PREDICTING INTENTION TO ADOPT B2B ELECTRONIC COMMERCE IN JORDAN: THE MODERATING ROLE OF TRUST AND DEPENDENCY

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ABSTRACT

Business to Business Electronic Commerce (B2B EC) has great potentials to extend firms' competency and efficiency. As such, Jordan has an objective to increase the diffusion of this technology. Despite extensive government efforts, the adoption of B2B EC is still limited. Consequently, there have been extensive efforts to better understand the phenomena. Yet, documented findings regarding the determinants of the adoption are not altogether consistent. To provide more insight, this study developed a research model utilizing the Technological, Organizational, and Environmental (TOE) framework to identify the determinants of the firms' propensity to adopt B2B EC. Since B2B EC is an inter-organizational phenomenon supporting transactions of partnerships, this study emphasizes the context of partnership characteristics. Grounded on inter-organizational theories, this study hypothesized that partnership characteristics, namely trust and dependency, moderate the role of TOE motivating factors. Moreover, given that B2B EC is used on both sides of the buyer/seller relationship, this study examined the differences and similarities in the perception of the marketing and purchasing departments regarding the determinants of the B2B EC adoption. A total of 798 questionnaires were self-administered to marketing and purchasing managers in 462 firms that have large registered capital in Jordan. In total, 114 marketing and 125 purchasing managers participated in this study. Marketing and purchasing responses were analyzed separately using the Partial Least Squares approach. The result revealed that the marketing and purchasing departments do have different views regarding the determinants of the adoption, specifically in terms of the role of Relative Advantage and Competition Pressure. Moreover, the results showed that the moderating role of trust was less pronounced. Meanwhile, the moderating role of dependency was partially supported particularly in the purchasing perspective. These findings have demonstrated how dependence asymmetries between trading partners may change the adoption motivations. They further explain the importance of considering the views of the business partner for the adoption to be done successfully.

Keywords: business to business electronic commerce, innovation diffusion, technological, organizational, and environmental framework, resource dependency theory.

ABSTRAK

Business to Business Electronic Commerce (B2B EC) berpotensi untuk meningkatkan kecekapan dan persaingan syarikat. Oleh itu, Jordan telah menetapkan objektif untuk meningkatkan penggunaan teknologi ini. Namun begitu, tahap penggunaan B2B masih terhad. Sehubungan dengan itu, pelbagai usaha untuk meningkatkan pemahaman terhadap fenomena ini telah dilaksanakan. Namun, hasil penemuan kajian-kajian lepas adalah tidak konsisten. Bagi memberi gambaran yang lebih jelas, kajian ini membangunkan model kajian berdasarkan rangka kerja Teknologi, Organisasi dan Persekitaran (*Technological, Organizational and Environmental*) (TOE) bagi mengenal pasti kecenderungan syarikat untuk mengguna pakai B2B EC. Memandangkan B2B EC adalah fenomena antara-organisasi yang menyokong perkongsian transaksi, kajian ini turut menekankan elemen berkaitan perkongsian iaitu Kepercayaan dan Kebergantungan yang menjadi moderator kepada faktor-faktor TOE. Tambahan pula, B2B EC diguna pakai oleh dua-dua pihak iaitu hubungan antara pembeli/penjual. Oleh itu, kajian ini mengenal pasti perbezaan dan persamaan persepsi jabatan pemasaran dan jabatan pembelian mengenai faktor penentu terhadap penggunaan B2B EC. Secara keseluruhannya, sebanyak 798 borang soal selidik adalah ditadbir sendiri kepada pengurus pemasaran dan pengurus pembelian di 462 buah syarikat modal berdaftar di Jordan. Seramai 114 pengurus pemasaran dan 125 pengurus pembelian telah terlibat dalam kajian ini. Maklum balas responden daripada kedua-dua pihak telah dianalisis secara berasingan dengan menggunakan pendekatan *Partial Least Square*. Keputusan kajian menunjukkan bahawa jabatan pemasaran dan pembelian mempunyai pandangan yang berbeza mengenai faktor penentu terhadap penggunaan B2B EC, khususnya terhadap faktor berkaitan dengan Tekanan Persaingan dan Manfaat Relatif. Selain daripada itu, keputusan juga menunjukkan bahawa peranan moderator bagi faktor Kepercayaan adalah tidak signifikan bagi kedua-dua kumpulan berkenaan. Manakala, peranan moderator untuk faktor Kebergantungan hanya signifikan daripada perspektif jabatan pembelian. Penemuