management support leads to a higher level of EC capability is supported as the critical ratio of this hypothesis is 10.685 which is greater than ±1.96 at p = 0.000. Its standardized loading is 0.86.

Hypothesis H_{3c}, which hypothesizes that the higher level of learning capacity leads to a higher level of EC capability is supported for the critical ratio of this hypothesis reaching 8.212 greater than ±1.96 at p = 0.000. Its standardized loading is 0.59.

Table 5.17 Summarized Results for Human resources and EC capability

No	H	Statement of Hypotheses	Standardized Loading	Critical Ratio	p	Results
1	H_3	A higher level of human resources leads to a higher level of EC capability	0.80	7.667	***	Supported
2	H_{3a}	the higher level of managerial expertise leads to a higher level of EC capability	-.03	-.547	***	Rejected
3	H_{3b}	the higher level of top management support leads to a higher level of EC capability	0.86	10.685	***	Supported

4	H_{3c}	the higher level of learning capacity leads to a higher level of EC capability	0.59	8.212	***	Supported

5.4.4 Part 4: Hypothesis H_4

The next hypotheses are referring to the consequences or outcomes of technology resources in the hypothesized model. H_4 hypothesizing a significant relationship between IT resources and EC capability is supported as the critical ratio of this hypothesis is 2.486 greater than ±1.96 at p = 0.000. Its standardized loading is 0.67.

The hypothesis, H_{4a} which hypothesizes that the higher level of IT Infrastructure leads to a higher level of EC capability of IT resources is supported as the critical ratio of this hypothesis is 8.730 at p = 0.000. Its standardized loading is 0.77.

H_{4b} represents that the higher level of EC resources leads to a higher level of EC capability. This hypothesis also is supported in that the critical ratio of this hypothesis is 2.858 greater than ±1.96 at p = 0.004. Its standardized loading is 0.46.

Table 5.18 Summarized Results for IT resources and EC capability

No	H	Statement of Hypotheses	Standardized Loading	Critical Ratio	p	Results
1	H_4	A higher level of IT resources leads to a higher level of EC capability	0.67	2.486	***	Supported
2	H_{4a}	the higher level of IT Infrastructure leads to a higher level of EC capability	0.77	8.730	***	Supported
3	H_{4b}	the higher level of EC resources leads to a higher level of EC capability	0.46	2.858	0.04	Supported

CHAPTER 6

DISCUSSIONS

6.1 Chapter Overview

This chapter presents the examinations of the research findings. The first section provides the discussions on research questions and hypotheses, intentionally to address the research questions outlined earlier in chapter 1. All major findings of the research questions will be singled out and accordingly discussed. The importance of these research questions is that they were the basis for the generations of the associated hypotheses. Following this, a review of the research questions is focused on taking a closer but broader to examine the relationships between the core constructs as posed by the individual research question. Responding to the research questions is to unravel the key points. These findings comprise of the foremost contributions of current study.

The second section in turn presents the summary of measurement models followed by summary of the structural models and the study. At the end of this chapter, implications, limitations and future directions of the study will be discussed.

6.2 Discussions on the research questions

The discussions on each research question are as follow,

6.2.1 Research Question 1

RQ1 is related to the determinants of EC capability and the impact of EC capability on business performance. The resea stated as,

RQ1: What determines EC capability and to what extent does it impact on business performance?

The findings of the research question 1 is based on the validated structural model which was subsequently purified using CFA as discussed in chapter 5.The diagram is presented with the value of the regression loading. Obviously, this mechanism could provide valuable knowledge for both researchers and managers to know how an outcome variable can be maximized.

Figure 6.1 summarizes the results of the research question 1 performed in structural modelling to identify the relationship of the underlying dimensions of EC capability and the impact of EC capability on business performance. These underlying dimensions include business, human and technology resources. To answer the research question1, four main hypotheses were developed (H_1, H_2, H_3, H_4,).

Analysis of the hypothesis (H_1) also indicated that there is a significant positive relationship between EC capability and business performance. It means that better EC capability will positively effect on business performance. This is in line with the previous research by Wu et al. (2003) concluding that EC can positively influence on performance outcomes. Here it infers that EC is an important tool that provides opportunities for organizations to develop idiosyncratic strategic positions. Ultimately EC provides the opportunity to the organizations to build the reliable relationship with the suppliers and customers and also delivers products and services and accomplishes low costs (gosh 1998) leading to better performance. H_{1a} again represents that financial performance is an underlying dimension of business performance is supported. H_{1b}, which hypothesizes that non-financial performance is an underlying dimension of business performance, is also supported. This implies that EC capability has a positive influence on both financial and non-financial performance of the firm. The outcomes of all hypotheses were found significant, emphasizing that the better utilization of business, human and technology resources are essential in developing EC capability that leads to better performance. The results of the research question 1 are in line with the RBV and DCT, whether the researchers argued that the better use

of the organizational resource enhances competitive advantage and ultimately business performance (Barney 1991, Teec et al. 1997).

Analysis of the next hypothesis (H_2) indicated a significant positive relationship between business resources and EC capability as shown in chapter 5. This also implies that the better utilization of business resources is developed, the better EC capability will be. The result of this finding is consistent with previous research by Keen (1993) arguing that firms need to integrate business resources into technologies, particularly with EC for better outcomes. Business resources are arguably expected to have influence on EC capability since involving business processes, strategies and innovations. Firms with better strategies and innovations are more possibly sound than the ones without any sound strategic approach (Lee 2002).

Analysis of the hypothesis (H_3) also indicated a significant positive relationship between human resources and EC capability, implying that the better utilization of human resources also will develop the better EC capability. The finding of this result is consistent with the past research, Clemons and Row (1993) argued that EC usage requires a better interaction of the firm's human resources. Human resources appeared as an important factor in the usage and implementation of the technologies. This shows that firms with highly skilled human resources and IT personnel can easily use and implement the technologies.

Furthermore analysis of the hypothesis (H_4) indicated that there is a significant positive relationship between IT resources and EC capability. This then reflects that the better utilization of IT resources is essential to develop the better EC capability and it is consistent with previous research, Baradwaj (2000) arguing that the combination of IT resources can create a firm-wide capability. Strategic IT planning emerged as key concept to identifying opportunities for leveraging IT to support business strategy and to efficiently administer the IT utility in the firm (Lederer and Sethi, 1996). Firms must have IT preparation systems that can cultivate inventiveness (Raghunathan and Raghunathan, 1991). Simply, IT resources factor is vital in developing EC capability.

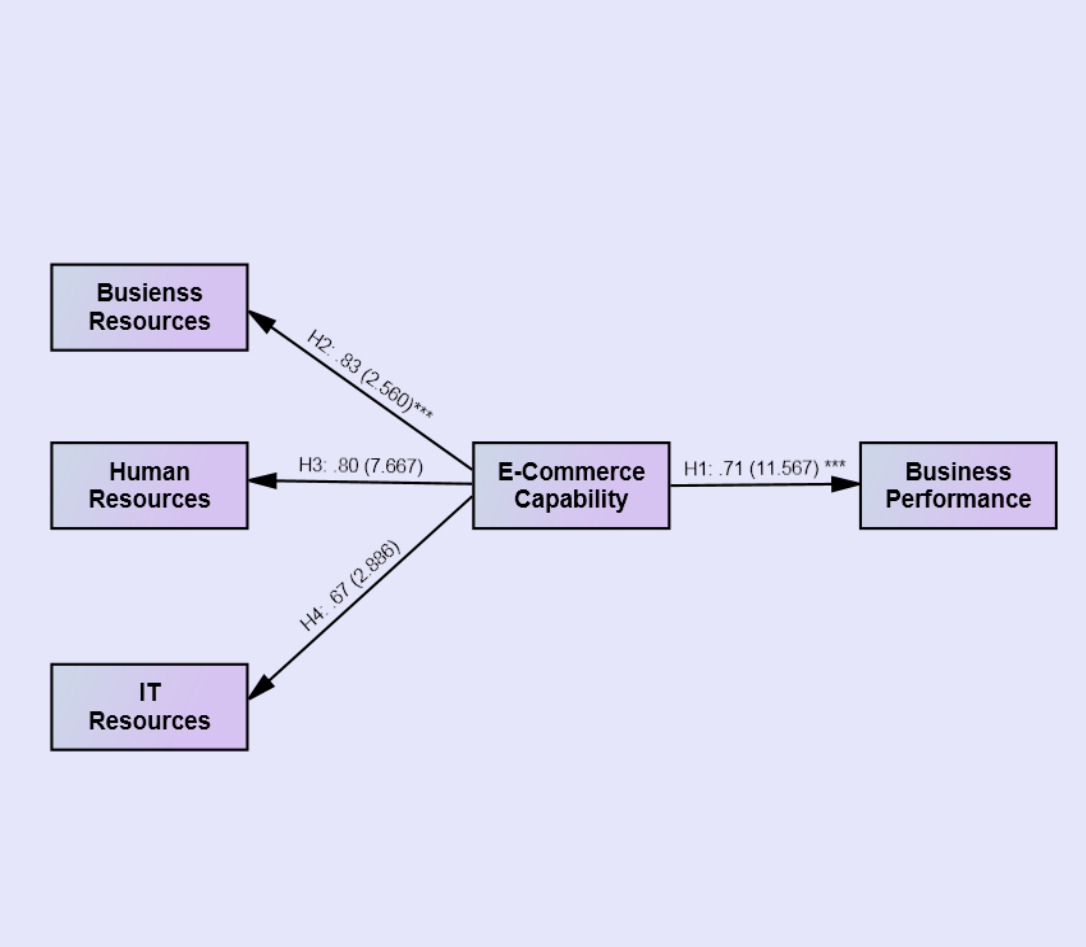


Figure 6.1: Findings of Research Question 1

6.2.2 Research Question 2

RQ2: Do business resources such as innovative capacity, market orientation and strategic flexibility influence on EC capability?

The findings of the research question 2 are based on the validated measurement model as discussed earlier in chapter 5. Based on the results, all the three underlying dimensions showed a positive relationship with EC capability. Innovative capacity came out with highest positive significant relationship with business resources. It indicates that the firms attaining innovations are likely more competitive in the market and innovative in processes. Moreover, innovation could be a resource for mostly firms to enhance business performance. Figure 6.2 summarizes the results of RQ2.

To answer the RQ2, three hypotheses were developed. Analysis of the H_{2a} indicated that innovative capacity is significantly influenced on EC capability. It shows that firms usually utilize innovations as a key for competitive advantage. The results of this hypothesis are consistent with previous studies by Govindarajan & Trimble, (2005) emphasizing on a better combination of the new initiatives with the rest of the organization to gain sustainable competitive advantage. However, innovative capacity of firms could vary depending on how innovations are developed and commercialized. Based on the results of this hypothesis it is considered that the firms with innovative skills create more opportunities to sustain the competitive advantage in online businesses.

The analysis of the second hypothesis H_{2b} furthermore indicated that market orientation positively influenced as underlying dimension and also implies that market orientation is an important factor of business resources. Most of the firms generate and deploy strategies to be vibrant in the market and to meet with customers' needs. The utilization of market orientation is one of the sources for sustainable competitive advantage, especially in online business environment is established. A firm in proposing a market orientation is to develop a positive reception for understanding potential customer requirements for offering superior customer value; pursuing the methodical aligning and sharing of information regarding potential customers and competitors to counter customer requirements and competitor actions in order to develop opportunities and prevent threats (Hunt and Morgan, 1995; Kohli and Jaworski, 1990; Narver and Slater, 1990). In addition, technological advancement is also enabling the firms to interact customers in a more advanced and efficient way and firms with the higher level of market orientation obtained better outcomes in virtual business.

Analysis of H_{2c} indicated that strategic flexibility is positively influenced as underlying dimension of business resources. This implies that firms often utilize the skill to acclimatize to environmental changes and incessantly build up strategies based on internal competences. The results are consistent with previous research, as according to Jhonson et al. (2003), strategic flexibility likely allows the firm to react to the environmental changes. Strategic decisions in organization need to retrace for

the efficient response to ample changes in the competitive environment (Young-Ybarra and Wiersema, 1999). While, this needs the flexibility by the firm that permits to counter the market threats and opportunities in a proactive or reactive approach (Grewal and Tansuhaj, 2001). Moreover, the alignment of conventional and virtual business needs strategic flexibility to enhance the market value. The outcomes of the RQ2 are presented in Figure 6.2.

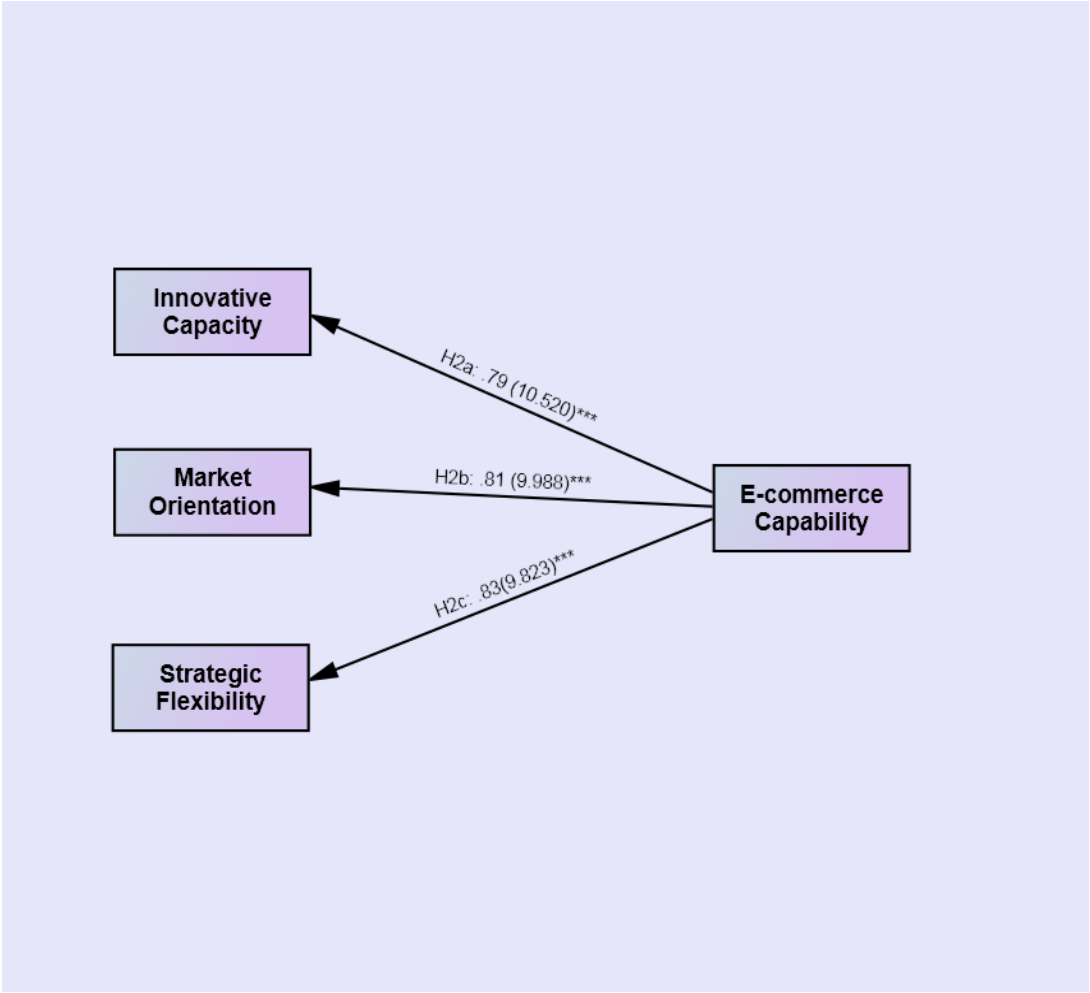


Figure 6.2: Findings of Research Question 2

6.2.3 Research Question 3

RQ3 is based on the human resources construct where human resources are represented by three underlying dimensions (Managerial expertise, top management support and learning capacity). RQ3 is stated as:

RQ3: Do Human resources such as managerial expertise, top management support and learning capacity influence on EC capability?

The finding of the RQ3 is based on the measurement model 2 as shown in chapter5. Three hypotheses were developed to answer RQ3 and supported except managerial expertise. This implies that top management support and leaning capacity positively influenced in adopting and the usage of new technologies, while managerial expertise came out with negative influence in same situation. This result is redundant because previous research shows the positive impact of managerial expertise as human resource (Williams et al., 2006). However, the results of top management support and leaning capacity are consistent with previous research (Engstrom et al., 2008, Vaidya et al., 2004, Yu-hui., 2008). The negative influence of the managerial expertise is likely caused by the lack of experience of specific technical staff for EC applications in manufacturing firms. It may be one of the reasons that managers' are not really involved with the specific EC expertise and have less experience in online business processes. Amit and Schoemaker (1993) argued that the expertise and effort can differ in the development of capabilities in different firms.

In online business environment firms' likely need the support from top management for the deployment of new strategies to counters the challenges that brought with the fast paced business environment around the globe. However, the firms require the higher level of knowledge management system to uphold the knowledge to compete with the competitors and to face the market challenges. As a result, it is considered in this study that firms require the utilization of specific human resources for the better outcomes of EC technologies. The outcomes of RQ3 are summarized in Figure 6.3.

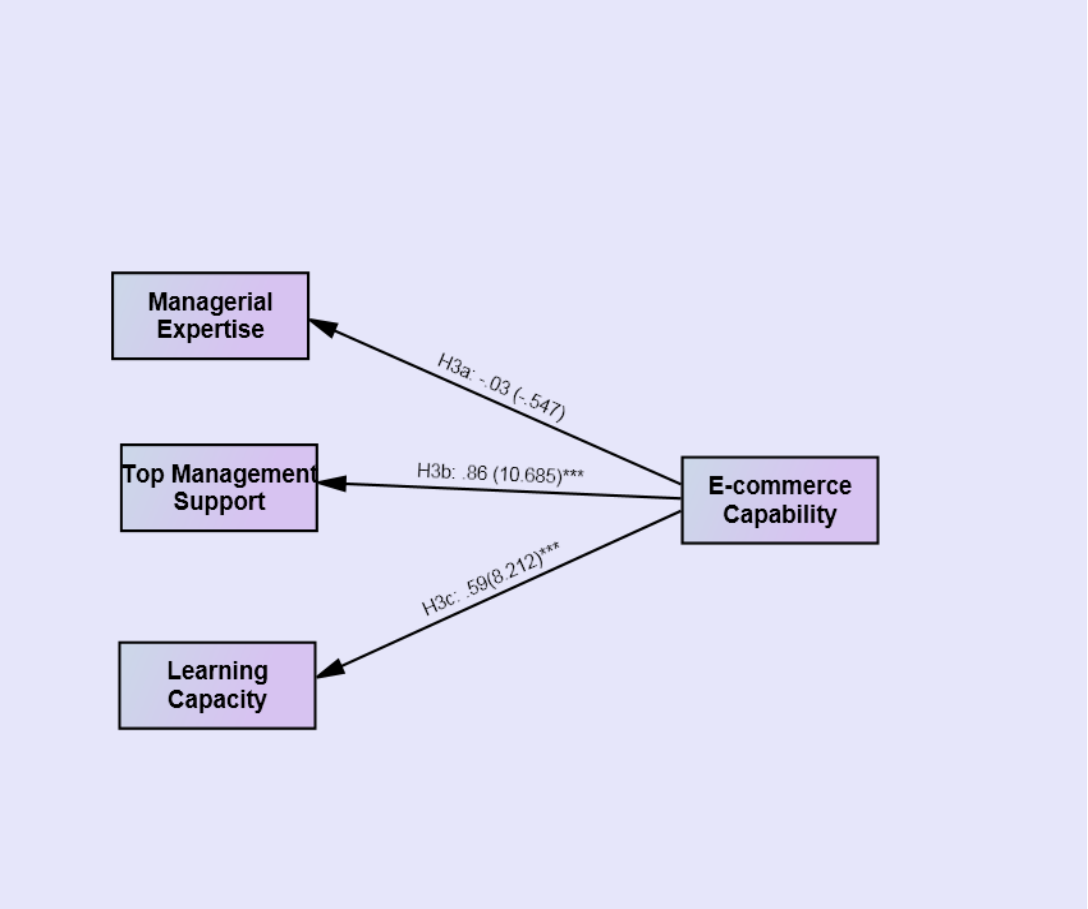


Figure 6.3: Findings of Research Question 3

6.2.4 Research Question 4

RQ4 represents the outcomes of the IT resources construct. Technology resources are represented by two underlying dimensions, namely IT infrastructure and EC resources. The RQ4 is stated as,

RQ4: Do IT resources such as IT infrastructure and EC resources influence on EC capability?

The findings of the RQ4 are based on measurement model 3. To answer the research question, two hypotheses were developed; both of which were found to have a positive influence as underlying dimensions of IT resources. This implies that IT Infrastructure and EC resources are the important factors in developing EC capability. Analysis of the H4a then indicated a significant relationship with IT infrastructure

reflecting that IT infrastructure must properly be utilized in the development of new competences. The results are consistent with the previous research as Real et al., (2006) argued that IT resources deployments are the key predictors of the firm' IT enabling a sustainable competitive advantage. The firms with the better IT infrastructure obtains a competitive advantage at the firm with low level of IT infrastructure is considered in this study. Based on the results, better IT infrastructure contributes significantly to the better usage of EC technologies and it enhance the chance of better outcomes in the implementation of EC. This implies that the firms need the proper IT infrastructure in the implementation and usage of EC technologies.

Analysis of the second hypothesis H_{4b} indicated that EC resources positive influenced as underlying dimension of IT resources implying that firm with better EC resources can create better EC capability that leads to better business performance. The results are consistent with the previous research by Keven Zhu (2004) that argued that EC competencies are closely connected to the resource base and implanted in the business processes of the firm. In this study, EC resources represent the richness of EC technologies such as website and its functionalities. The higher level of Website functionalities provides opportunities to the firms to handle the online business more efficiently and effectively. Based on the results of RQ3 it is considered that with the higher level of these resources more likely influence on EC success.

The outcomes of the RQ4 are presented in Figure 6.4.

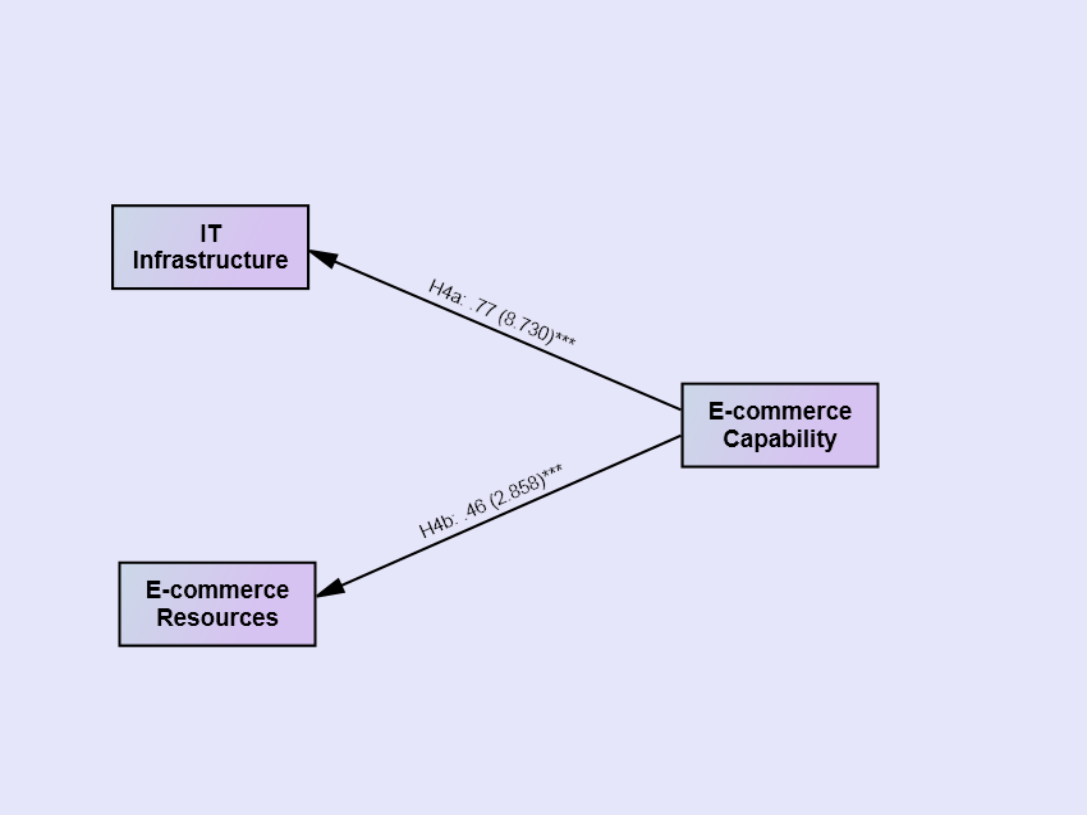


Figure 6.4: Findings of Research Question 4

6.3 Discussions on Measurement Models

In this study, fourteen measurement variables were identified. Business resources, human resources and technology resources were identified as the determinants of EC capability. All the variables were evaluated. Using item analysis and EFA the measures were purified as briefly discussed in chapter 4. The results of EFA are presented and consequently, refined and verified for unidimensionality, validity and reliability by performing CFA, as prescribed by Gerbing & Anderson (1988). To recapitulate, it is vital to remind that validity is concerned with how fit the concept is defined by the measures (Hair et al., 2005). While, reliability is defined as the extent to which the observed variable measures the "true" value and the "error free" (Hair et al., 2005). In other words, validity stresses on what should be measured, while reliability emphasizes on how it is measured. CFA was performed to validate the measures. Hypothesized Model A was decomposed into four measurement models so

that the case - parameter ratio is at least 5:1 (Baumgartner & Homburg, 1996; Bentler & Chou, 1987) Jap & Ganesan, 2000).

All the sub-models were assessed for convergent validity, unidimensionality and reliability as presented in chapter 5. The summarized results of each of the measurement models were presented in chapter 5. The results derived from the assessment of the measurement model were deemed to have achieved an adequate measurement standard in terms of unidimensionality, reliability as well as convergent validity. Measurement model 1 presented the business resources constructs that include innovative capacity, market orientation and strategic flexibility as observed variables. Measurement model 1 has achieved the acceptable goodness of fit where all the observed variables of business resources show the positive and acceptable regression loadings. This then implies that measurement model 1 has highlighted the accurate representation of business resources construct. Measurement model 2 presented the human resources construct that includes managerial expertise, top management support and learning capacity as the underlying dimensions. It was measured using CFA and found to be with acceptable goodness of fit, while managerial expertise showed the insignificant effect. It is not consistent with the previous studies since the data collected from the top management of manufacturing organizations and most of the organizations have a separate procurement department that handle EC processes and were having less experience in EC technologies.

Measurement model 3 was assessed to find out the outcomes of IT resources constructs that consist of two variables - IT infrastructure and EC resources. The results of CFA indicated the best model fit and both of variables of technology resources construct have obtained an acceptable regression weight. This implies that IT infrastructure and EC resources significantly contributes to develop EC capability as IT resources. Measurement model 4 meanwhile was assessed to measure the business performance construct. Business performance was measured by financial and non-financial performance in which its results indicated that both variables significantly influence business performance factor. However, non-financial performance showed more variance to business performance than financial

performance implying that business gains more intangible outcomes from online business activities.

6.4 Structural Model Summary

SEM was used to represent the simultaneous effects of all constructs incorporated in the conceptual model and demonstrate how they are interrelated to explain and predict the focal constructs which in this current study are EC capability and business performance as depicted in chapter 3. The hypothesized relationships amongst the constructs were assessed using the AMOS18. In addition, these results were also referred to answer the research questions as outlined in chapter 1. The overall fit of the hypothesized model was a good fit to the observed data. Hence, the model was respecified as recommended by Byrne (2001) in order to establish a more parsimonious and best-fit model.

Two models were formulated and referred as model A and model B. model. , Model A posited a relationship between second order factors of EC capability. However, Model B represented a relationship between first order factors (underlying dimensions) and EC capability.

Finally, Model A and Model B was re-estimated after deleting the low path loading and non-significant paths(Bagozzi, 1988) and the model without the non-significant paths is referred to as Final Model A and Final Model B. In order to improve model fit further, the model was aggregated as illustrated in chapter 5, Aggregated Final Model A and Final Model B have better fit indices as the values for GFI, AGFI, IFI and CFI are well above 0.900.

6.5 Research summary

The initial step of this research was to review the literature to establish the possible theory that explains the development of EC capability and its relationship with business performance. The review of the IT/IS, marketing and strategic management

literatures included previous theoretical and empirical studies regarding strategic management and IT/IS were undertaken for the theoretical foundation of this study. Then the literatures were narrowed down to include studies involving capability development and IT/IS. Finally the research exclusively surveyed on, resource based and dynamic capability view of EC, IT/IS adoption and its outcomes. In order to develop the theoretical model, relevant theoretical and empirical studies were surveyed.

The hypotheses were generated to examine a relationship between the factors in the theoretical model. The main objective of the research was to develop the EC capability and find out its relationship with business performance. The hypotheses developed in this research are presented as,
Hypothesis H1 was to test EC capability impact on business performance, H2 to find the relationship between business resources and EC capability, H3 to examine the relationship between human resources and EC capability and H4 to find out the relationship between IT resources and EC capability. Further several sub-hypotheses were generated (H1a, H1b, H1c, H2a, H2b, H2c, H3a, H3b, H4a, H4b) to determine the underlying dimensions of the above second order factors

The next step of the study was to develop the instrument to measure each factor of the theoretical model. The instrument was formulated through the items adopted from previous studies with modification and some items were generated newly. Pre-testing was carried out using Dillmon's four stage method. In the first stage, 8 versions of the instruments were developed and revised to see whether all the necessary questions had been included to measure the variables and evaluate whether the scales support appropriate analysis. The second stage was followed to check the readability and the understandability of the items in the questionnaire. Essentially, it was to see the applicability of the items for the respondents. In the third stage a pilot study was performed to test the instrument for avoiding the big mistakes. In this stage the instrument was administered to 21 participating firms. The final stage was performed to reassess and revised the instrument and eliminate all those mistakes pointed in previous stages. As a result and several iterations it was possible to develop the instrument for this study including all the questions that measure all constructs.

Finally the revised instrument was sent to 457 top officials of manufacturing firms around Malaysia. Total of 312 responses were received which represented the response rate of 61%. 287 responses were considered for statistical analysis.

SEM was used to test the hypotheses of this study and several steps were taken to ensure that the data is normally distributed. After looking for outliers and conducting skewness and kurtosis analysis some items were dropped from the final analysis. After being adjusted, the sample data seemed to be normally distributed.

This study is the identification and examination of the key determinants and outcomes of EC capability. Integrating the other constructs, business resources, human resources and technology resources has enabled this study to investigate the interplay between pairs of constructs basically linked from amongst the proposed constructs, were supported by the theoretical model that encapsulates some of the salient empirical findings of previous studies. The proposed model adopts a broader conceptualization of EC capability by incorporating three organizational resources comprising of business resources, human resources and technology resources into the conceptual model. The core construct of this current study is EC capability. All other constructs are individually identified either as its determinants or as outcomes directly or indirectly. This conceptualization is an integration of the findings of the studies by Lee and Slater (2007); the researcher argued that long-term dedication and efforts towards attaining new technologies, attracting highly skilled human resources, and entrepreneurial top management with a crisis-driven approach will lead to the creation of the technological capability. Similarly, C. Yew Wong, N. Karia (2010) developed a theoretical framework that comprises the physical, human, information, knowledge and relational resources structuring and deployment for the sustainable competitive advantage. While previous studies were based on the constructs which were evaluated by direct measures; this current study investigates the conceptual model that comprises with first order and second order factors. EC has been defined as the creation of superior value for organizations and thus, continuing the superior performance for the business.

At the outset, accomplishing the above objectives was preceded by establishing the validity and reliability of the measures of the constructs as suggested by Churchill (1979) and Ping (2004). In compliance with the procedure, assessment and validation were made by performing item analysis and exploratory factor analysis (EFA) as suggested by Churchill (1979) and confirmatory factor analysis (CFA) as prescribed by Anderson & Gerbing (1988). As evidenced by the results of the tests, it is affirmed that the unidimensionality, validity and reliability of the constructs that make up the conceptual model were above the acceptable levels enabling the undertaking of the next stage of analysis.

The hypothesized model in this current study was re-estimated after the exclusion of low loading indicators as their standardized regression weights were below 0.700. Only the items with acceptable loading for each construct were retained in order to achieve good model fit. For instance, business resources were proposed to have three underlying dimensions namely innovative capacity, market orientation and strategic flexibility. Human resources also were proposed to have three underlying dimensions, namely managerial expertise, top management support and learning capacity, meanwhile technology resources were proposed to have two underlying dimensions, namely IT resources and EC resources. However, business performance was measured by two underlying dimensions: financial performance and non-financial performance. Since the standardized loading for managerial expertise was -0.03, meaning below 0.700, it was then deleted. Two final models were estimated to determine the best model that fits the data. Final Model A was found to have the best fit which led to this model being singled out as Final Model B, subsequent to the deletion of non-significant path.

A significant association was found between EC capability and business performance that implies the importance of EC capability to business performance. Other dimensions of the theoretical model were also found to have a significant relationship except managerial expertise. This implies that utilization of organizational resources is a key to enhance business performance in EC environment.

6.6 Conceptual Implications

The conceptual contribution is realised through the integration of the two theories to facilitate a more comprehensive or holistic theoretical framework for the benefit of understanding the outcomes of EC. Current study further contributes to resource-based theory of the firm and dynamic capability theory by addressing major issues. The first issue is whether the integration of the determinants has any significant impact on the EC capability. The second issue is related to the utilization of organizational resources that specifically deployed for developing EC capability.

The two theories serve as a guiding framework for selecting and developing a theoretical framework and major constructs. The core theoretical contribution of this current study lies in the operationalizations of organizational resources and their interplay with EC capability. This has provided the opportunity to generate knowledge on the effects of organizational resources, EC capability and business performance. Finally, the new set of determinants was selected based on the characteristics of organizational resource that have strong impact on EC capability and business performance.

6.7 Theoretical Implications

This research elucidates the literature through five contributions. First, it extends the research by being the first to develop a continuous scale to measure EC capability that showed the strong relationship with business performance. Second, this is the first empirical study to find the fully mediated impact of EC capability on business performance. Third, this is the first study to found that business, human and technology resources can be presented in a second order factor of EC capability. Fourth, this study found that some of the factors comprising business, human and technology resources are the most important factors in developing EC capability that leads to better business performance. Fifth, this research provides a methodological

contribution by developing measures that simplify the examination of EC capability and business performance.

Some of the prior studies used the dichotomous variables to estimate EC capability. Zhu and Kraemer (2004) examined EC capability by measuring the website characteristics of the firms while the researchers did not measure EC capability with the available organizational resources that can be utilized in the development of EC capability. Consequently, their measures of EC capability are limited to a general examination of website characteristics of the firms. The measures developed in this study are important for two reasons. One, previous research on linking EC and business performance have found that a range of EC applications are affected differently and should be measured separately. Two, measuring technology implementations on continuous scale may better examine in the real world firms Brews and Tucci (2004). Contradicting some of the previous findings Grey et al. (2005), Gefen (2004) and Metta and Krieger (2001) who found negative or impartial impact of EC on performance, the finding in this study, in line with the findings of Zhu and Kraemer (2004) and Toy (2001), shows that there is a strong relationship of EC and firm's performance.

Second, this research finds that EC capability is fully mediated by utilization and reconfiguration of organizational resources. This indicates that the researchers should consider more than IT investment and its usage when they predict performance. The finding may provide explanations to the productivity paradox. It submits to the dilemma in the literature between studies that argued the capacity to predict firm's performance based on IT usage and investments and those that argued that IT usage and investments is not an accurate predictor of performance. In the other way, the paradox is established because firms with similar investments and usage of IT do not always improve performance. This may explain why some firms are getting advantages from IT investments and usage while others are not.

Third, the finding that business, human and technology resources load onto a second order factor which is referred to EC capability is important because this implies that organizational resources must be utilized and reconfigured to achieve the higher

degree of EC capability. This indicates that business, human and technology resources must be present to gain the better performance in EC environment. Prior studies, including Zhu and Kraemer (2004), measured EC capability by indicating web site functionalities but not examining the organizational resources and utilization for the development of a capability as Teece et al. (1997) mentioned that capability can be developed by the reconfiguration, utilization and deployment of specific resources. This finding may put another explanation to the productivity paradox. If firms only invest in technology they are not likely to gain the better performance suggested in this research. The mixed results in the literature may be caused by some firms investing only in technology while others invest in both technologies along with specific resources.

Fourth, this study is one of the few studies to quantify the outcomes of organizational resources on business performance in EC environment. Zhu and Kraemer (2004) claimed to be the first study to develop EC capability, yet their construct were based primarily on infrastructure and website characteristics which has been shown to be insufficient in this study for gaining the full benefits of EC implementations.

Fifth, some of the indicators of business, human and technology resources are more important to explain the variance in business performance than others. This study found that market orientation, innovative capacity, EC resources and top management support are more important to the composition of EC capability that have more impact on performance than other indicators. Sixth, a methodological contribution is that EC capability model provides more prudent method for testing future IT models.

6.8 Practical Implications

Four of the five theoretical implications also have contributions to practitioners. First, from this research it is found that EC capability has a strong influence on business performance. Second, the evidence advocates that the impact of EC is not direct but mediated by other variables. Third, the findings advocate that managers must recognizably invest in business, human and technology resources for the improvement

in business performance. Fourth, some variables emerge to be more imperative for EC success than others.

The finding of this study that EC capability has a strong positive relationship with business performance implies that managers should be moving ahead by considering the organizational resources and implement EC with the expectation for a business performance improvement. This is vital to the managers who justify EC projects.

The fully mediated effect of organizational resources is important to managers, implying their responsibility for investing to generate specific resources and to deploy it for the realization of EC usage and implementation. Managers who expect to receive full benefits of the EC technology must invest in activities that comprise business, human and technology resources. Investment in organizational resources involves activities such as the market orientation development, high innovative capacity, flexible strategies, top management support for technology usage and implementation, better knowledge of management system, better IT infrastructure and the high contents of website development. This study concludes that given the limitations of resources, that firms implementing EC should invest in organizational resources. However the importance of these variables may have different impact in dissimilar business conditions. Managers must identify the type of resources that will most benefit performance and then deploy it. Otherwise unnecessary or insufficient resource utilization and reconfiguration may have insignificant or even no effect on performance.

CHAPTER 7

CONCLUSION

7.1 Chapter Overview

The previous chapter of this study presents the theoretical as well as practical explanation of the empirical findings discussed in the analysis as well as practical implications, contribution of current research, limitations of the study and recommendation for future research directions. This chapter presents some of the significant findings of this current study by particularly examining the research objectives and highlighting its outcomes.

7.2 Addressing the Research Objectives

This study presents the conceptual model of EC capability by integrating new constructs that include a new combination of determinants, namely business resource with three underlying dimensions (innovative capacity, market orientation and strategic flexibility), human resources with three underlying dimensions (managerial expertise, top management support and learning capacity) and IT resources with two underlying dimensions (IT Infrastructure and EC resources). However, for the business performance construct, financial performance and non financial performance are included as underlying dimensions. This current study affirms that EC capability has significant relationships with business performance. This principally is the main objective of this research. By developing a vibrant EC capability the firm can achieve the competitive advantage that leads to better business performance. This study provides the empirical findings to answer the objectives of this research.

There are primarily three objectives of this study as stated in section 1.5. The key findings of the research objectives are st follow.

7.2.1 Objective One

To propose a model explaining how EC capability develops by utilizing organizational resources.

The main objective of this study was to develop a model of E-commerce capability by utilizing organizational resources. Three main organizational resources were examined to develop a model. Business resources factors (innovative capacity, market orientation and strategic flexibility), human resources factors (managerial expertise, top management support and learning capacity) and IT resources (IT infrastructure and EC resources) were integrated to develop a research model. The model is based on the combination of theoretical and empirical studies. The model was tested then for its validation. Several steps were taken to validate the model. After testing the model by using several statistical techniques and modifications, the validation has been achieved. Several statistical techniques were followed to examine the factors and relationships. The findings of the model shown that business resources, human resources and IT resources are the key predictor in successful online business processes. The findings of this study suggest that by deploying these resources to handle online business processes, the firm may achieve the better outcomes.

Hence, this study provides guidelines to the organizations to reorganize and regenerate the organizational resources that could help in developing EC capability which leads to EC success. Considering the key dimensions of the EC capability shown in this study may help the decision makers to avoid the EC technology disappointments and failure.

7.2.2 Objective Two

To find out the relationship between EC capability and business performance.

The second objective addresses the development of EC capability and its impact on business performance. The results show that the better deployment and utilization of organizational resources can develop the higher level of EC capability that leads to its success. It has been realized that EC technology alone may not give a sufficient outcomes, while considering the specific resources that deploys to improve its capability may have a strong influence on the outcomes of EC investments. Based on the results of this objective, the researcher concludes that with the integration, reconfiguration and deployment of specific organizational resources, the higher level of EC capability can be developed to EC success.

The purpose of the objective is to examine why some firms are getting advantages from EC technology while others are not. This current study enlightens the reason behind the success of EC implementation and usage by arguing that the better allocation of the resources foster to the higher level of EC capability that leads to its success.. However, the failure in this technology may occur as some firms pay no attention to its complementary resources. It is also considered in the previous studies that EC alone may not offer the advantages that firms intend to achieve by its implementation. Based on the results, current study supports this argument and points out that how EC influences positively on firms' business performance.

Furthermore, in this study, EC capability is found to have a strong relationship with business performance. This implies that the better EC capability development contributes significantly to better business performance and also indicates that the organizations should develop an efficient EC capability for conducting online business activities to achieve its full benefits. In this study business performance was measured by two attributes namely financial performance and non-financial performance. This may provide more insights to the organizations in analyzing the benefits of EC technology.

7.2.3 Objective Three

To examine the attributes of business, human and IT resources that provide a base for the development of EC capability.

The third objective of this study is to examine and explore the attributes of organizational resources that can be tested to deploy for an efficient EC capability. For this, business human and technology resources were scoped for this study. Furthermore, the attribute that examines the business, human and technology resources were found in the literature survey of this study as discussed in chapter 2. Innovative capacity, market orientation and strategic flexibility also were stated as underlying dimensions of business resources. Managerial expertise, top management support and learning capacity represent as human resources. IT resources and EC resources were examined as technology resources. Based on the results, each of the underlying dimensions shows a strong relationship with EC capability and it is established that the attributes of the business, human and technology resources contributes significantly in the development higher level of EC capability. This implies that firms need to invest and utilize the organizational resources to be successful in online business that can help in achieving better firm performance. The attributes such as innovative capacity, market orientation, strategic flexibility, top management support, learning capacity, IT infrastructure and EC resources should be flourished by the organizations to achieve the full advantages of EC. The attributes presented in this study are vital in making strategies for the successful implementation and usage of EC technology.

7.2.3 Concluding Comments

This study signifies a systematic approach to examine the utilization and reconfiguration of organizational resources that specifically deployed for EC capability development that predicts better business performance. Current study includes number of elements, incorporating the development of theoretical model, creation of instrument, participation of subjects for online business environment and understudied research population. This study also brought together various research

streams and the models that give more rigorous insights. All these features provide a significant strength to this study.

The results showed the validity of the theoretical model as applied to the domain of online business environment of Malaysian manufacturing industry. Consequently, when considering the measures of the attributes of organizational resources, it was found that business, human and IT resources were the significant predictors of EC capability for a better business performance. In addition, the results of this study enhanced our understanding of the nature and dimensionality of EC capability construct by itself and in conjunction with other organizational resources to determine EC success.

Based on the findings of this study, Malaysian manufacturing industry has shown the positive trend to use E-Commerce applications. Mostly small and medium enterprises are showing the interest to adopt the E-Commerce and take advantages from the government's E-Commerce plans. The impact of information and communication technologies has resulted changes in the society. Maintain well planed strategies among the businesses in Malaysia have provided entrance to new customers while mounting sales and profits. Due to new technologies, government initiatives and economic reforms, E-Commerce in Malaysia is moving towards an upward direction. Statistics shows that most of Malaysian internet users are students and professionals. Most of them have well media exposure, well educated and have good experience of internet which is making them to go online and purchase goods through internet. The current position of the internet users, online spending and rapid growth of new technologies shows that the internet user's buying behaviour is changing and users like to go online and make the transactions, which is affecting businesses in Malaysia and most of businesses are showing their interest to compete globally with the E-Commerce applications. However, the successful implementation of E-Commerce needs proper strategies and the ability of the firms to maintain their positions in digital business environment. Therefore, this study was undertaken to explore the attributes of E-Commerce capability that can be considered in making strategies for the successful E-commerce implementation.

As a final point, even though some of the outcomes and findings of the results are somewhat exploratory in nature, it is expected that findings and the implications of

this study may help not only the decision makers for the adoption and usage of this technology especially in Malaysian manufacturing industry, but also the researchers to assemble stronger theories to explain the important phenomenon of EC capabilities. The findings of this current study are useful to the practitioners as EC capability was found to have wide-ranging impacts on financial and non financial performance of a firm. However, at the outset, the development of EC capability as a strategic tool is contingent upon the successful usage and implementation of EC. Inherently, EC capability is equally important to the manufacturing industry as it is to other industries.

7.3 Limitation

This research has some limitations. First, this study tested the effect of business, human and technology resources on EC capability without any consideration for other financial resources. This study focused on the manufacturing firms who already using EC applications, this was also the reason to avoid financial resources. In order to develop a better understanding of the comprehensive effect of EC in initial phase of adoption, these resources should be tested simultaneously. However, due to the length of the instrument of this study (appendix A), these variable should be tested in separate questionnaires. Second, this study only focuses on the internet based forms of EC activities and does not consider non-internet forms of EC such as EDI. This approach was followed intentionally to isolate the impacts of internet-based systems. There are other indicators of business performance in online business environment that are not included in this study. These indicators include order processing cycle, operating costs and supply chain performance. To obtain better results of EC capability, these performance indicators should also include with business performance. Fourth, this study focuses on manufacturing industries not including different sample, or all Malaysian industries which may have different outcomes of EC capability. Fifth, researchers have expanded studies on EC capability in a cross-sectional context. Current study was conducted in Malaysia, thus the research findings were based on a setting that differs from that of other countries in terms of cultural background, socio-economic factors and technologies which invariably, have

influenced EC implementation. Maintaining homogeneity of the sample was the reason that this current study confined the data collection from amongst Malaysian manufacturing firms.

7.4 Future Research Directions

The limitations of this study discussed in previous section offer an extensive opportunity for the extension of current study. First, the construct of financial resources can be developed and tested in a model, most preferably in the initial stage of EC adoption. Testing these constructs together with the model of current study may offer a broader examination of the outcomes of EC capability that may increase the understanding and the model fit.

Second, the current study were only managed to scratch the surface of what determined the EC capability. Much further study is needed until we have a clear picture of other resources that influence on online business process. The study focused particularly on manufacturing industries. This study could be considered as the stepping stone for other industries in order to get more theoretical and empirical insights.

Third, the factor of business performance was measured by some of the metrics which were found in the literature. Future studies could expand the business performance construct including more indicators such as operating performance, transactions costs and supply chain performance, etc. that are prevalent in the previous studies.

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APPENDIX A

Questionnaire

E-Commerce capability impact on business performance

Definition(s) Electronic Commerce: EC means to conduct business online and it refers to the commercial transaction between and among the consumers, customers and organizations via online means.

RESPONDENT AND COMPANY GENERAL QUESTIONS

Gender	Male ☐ Female ☐
Position	CEO ☐ Directo☐ General Manager ☐ Manager ☐ Officer☐ Other ☐
Education	Diploma ☐ Bachelor ☐ Maste☐ PhD ☐

Type of Sector	Manufacturing ☐ Service ☐ Other ☐
Nature of the Business	

Conducting Business ☐	
Locally ☐	Internationally ☐
Both	

Q5 What functionalities of software used by Our firm? (tick more than one)				
a) E-Ordering	☐	d) E-Catalogue	☐	
b) E-Invoicing	☐	e) E-Tendering	☐	
c) E-Payment	☐	f) E-Auction	☐	
Q6 How long E-commerce has been implemented or using by Our firm?				
a) 1 year	☐	e) 4-5 years	☐	
b) 1-2 years	☐	f) More than 5 years	☐	
c) 2-3 years	☐		☐	
d) 3-4 years	☐		☐	

Q8 Annual transaction of E-procurement (including direct and indirect) for the last financial year?			
a) Less than RM100,000	☐	e) RM500,000-RM750,000	☐
b) RM100,000-RM200,000	☐	f) RM750,000-RM1 Million	☐
c) RM200,000-RM300,000	☐	g) RM1-RM5 Million	☐
d) RM300,000-RM500,000	☐	h) More than RM5 Million	☐

Q12 How many full time employees are there in Our firm?			
a) Less than 50	☐	f) 250-300	☐
b) 50-100	☐	g) 300-400	☐
c) 100-150	☐	h) 400-500	☐
d) 150-200	☐	i) More than 500	☐
e) 200-250	☐		☐
Q13 Average annual revenue of Our firm?			
a) Less than RM200,000	☐	f) RM10-RM25 Million	☐
b) RM200,000-RM500,000	☐	g) RM25-RM50 Million	☐
c) RM500,000-RM1 Million	☐	h) RM50-RM100 Million	☐
d) RM1-RM5 Million	☐	i) RM1-RM50 Billion	☐
e) RM5-RM10 Million	☐	j) More than 50 Billion	☐

Please use the following scale

strongly disagree	disagree	somewhat disagree	neutral	somewhat agree	agree	strongly agree
1	2	3	4	5	6	7

The level of Innovative capacity of your firm

Items							
1. Our company is proactive in developing new technologies and customer applications.	1	2	3	4	5	6	7
2. Our company is proactive in the innovations of products/services	1	2	3	4	5	6	7
3. Our company is proactive in the innovations of processes	1	2	3	4	5	6	7
4. Our company is proactive in the innovations	1	2	3	4	5	6	7

of its organization.							

The level of Market Orientation of your firm

Items
1. Our Firm uses market research studies
2. Our Firm segments its online customers
3. Our firm offering the customer retention programs to attract more customers
4. Our firm maintains personalized relationship with each customers
5. Our strategy to achieve competitive advantage is based on the comprehension of customer needs.
6. Our firm often examines costumers and market segmentations where our competitors are ahead.

The level of Strategic flexibility of your firm

Items							
1. We redesigned our process management to fit e-Commerce	1	2	3	4	5	6	7
2. We redesign our marketing and sales process to fit e-Commerce	1	2	3	4	5	6	7
3. We have clearly identified our e-Commerce projects priorities	1	2	3	4	5	6	7
4. Our e-Commerce planning is integrated with overall business plan.	1	2	3	4	5	6	7
5. We have a long term strategic plan for e-Commerce.	1	2	3	4	5	6	7
6. We actively research the best Web practices of other Web sites to bring new changes.	1	2	3	4	5	6	7

The level of Managerial Expertise of your firm

Items							
1.Our management has extensive experience in ICT usage.	1	2	3	4	5	6	7
2. Our organization always acquires sufficient number of ICT personnel.	1	2	3	4	5	6	7
3. Managers in Our company understand how employees from all function can contribute to deliver customer value.	1	2	3	4	5	6	7
4. Our managers are capable to fit e-Commerce in the culture of Our company.	1	2	3	4	5	6	7
5. we understand how employees from all function can contribute to deliver customer value	1	2	3	4	5	6	7

The level of Top Management Support of your firm

Items							
1. Top management have clearly shown their interest in e-Commerce activities.	1	2	3	4	5	6	7
2. Our top management reacts quickly to the action of our competitors.	1	2	3	4	5	6	7
3. Our top management always concerned about meeting customer's needs.	1	2	3	4	5	6	7
4. Our top management is aware of the benefits of E-Commerce.	1	2	3	4	5	6	7
5. Our top management is capable of integrating firm's resources to utilize E-Commerce value.	1	2	3	4	5	6	7

The level of Learning Capacity of your firm

Items							
1. Information about our customer is communicated freely throughout our company	1	2	3	4	5	6	7
2. In our company sales people share a lot of information about the competition.	1	2	3	4	5	6	7
3. In our organization knowledge can easily acquired from experts and co-workers.	1	2	3	4	5	6	7
4. In our organization knowledge can be acquired easily through formal documents and manual.	1	2	3	4	5	6	7
5. In our organization it is easy to get face-to-face advice from experts	1	2	3	4	5	6	7
6. Our firms often use the knowledge management and knowledge sharing approaches.	1	2	3	4	5	6	7

The level of IT Infrastructure of your firm

Items							
1. Our firm's IT infrastructure efficiently support E-Commerce	1	2	3	4	5	6	7
2. Our firm is well computerized with high internet connectivity	1	2	3	4	5	6	7
3. Our firm is concerned with getting most up-to date IT applications	1	2	3	4	5	6	7
4. We have formal strategic plan for E-	1	2	3	4	5	6	7

Commerce							
5. We have set of clear priorities for our E-Commerce projects.	1	2	3	4	5	6	7
6. We measure on a regular basis the effectiveness of E-Commerce projects.	1	2	3	4	5	6	7
7. Our company using IT applications for the rapid response of environmental pressure.	1	2	3	4	5	6	7
8. Our firm uses an external information network to identify our requirement for IT	1	2	3	4	5	6	7

The level of e-Commerce Resources of your firm

Items							
1. Our website publishing basic company's information with interactivity.	1	2	3	4	5	6	7
2. Our website publishing basic company's information without interactivity.	1	2	3	4	5	6	7
3. Our website has a capability of accepting queries and form entry from users	1	2	3	4	5	6	7
4. Our website has a features of online transactions and it allows secure transactions	1	2	3	4	5	6	7
5. Our website facilitates suppliers, customers and other back office system	1	2	3	4	5	6	7
6. Our website loads quickly and it crashes infrequently	1	2	3	4	5	6	7

Financial Performance after implementation E-commerce

Items							
1. Since we implement E-Commerce in our business, its affecting positively to achieve sales projection	1	2	3	4	5	6	7
2. Since we implement E-Commerce in our business our sales growth has been outstanding	1	2	3	4	5	6	7
3. Since we implement E-Commerce in our business, return on investment has improved dramatically	1	2	3	4	5	6	7
4. Since we implement E-Commerce in our business, return on investment has improved dramatically	1	2	3	4	5	6	7
5. Since we implement E-Commerce in	1	2	3	4	5	6	7

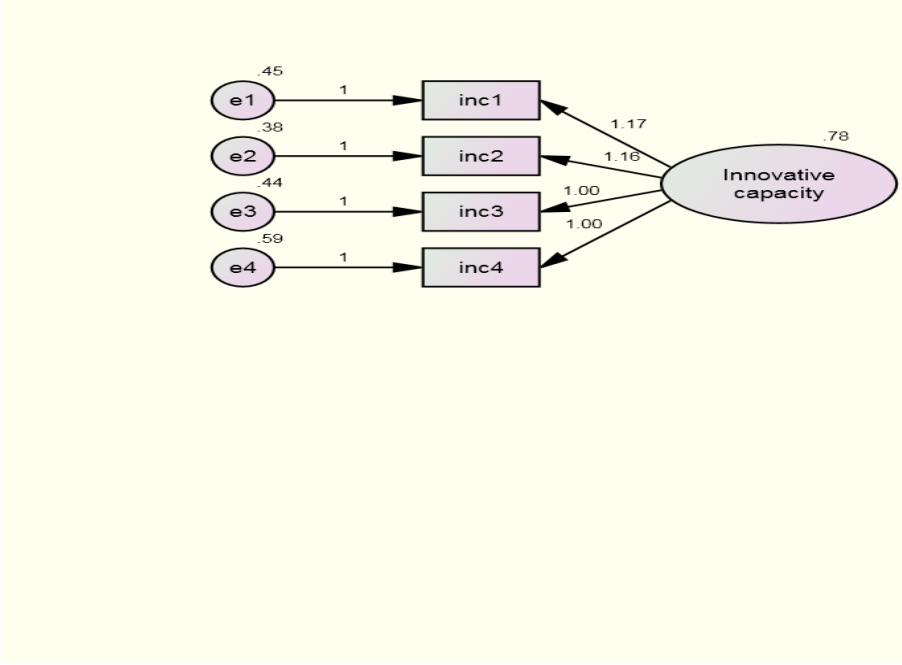
our business, profit is relative to expectations							
6. Since we implement E-Commerce in our business, our cost position is relative to expectations.	1	2	3	4	5	6	7

Non-Financial Performance after implementation of E-commerce

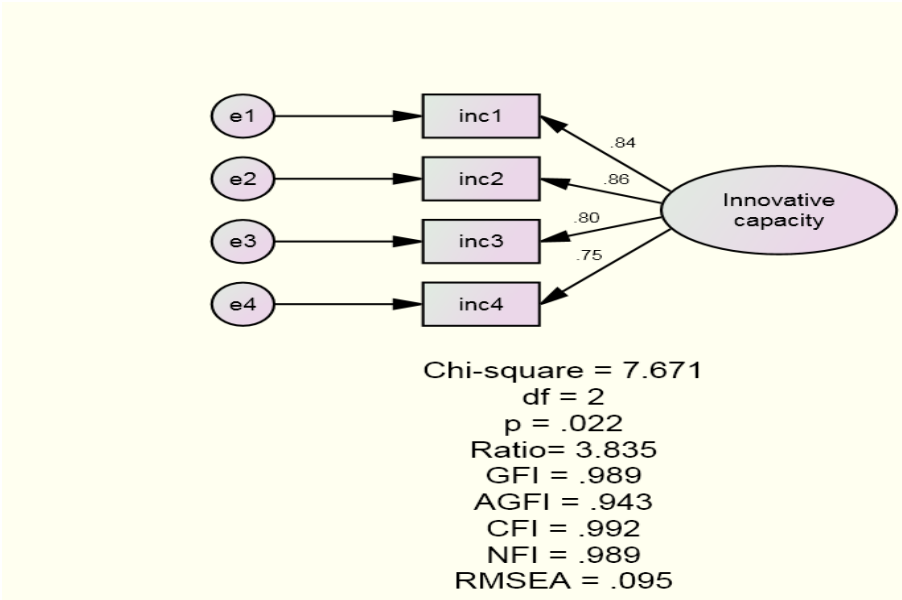
Items							
1. Since we implement E-Commerce in our business, the customers are showing satisfaction.	1	2	3	4	5	6	7
2. Since we implement E-Commerce in our business, our firm is providing the rapid after sales services	1	2	3	4	5	6	7
3. Since we implement E-Commerce in our business, the delivery of products and services is relative to expectation	1	2	3	4	5	6	7
4. Since we implement E-Commerce in our business, our product quality has been improved	1	2	3	4	5	6	7
5. Since we implement E-Commerce in our business, our business is more reliable	1	2	3	4	5	6	7
6. Since we implement E-Commerce in our business, our firms retained the customer based.	1	2	3	4	5	6	7

APPENDIX B

Innovative Capacity

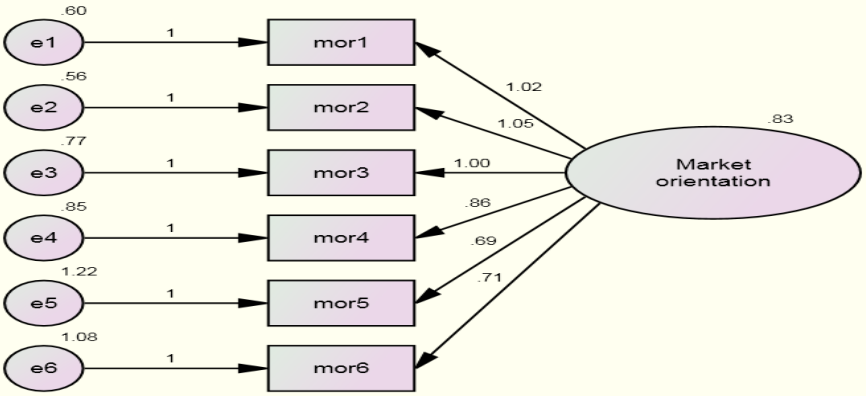


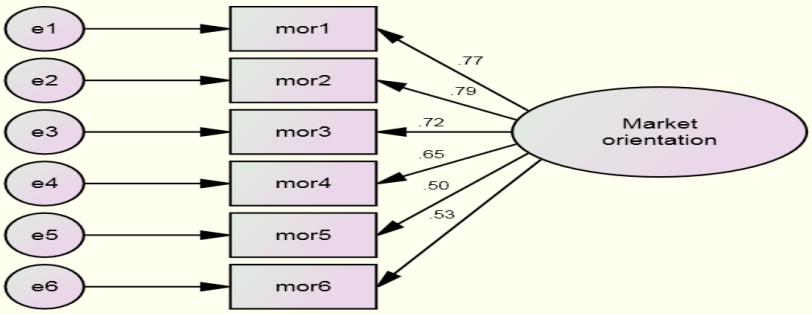
Unstandardized



Chi-square = 7.671
df = 2
p = .022
Ratio= 3.835
GFI = .989
AGFI = .943
CFI = .992
NFI = .989
RMSEA = .095

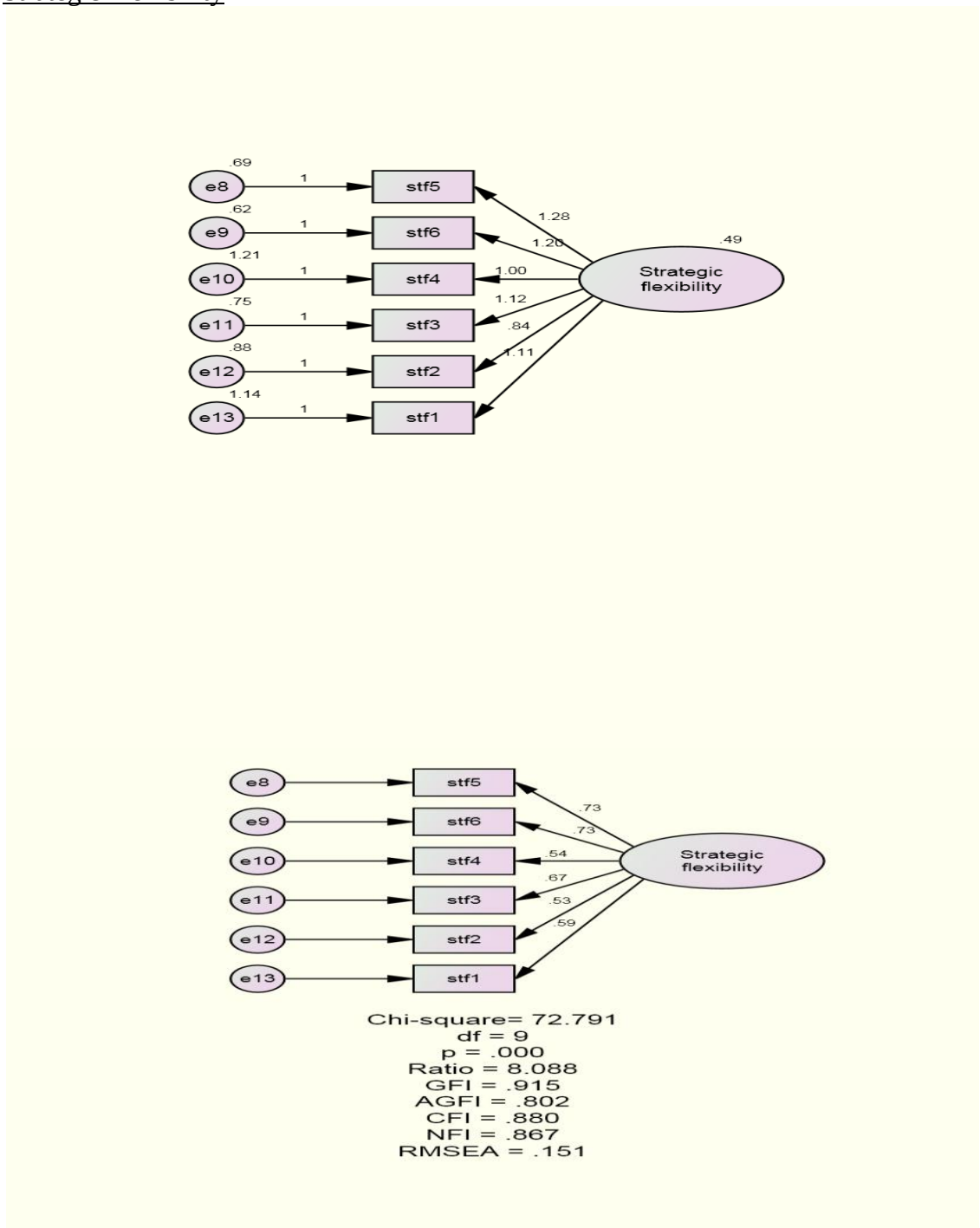
Market Orientation



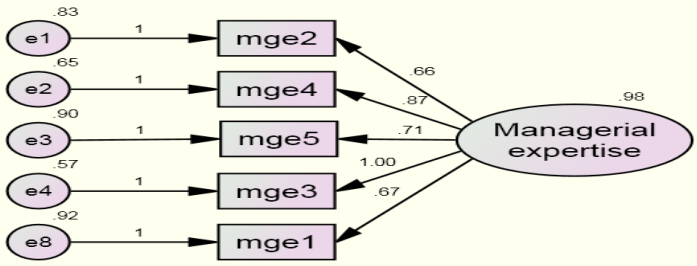


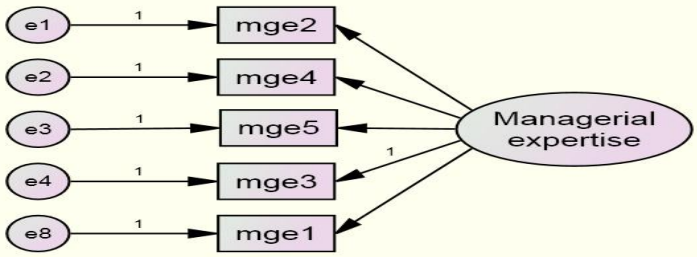
Chi-square = 151.542
df = 9
p = .000
Ratio = 16.838
GFI = .839
AGFI = .624
CFI = .360
NFI = .792
RMSEA = .226

Strategic Flexibility



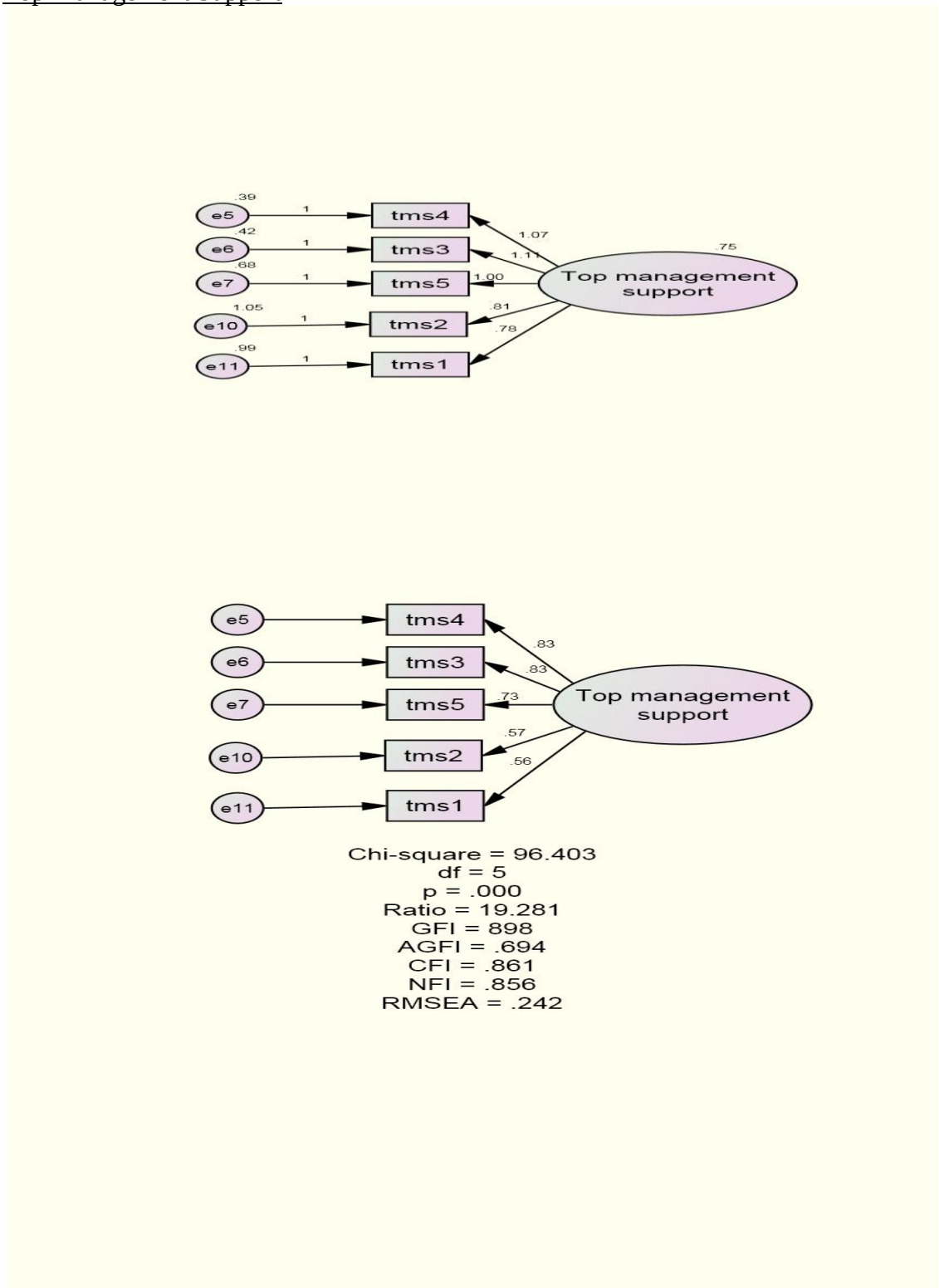
Managerial Expertise



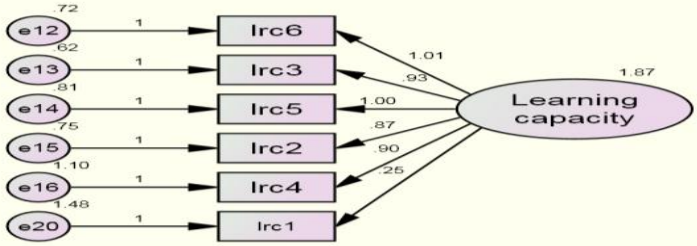


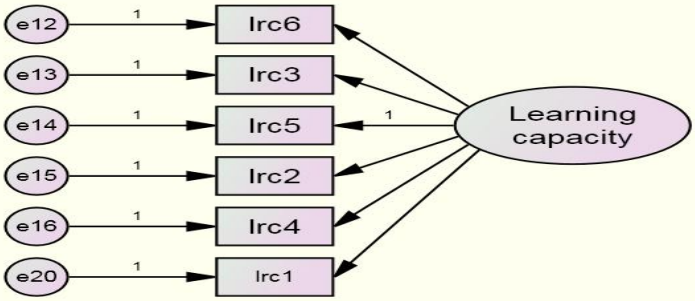
Chi-square = 40.628
df = 5
p = .000
Ratio = 8.126
GFI = .948
AGFI = .843
CFI = .919
NFI = .909
RMSEA = .151

Top Management Support



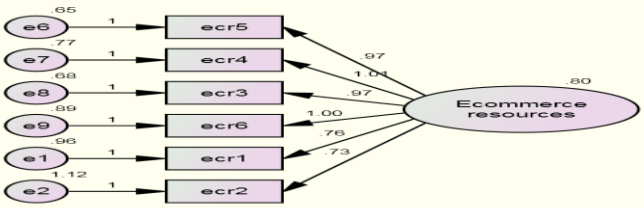
Learning Capacity

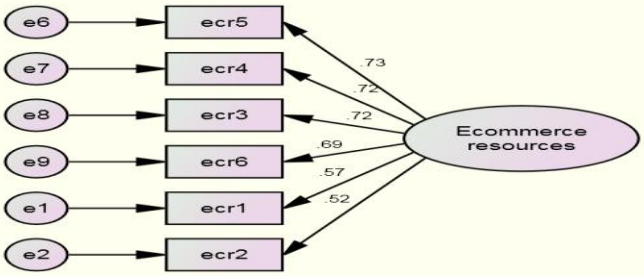




Chi-square = 46.420
df = 9
p = .000
Ratio = 5.158
GFI = .955
AGFI = .895
CFI = .965
NFI = .957
RMSEA = .116

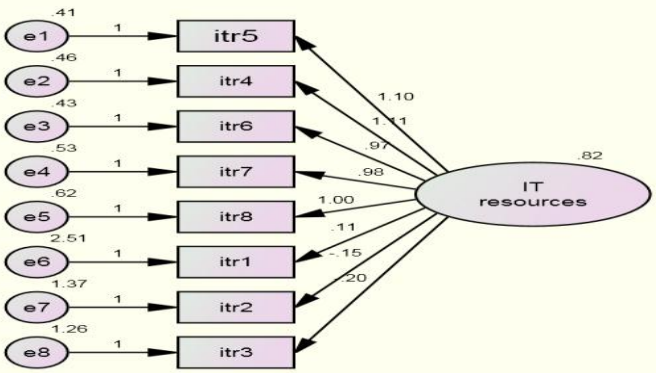
E-commerce Resources

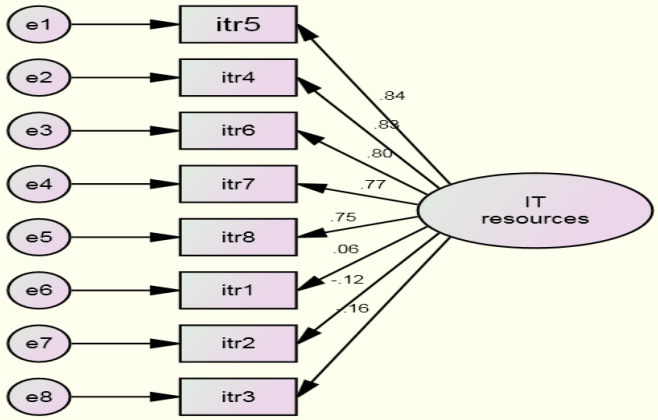




Chi-square = 128.493
df = 9
p = .000
Ratio = 14.277
GFI = .880
AGFI = .720
CFI = .821
NFI = .812
RMSEA = .207

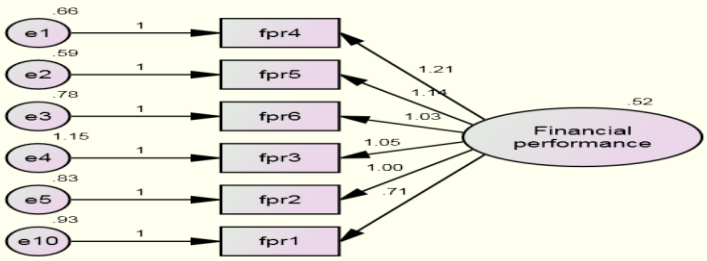
IT Infrastructure

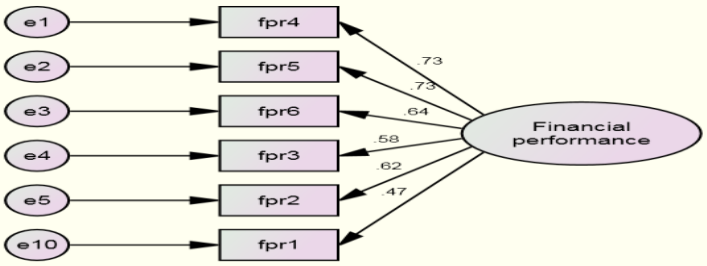




Chi-square = 214.386
df = 20
p = .000
Ratio = 10.719
GFI = .864
AGFI = .755
CFI = .821
NFI = .808
RMSEA = .177

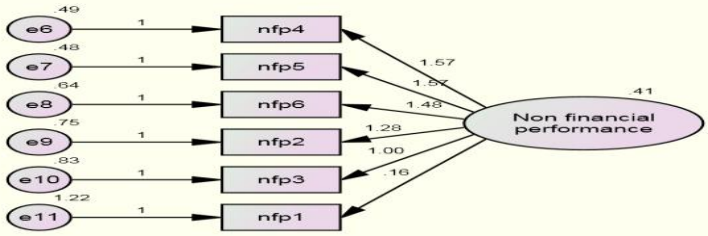
Financial Performance

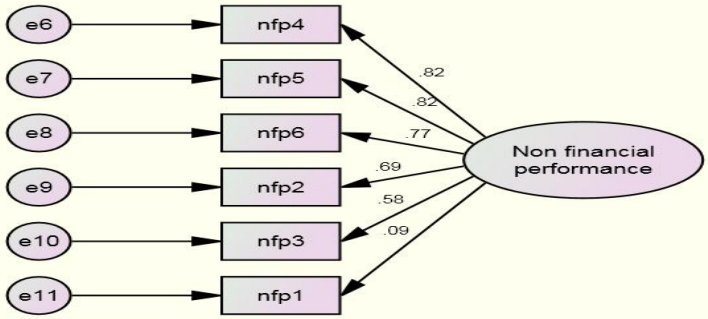




Chi-Square = 64.266
df = 9
p = .000
Ratio = 7.141
GFI = .935
AGFI = .849
CFI = .894
NFI = .880
RMSEA = .141

Non-financial Performance

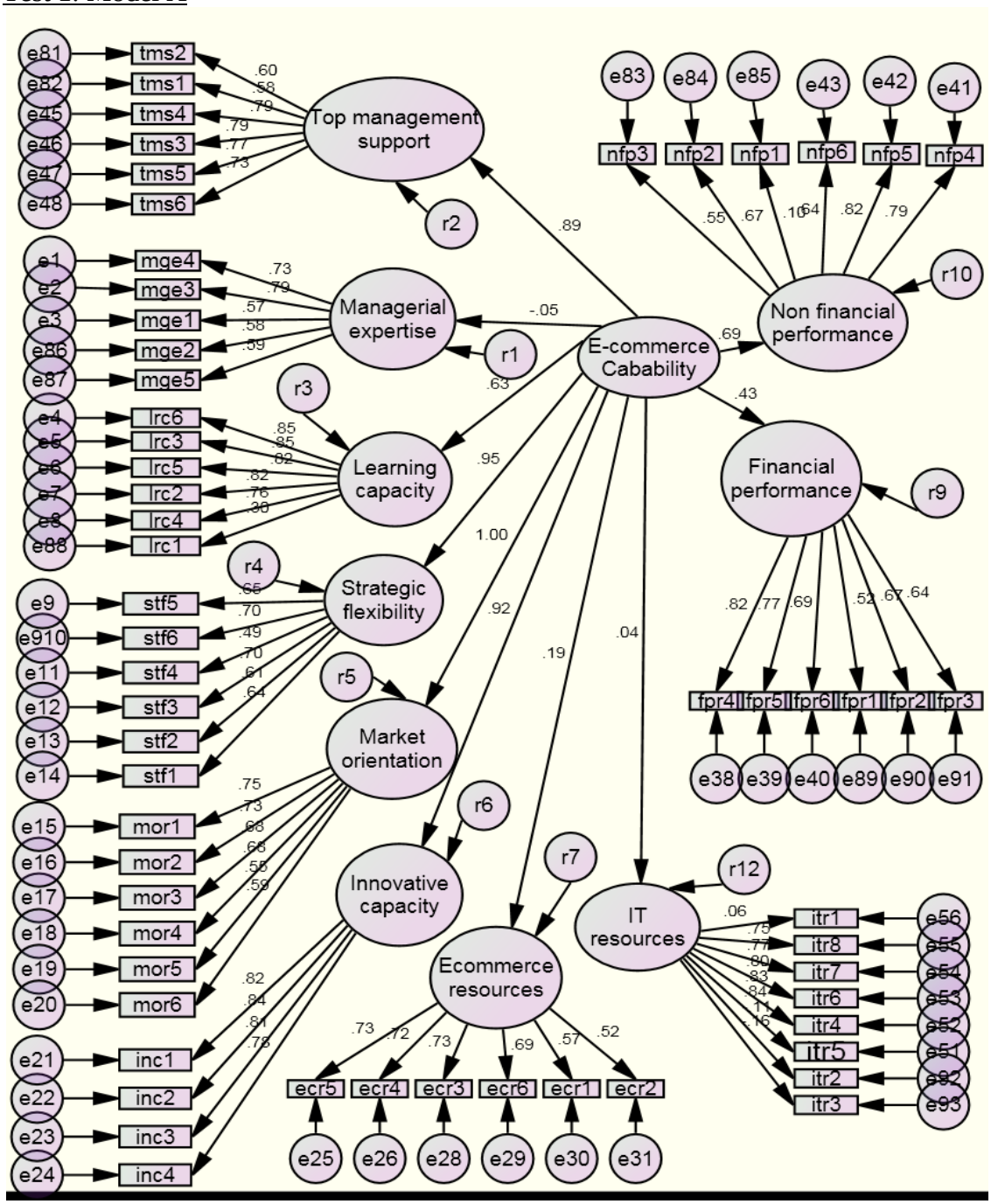




Chi-square = 30.978
df = 9
p = .000
Ratio = 3.442
GFI = .966
AGFI = .922
CFI = .967
NFI = .955
RMSEA = .089

APPENDIX C

Test 1: Model A



(1) Model Fit Summary

(2) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	127	4770.449	1643	.000	2.903
Saturated model	1770	.000	0		
Independence model	59	12488.260	1711	.000	7.299

(3) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.260	.660	.634	.613
Saturated model	.000	1.000		
Independence model	.447	.170	.141	.164

(4) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.618	.602	.712	.698	.710
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(5) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.960	.593	.682
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(6) NCP

Model	NCP	LO 90	HI 90
Default model	3127.449	2924.399	3338.003
Saturated model	.000	.000	.000
Independence model	10777.260	10425.749	11135.357

(7) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	15.339	10.056	9.403	10.733
Saturated model	.000	.000	.000	.000
Independence model	40.155	34.654	33.523	35.805

(8) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.078	.076	.081	.000
Independence	.142	.140	.145	.000

Model	RMSEA	LO 90	HI 90	PCLOSE
model				

(9) AIC

Model	AIC	BCC	BIC	CAIC
Default model	5024.449	5085.166	5499.811	5626.811
Saturated model	3540.000	4386.215	10165.116	11935.116
Independence model	12606.260	12634.467	12827.097	12886.097

(10) ECVI

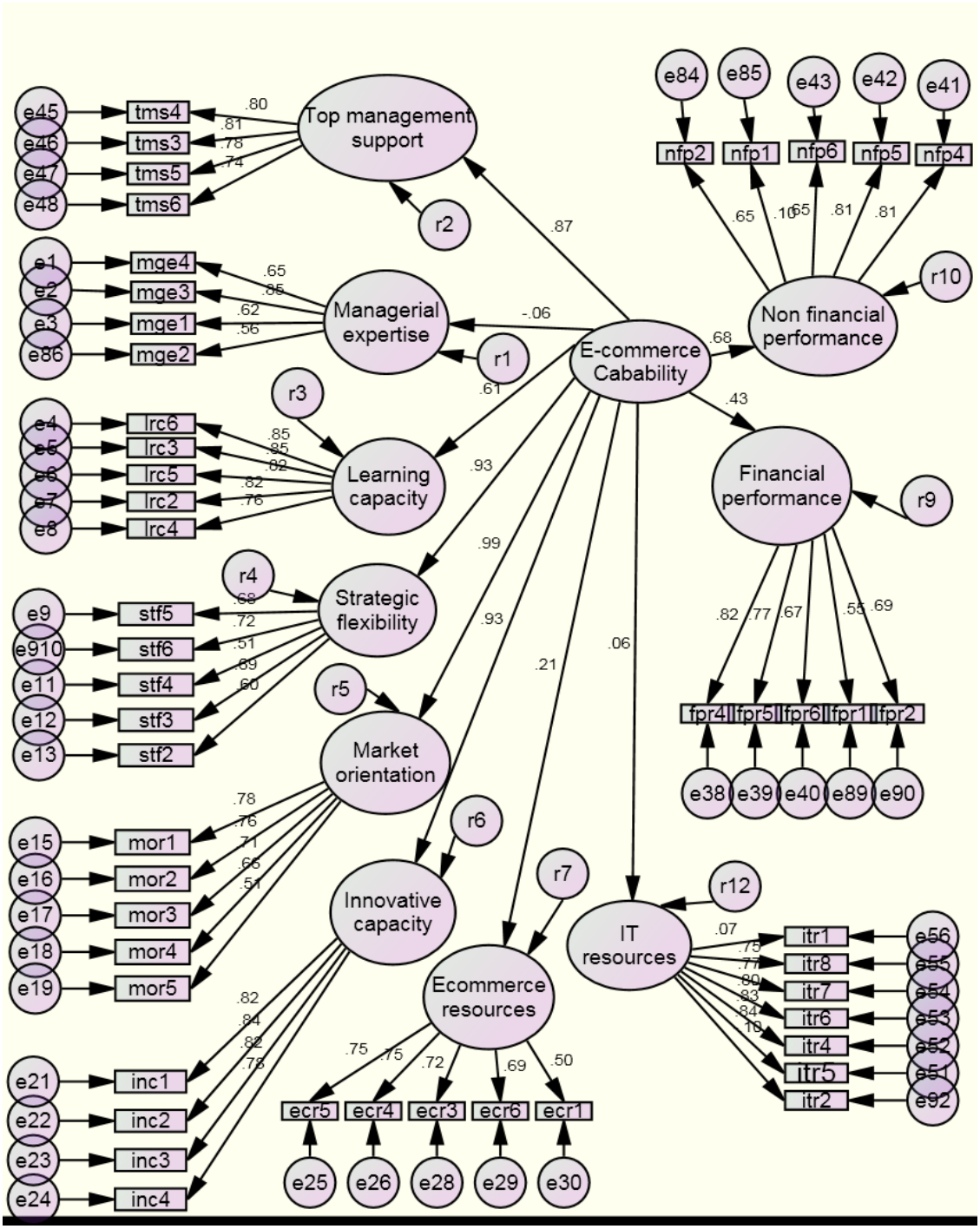
Model	ECVI	LO 90	HI 90	MECVI
Default model	16.156	15.503	16.833	16.351
Saturated model	11.383	11.383	11.383	14.104
Independence model	40.535	39.404	41.686	40.625

(11) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	114	116
Independence model	46	47

Minimization:	.247
Miscellaneous:	14.740
Bootstrap:	.000
Total:	14.987

Test 2: Model A



(13)
(14)
(15)
(16) Model Fit Summary
(17) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	107	3248.922	1118	.000	2.906
Saturated model	1225	.000	0		
Independence model	49	10087.666	1176	.000	8.578

(18) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.262	.708	.680	.646
Saturated model	.000	1.000		
Independence model	.465	.188	.154	.181

(19) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.678	.661	.762	.748	.761
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(20) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.951	.644	.723
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(21) NCP

Model	NCP	LO 90	HI 90
Default model	2130.922	1964.027	2305.373
Saturated model	.000	.000	.000
Independence model	8911.666	8594.310	9235.562

(22) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	10.447	6.852	6.315	7.413
Saturated model	.000	.000	.000	.000
Independence model	32.436	28.655	27.634	29.696

(23) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.078	.075	.081	.000

Model	RMSEA	LO 90	HI 90	PCLOSE
Independence model	.156	.153	.159	.000

(24) AIC

Model	AIC	BCC	BIC	CAIC
Default model	3462.922	3503.919	3863.424	3970.424
Saturated model	2450.000	2919.349	7035.179	8260.179
Independence model	10185.666	10204.440	10369.074	10418.074

(25) ECVI

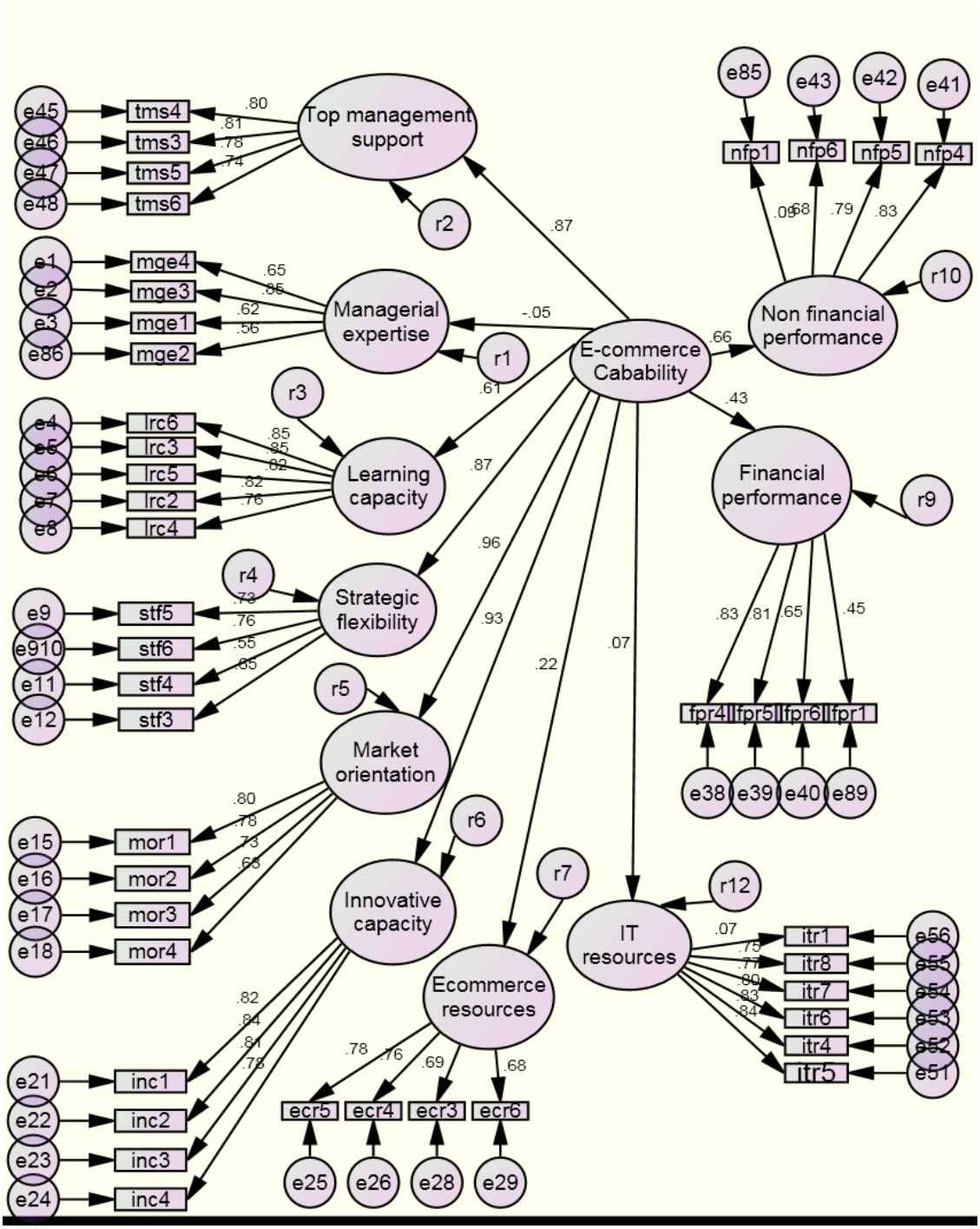
Model	ECVI	LO 90	HI 90	MECVI
Default model	11.135	10.598	11.696	11.267
Saturated model	7.878	7.878	7.878	9.387
Independence model	32.751	31.731	33.793	32.812

(26) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	115	118
Independence model	39	40

Minimization:	.170
Miscellaneous:	7.780
Bootstrap:	.000
Total:	7.950

Test 3: Model A



(28)
(29)
(30)
(31) Model Fit Summary
(32) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	95	2411.396	851	.000	2.834
Saturated model	946	.000	0		
Independence model	43	8720.212	903	.000	9.657

(33) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.252	.746	.717	.671
Saturated model	.000	1.000		
Independence model	.480	.204	.167	.195

(34) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.723	.707	.802	.788	.800
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(35) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.942	.682	.754
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(36) NCP

Model	NCP	LO 90	HI 90
Default model	1560.396	1417.546	1710.836
Saturated model	.000	.000	.000
Independence model	7817.212	7521.335	8119.598

(37) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	7.754	5.017	4.558	5.501
Saturated model	.000	.000	.000	.000
Independence model	28.039	25.136	24.184	26.108

(38) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.077	.073	.080	.000

Model	RMSEA	LO 90	HI 90	PCLOSE
Independence model	.167	.164	.170	.000

(39) AIC

Model	AIC	BCC	BIC	CAIC
Default model	2601.396	2632.707	2956.981	3051.981
Saturated model	1892.000	2203.790	5432.881	6378.881
Independence model	8806.212	8820.384	8967.161	9010.161

(40) ECVI

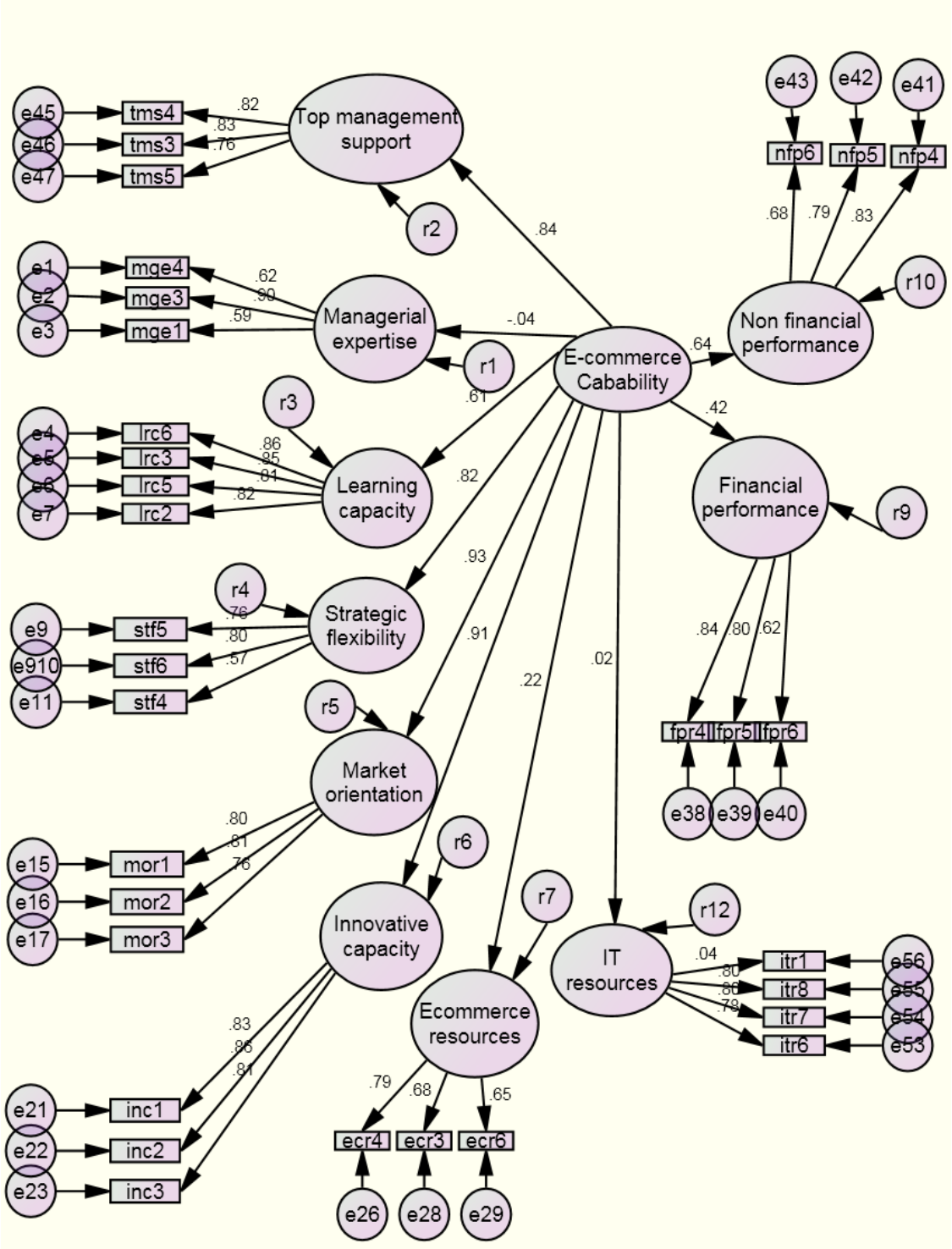
Model	ECVI	LO 90	HI 90	MECVI
Default model	8.365	7.905	8.848	8.465
Saturated model	6.084	6.084	6.084	7.086
Independence model	28.316	27.364	29.288	28.361

(41) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	119	123
Independence model	35	36

Minimization:	.161
Miscellaneous:	5.518
Bootstrap:	.000
Total:	5.679

Test 4: Model A



(43)
(44)
(45)
(46) Model Fit Summary
(47) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	73	1399.922	455	.000	3.077
Saturated model	528	.000	0		
Independence model	32	5918.336	496	.000	11.932

(48) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.265	.799	.767	.689
Saturated model	.000	1.000		
Independence model	.500	.249	.201	.234

(49) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.763	.742	.827	.810	.826
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(50) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.917	.700	.757
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(51) NCP

Model	NCP	LO 90	HI 90
Default model	944.922	836.042	1061.399
Saturated model	.000	.000	.000
Independence model	5422.336	5177.859	5673.277

(52) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	4.501	3.038	2.688	3.413
Saturated model	.000	.000	.000	.000
Independence model	19.030	17.435	16.649	18.242

(53) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.082	.077	.087	.000
Independence model	.187	.183	.192	.000

(54) AIC

Model	AIC	BCC	BIC	CAIC
Default model	1545.922	1563.253	1819.162	1892.162
Saturated model	1056.000	1181.353	3032.306	3560.306
Independence model	5982.336	5989.933	6102.112	6134.112

(55) ECVI

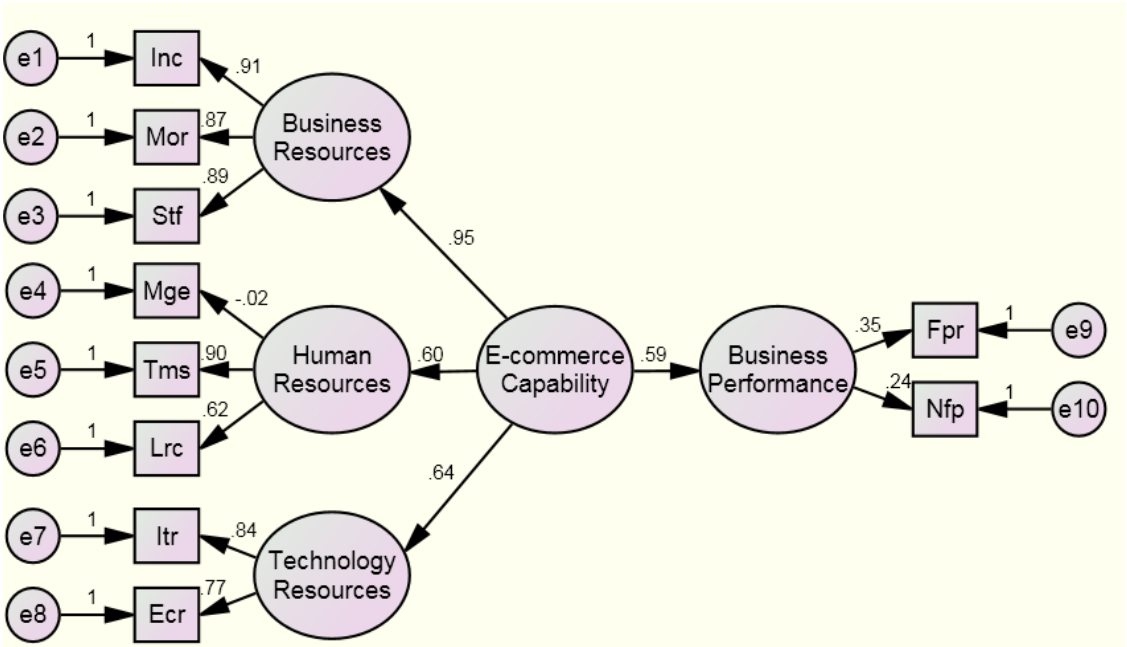
Model	ECVI	LO 90	HI 90	MECVI
Default model	4.971	4.621	5.345	5.027
Saturated model	3.395	3.395	3.395	3.799
Independence model	19.236	18.450	20.043	19.260

(56) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	113	118
Independence model	29	31

Minimization:	.099
Miscellaneous:	6.172
Bootstrap:	.000
Total:	6.271

Test 1: Model A



Chi-square = 1182.684
df = 519
p = .000
Ratio = 2.279
GFI = .838
AGFI = 814
CFI = .893
NFI = .827
RMSEA = . 064

(58)
(59)
(60)
(61)
(62) Model Fit Summary
(63) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	76	1182.684	519	.000	2.279
Saturated model	595	.000	0		
Independence model	34	6826.292	561	.000	12.168

(64) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.190	.838	.814	.731
Saturated model	.000	1.000		
Independence model	.475	.226	.179	.213

(65) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.827	.813	.895	.885	.894
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(66) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.925	.765	.827
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(67) NCP

Model	NCP	LO 90	HI 90
Default model	663.684	567.550	767.524
Saturated model	.000	.000	.000
Independence model	6265.292	6002.376	6534.669

(68) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	3.803	2.134	1.825	2.468
Saturated model	.000	.000	.000	.000
Independence model	21.949	20.146	19.300	21.012

(69) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.064	.059	.069	.000
Independence model	.189	.185	.194	.000

(70) AIC

Model	AIC	BCC	BIC	CAIC
Default model	1334.684	1353.959	1619.152	1695.152
Saturated model	1190.000	1340.906	3417.087	4012.087
Independence model	6894.292	6902.915	7021.554	7055.554

(71) ECVI

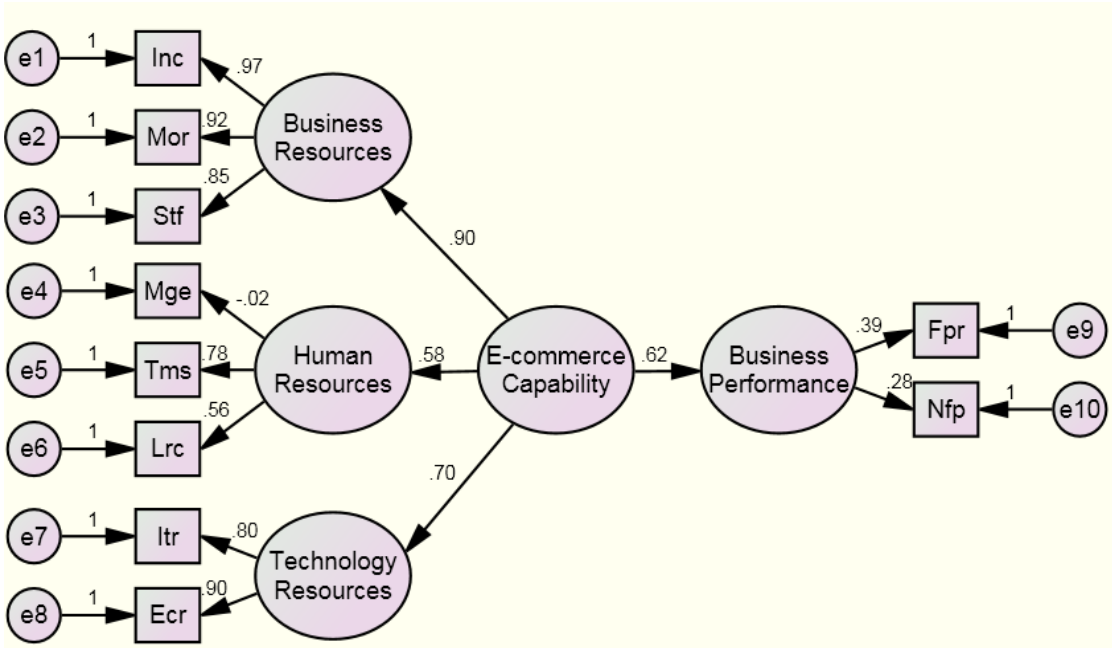
Model	ECVI	LO 90	HI 90	MECVI
Default model	4.292	3.982	4.625	4.354
Saturated model	3.826	3.826	3.826	4.312
Independence model	22.168	21.323	23.034	22.196

(72) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	151	157
Independence model	29	30

Minimization:	.081
Miscellaneous:	9.062
Bootstrap:	.000
Total:	9.143

Test 2 of Model A



Chi-square = 955.018
df = 455
p = .000
Ratio = 2.099
GFI = .856
AGFI = 833
CFI = .908
NFI = .838
RMSEA = . 059

(74)
(75)
(76)
(77) Model Fit Summary
(78) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	73	955.018	455	.000	2.099
Saturated model	528	.000	0		
Independence model	32	5904.429	496	.000	11.904

(79) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.189	.856	.833	.737
Saturated model	.000	1.000		
Independence model	.460	.257	.209	.242

(80) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.838	.824	.908	.899	.908
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(81) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.917	.769	.833
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(82) NCP

Model	NCP	LO 90	HI 90
Default model	500.018	415.128	592.657
Saturated model	.000	.000	.000
Independence model	5408.429	5164.257	5659.067

(83) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	3.071	1.608	1.335	1.906
Saturated model	.000	.000	.000	.000
Independence model	18.985	17.390	16.605	18.196

(84) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.059	.054	.065	.002
Independence model	.187	.183	.192	.000

(85) AIC

Model	AIC	BCC	BIC	CAIC
Default model	1101.018	1118.349	1374.257	1447.257
Saturated model	1056.000	1181.353	3032.306	3560.306
Independence model	5968.429	5976.027	6088.206	6120.206

(86) ECVI

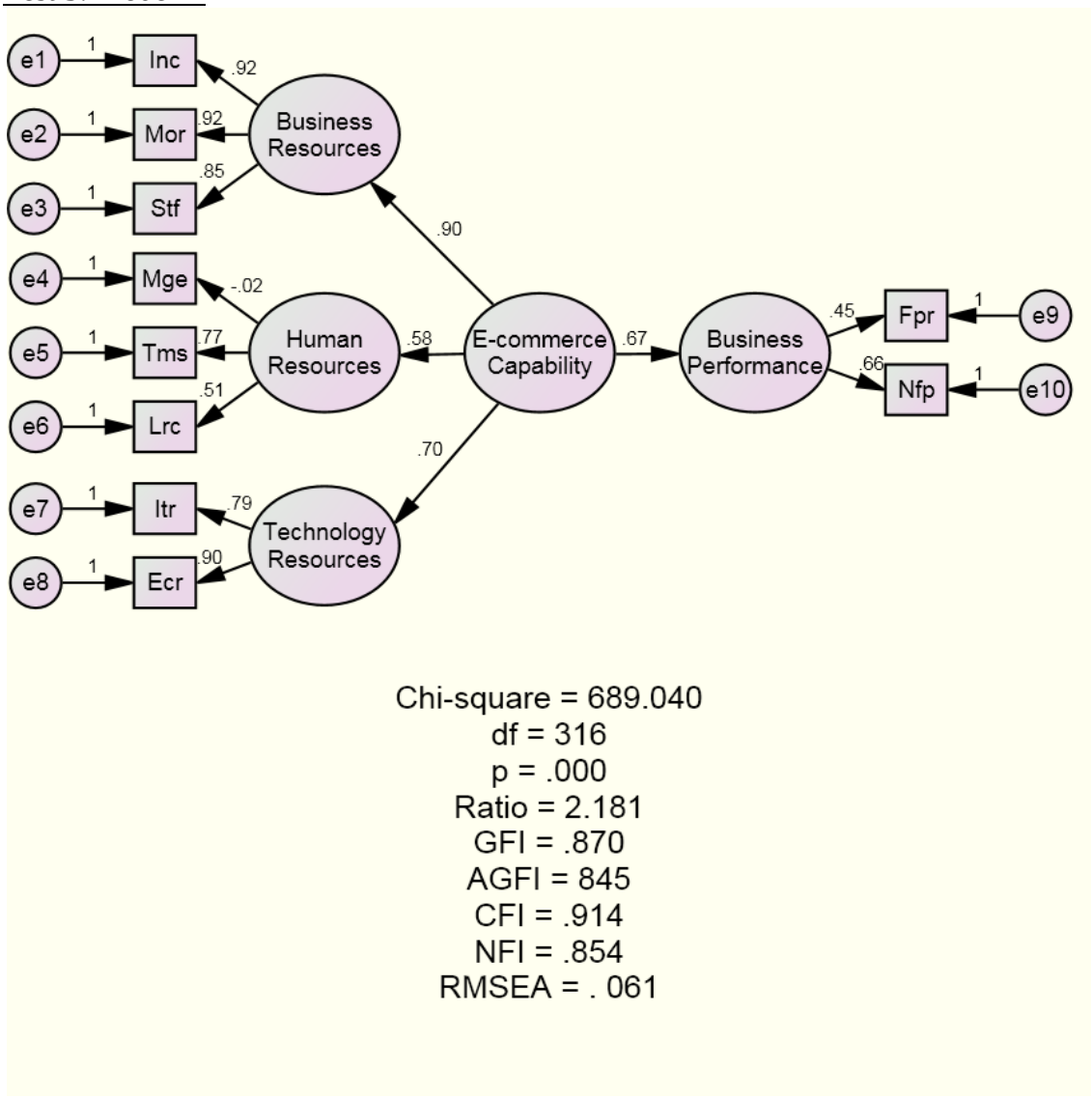
Model	ECVI	LO 90	HI 90	MECVI
Default model	3.540	3.267	3.838	3.596
Saturated model	3.395	3.395	3.395	3.799
Independence model	19.191	18.406	19.997	19.216

(87) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	165	172
Independence model	29	31

Minimization:	.068
Miscellaneous:	7.848
Bootstrap:	.000
Total:	7.916

Test 3: Model B



(89)
(90)
(91)
(92) Model Fit Summary
(93) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	62	689.040	316	.000	2.181
Saturated model	378	.000	0		
Independence model	27	4705.369	351	.000	13.406

(94) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.189	.870	.845	.727

Model	RMR	GFI	AGFI	PGFI
Saturated model	.000	1.000		
Independence model	.458	.287	.233	.267

(95) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.854	.837	.915	.905	.914
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(96) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.900	.768	.823
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(97) NCP

Model	NCP	LO 90	HI 90
Default model	373.040	301.064	452.752
Saturated model	.000	.000	.000
Independence model	4354.369	4136.512	4579.509

(98) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	2.216	1.199	.968	1.456
Saturated model	.000	.000	.000	.000
Independence model	15.130	14.001	13.301	14.725

(99) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.062	.055	.068	.001
Independence model	.200	.195	.205	.000

(100) AIC

Model	AIC	BCC	BIC	CAIC
Default model	813.040	825.309	1045.106	1107.106
Saturated model	756.000	830.799	2170.855	2548.855
Independence model	4759.369	4764.712	4860.430	4887.430

(101) ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	2.614	2.383	2.871	2.654
Saturated model	2.431	2.431	2.431	2.671

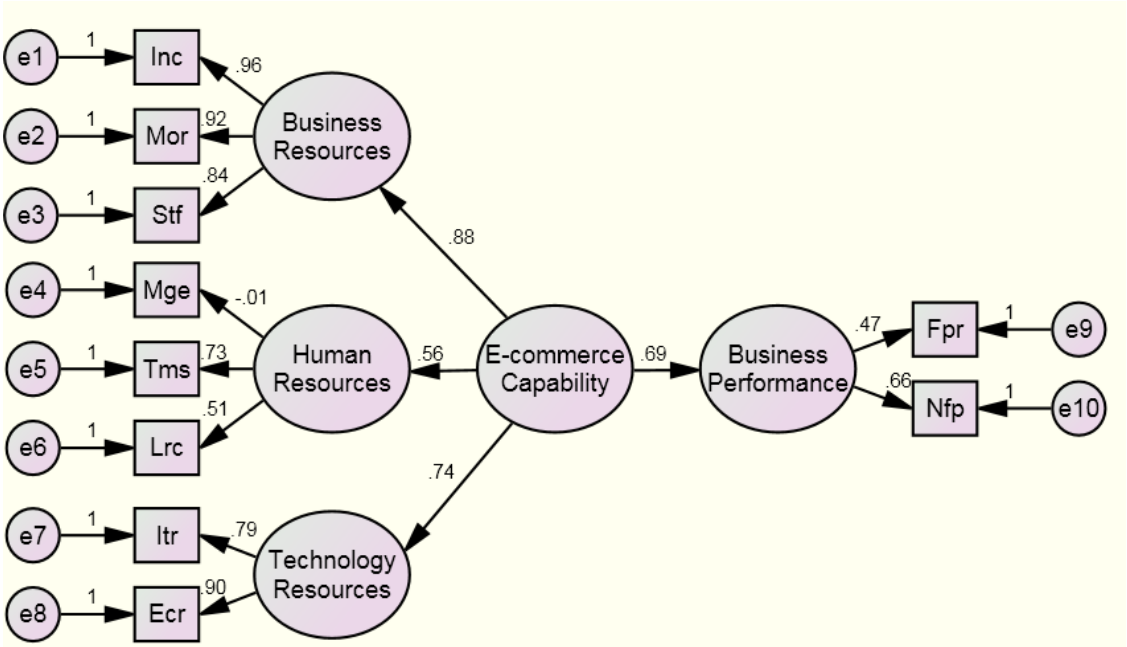
Model	ECVI	LO 90	HI 90	MECVI
Independence model	15.303	14.603	16.027	15.321

(102) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	162	171
Independence model	27	28

Minimization:	.066
Miscellaneous:	6.984
Bootstrap:	.000
Total:	7.050

Test 4: Model B



Chi-square = 580.293
df = 246
p = .000
Ratio = 2.359
GFI = .878
AGFI = 851
CFI = .911
NFI = .856
RMSEA = . 066

(104) Model Fit Summary

(105) CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	54	580.293	246	.000	2.359
Saturated model	300	.000	0		
Independence model	24	4019.349	276	.000	14.563

(106) RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.196	.878	.851	.720
Saturated model	.000	1.000		
Independence model	.461	.314	.254	.289

(107) Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.856	.838	.911	.900	.911
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(108) Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.891	.763	.812
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

(109) NCP

Model	NCP	LO 90	HI 90
Default model	334.293	267.762	408.531
Saturated model	.000	.000	.000
Independence model	3743.349	3541.972	3952.028

(110) FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	1.866	1.075	.861	1.314
Saturated model	.000	.000	.000	.000
Independence model	12.924	12.036	11.389	12.707

(111) RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.066	.059	.073	.000
Independence model	.209	.203	.215	.000

(112) AIC

Model	AIC	BCC	BIC	CAIC
Default model	688.293	697.734	890.416	944.416
Saturated model	600.000	652.448	1722.901	2022.901
Independence model	4067.349	4071.544	4157.181	4181.181

(113) ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	2.213	1.999	2.452	2.244
Saturated model	1.929	1.929	1.929	2.098
Independence model	13.078	12.431	13.749	13.092

(114) HOELTER

Model	HOELTER .05	HOELTER .01
Default model	152	162
Independence model	25	26

Minimization:	.053
Miscellaneous:	5.261
Bootstrap:	.000
Total:	5.314

APPENDIX D

Factor analysis and Relaibility
Innovative capacity

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.827
Bartlett's Test of Sphericity	Approx. Chi-Square	679.517
	df	6
	Sig.	.000

Factor Matrix[a]

	Factor
	1
inc2	.852
inc1	.835
inc3	.803
inc4	.759

Extraction Method: Principal Axis Factoring.
a. 1 factors extracted. 5 iterations required.

Reliability Statistics

Cronbach's Alpha	N of Items
.885	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
inc1	16.87	9.214	.770	.845
inc2	16.83	9.355	.781	.840
inc3	16.66	10.046	.744	.856
inc4	16.73	9.903	.708	.869

Market Orientation

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.798
Bartlett's Test of Sphericity	Approx. Chi-Square	721.527
	df	15
	Sig.	.000

Factor Matrix[a]

	Factor	
	1	2
mor2	.758	
mor1	.727	
mor4	.709	
mor3	.682	
mor6	.616	
mor5	.608	

Extraction Method:
Principal Axis Factoring.
a. 2 factors extracted. 12 iterations required.

Rotated Factor Matrix[a]

	Factor	
	1	2
mor2	.789	
mor3	.740	
mor1	.729	
mor5		.754
mor6		.684
mor4		.649

Extraction Method:
Principal Axis Factoring.
Rotation Method:
Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Reliability Statistics

Cronbach's Alpha	N of Items
.831	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
mor1	10.94	5.073	.671	.784
mor2	11.09	4.854	.718	.738
mor3	10.98	4.813	.681	.776

Reliability Statistics

Cronbach's Alpha	N of Items
.779	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
mor4	10.88	4.843	.606	.711
mor5	11.34	4.520	.630	.685
mor6	11.15	4.787	.611	.706

Strategic Flexibility

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.809
Bartlett's Test of Sphericity	Approx. Chi-Square	543.112
	df	15
	Sig.	.000

Factor Matrix[a]

	Factor	
	1	2
stf5	.738	
stf3	.720	
stf6	.718	
stf1	.593	
stf2	.580	
stf4	.521	

Extraction Method: Principal Axis Factoring.
a. 2 factors extracted. 10 iterations required.

Rotated Factor Matrix[a]

	Factor	
	1	2
stf5	.748	
stf6	.694	
stf4	.561	
stf3		.712
stf2		.681
stf1		.537

Extraction Method:
Principal Axis Factoring.
Rotation Method:
Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Reliability Statistics

Cronbach's Alpha	N of Items
.750	3

Item Statistics

	Mean	Std. Deviation	N
stf5	5.18	1.221	312
stf6	5.30	1.151	312
stf4	4.97	1.304	312

Reliability Statistics

Cronbach's Alpha	N of Items
.726	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
stf3	11.44	4.182	.600	.577
stf2	11.02	4.594	.547	.643
stf1	11.61	3.982	.508	.698

Managerial expertise

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.776
Bartlett's Test of Sphericity	Approx. Chi-Square	445.183
	df	10
	Sig.	.000

Factor Matrix[a]

	Factor
	1
mge3	.799
mge4	.736
mge5	.589
mge2	.588
mge1	.551

Extraction Method: Principal Axis Factoring.
a. 1 factors extracted. 8 iterations required.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.787	.786	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
mge1	20.20	13.345	.480	.314	.774
mge2	20.03	13.286	.522	.277	.760
mge3	20.17	11.505	.680	.480	.706
mge4	20.06	12.202	.634	.445	.724
mge5	20.26	13.059	.508	.348	.765

Top management support

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.826
Bartlett's Test of Sphericity	Approx. Chi-Square	849.467
	df	15
	Sig.	.000

Factor Matrix[a]

	Factor
	1
tms4	.809
tms3	.785
tms5	.737
tms6	.716
tms2	.618
tms1	.600

Extraction Method:
Principal Axis
Factoring.
a. 1 factors
extracted. 5
iterations required.

Reliability Statistics

Cronbach's Alpha	N of Items
.858	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
tms1	27.91	21.793	.573	.848
tms2	27.95	21.338	.589	.846
tms3	28.20	20.925	.699	.825
tms4	28.16	20.999	.723	.821
tms5	28.29	20.996	.661	.832
tms6	28.18	21.127	.650	.834

Learning capacity

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.866
Bartlett's Test of Sphericity	Approx. Chi-Square	1062.556
	df	15
	Sig.	.000

Factor Matrix[a]

	Factor
	1
lrc6	.854
lrc3	.851
lrc5	.833
lrc2	.810
lrc4	.760
lrc1	

Extraction Method: Principal Axis Factoring.
a. 1 factors extracted. 5 iterations required.

Reliability Statistics

Cronbach's Alpha	N of Items
.875	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
lrc1	25.93	45.603	.254	.911
lrc2	26.35	35.996	.755	.841
lrc3	26.33	35.335	.784	.836
lrc4	26.91	35.339	.708	.849
lrc5	26.54	34.076	.773	.837
lrc6	26.39	33.847	.801	.831

IT resources

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.824
Bartlett's Test of Sphericity	Approx. Chi-Square	1103.004
	df	28
	Sig.	.000

Factor Matrix[a]

	Factor	
	1	2
itr5	.832	
itr4	.819	
itr6	.803	
itr7	.776	
itr8	.757	
itr2		.770
itr3		.767
itr1		

Extraction Method: Principal Axis Factoring.
a. 2 factors extracted. 9 iterations required.

Rotated Factor Matrix[a]

	Factor	
	1	2
itr5	.836	
itr4	.826	
itr6	.803	
itr7	.778	
itr8	.761	
itr3		.790
itr2		.786
itr1		

Extraction Method:
Principal Axis Factoring.
Rotation Method:
Varimax with Kaiser
Normalization.
a. Rotation converged in 3
iterations.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.899	.899	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
itr5	22.29	15.746	.779	.634	.870
itr4	22.32	15.602	.767	.615	.873
itr6	22.12	16.540	.753	.572	.877
itr7	22.16	16.287	.735	.547	.880
itr8	22.25	16.111	.716	.522	.884

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.614	.652	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
itr1	10.82	4.384	.287	.082	.775
itr2	10.66	4.765	.518	.411	.396
itr3	10.61	4.883	.526	.412	.396

Ec resources

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.797
Bartlett's Test of Sphericity	Approx. Chi-Square	677.923
	df	15
	Sig.	.000

Factor Matrix[a]

	Factor	
	1	2
ecr5	.712	
ecr3	.701	
ecr4	.698	
ecr1	.690	.505
ecr6	.666	
ecr2	.613	

Extraction Method: Principal Axis Factoring.
a. Attempted to extract 2 factors. More than 25 iterations required. (Convergence=.002). Extraction was terminated.

Rotated Factor Matrix[a]

	Factor	
	1	2
ecr5	.760	
ecr4	.758	
ecr3	.617	
ecr6	.615	
ecr1		.819
ecr2		.726

Extraction Method:
Principal Axis Factoring.
Rotation Method:
Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.816	.817	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ecr5	16.54	9.445	.678	.460	.750
ecr4	16.75	9.093	.669	.450	.753
ecr3	16.32	9.780	.605	.380	.782
ecr6	16.69	9.346	.596	.366	.789

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.784	.785	2

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ecr1	5.51	1.550	.646	.417	.[a]
ecr2	5.40	1.424	.646	.417	.[a]

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Financial performance

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.802
Bartlett's Test of Sphericity	Approx. Chi-Square	531.643
	df	15
	Sig.	.000

Factor Matrix[a]

	Factor
	1
fpr4	.715
fpr5	.714
fpr6	.654
fpr2	.644
fpr3	.568
fpr1	

Extraction Method:
Principal Axis
Factoring.
a. 1 factors
extracted. 5
iterations required.

Reliability Statistics

Cronbach's Alpha	N of Items
.797	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
fpr1	26.28	19.374	.435	.790
fpr2	26.70	17.749	.574	.760
fpr3	27.30	17.549	.497	.781
fpr4	27.11	17.197	.615	.750
fpr5	27.02	17.649	.615	.751
fpr6	27.05	17.789	.579	.759

Non financial performance

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.839
Bartlett's Test of Sphericity	Approx. Chi-Square	681.908
	df	15
	Sig.	.000

Factor Matrix[a]

	Factor	
	1	2
nfp4	.816	
nfp5	.809	
nfp6	.762	
nfp2	.752	
nfp3	.591	
nfp1		

Extraction Method: Principal Axis Factoring.
a. Attempted to extract 2 factors. More than 25 iterations required. (Convergence=.002). Extraction was terminated.

Rotated Factor Matrix[a]

	Factor	
	1	2
nfp4	.812	
nfp6	.779	
nfp5	.711	
nfp2		.709
nfp3		
nfp1		

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Reliability Statistics	
Cronbach's Alpha	N of Items
.795	6

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
nfp1	26.70	22.943	.087	.856
nfp2	26.66	17.255	.647	.740
nfp3	26.73	18.752	.527	.769
nfp4	26.62	16.602	.698	.726
nfp5	26.59	16.396	.729	.718
nfp6	26.54	16.970	.644	.740

Appendix E

Table 2.2: Summary of the Prior Research factors

Factors	Literature References
Top Management support	(Teo et al., 2008), (Vaidya et al., 2004), , (Hui L.Y., 2008), (Kaliannan et al., 2009), (Williams et al., 2006) and (Engstrom et al., 2008)
IT infrastructure	(Harland et al., 2007), (Wu et al., 2003), (Williams et al., 2006), (Kaliannan et al., 2009), (Aik., 2005) and (Carayannis and Popesco, 2005)
IT Expertise	(Harland et al., 2007), (Davila et al., 2003) and (Engstrom et al., 2008)

Training and Education of Employees	(Vaidya et al., 2004), (Leipold et al., 2004), (Kheng et al., 2002), (Aik., 2005)
Skills and Knowledge	(Harland et al., 2007), (Gunasekaran et al., 2009) and (Williams et al., 2006)
Standardization issues	(Angeles and Nath, 2007) and (Huber et al., 2004)
Immaturity in market	(Angeles and Nath, 2007)
Trust in supply chain relationship	(Gattiker et al., 2007)
Organization culture	(Gunasekaran & Ngai, 2008)
Firm size	(Teo et al., 2008)
System integration	(Vaidya et al., 2004), (Leipold et al., 2004) and (Angeles et al., 2007)
Complexity	(Chan J., 2002)
Government policy and regulations	(Kaliannan et al., 2009)
Market Orientation	(Kevin and Li, 2010)
Innovativeness	Crespo (2008)
Strategic flexibility	TomR.Eikebrokk and DagH.Olsen (2007)
Learning capacity	Schulz (2001), Lee et al (2007)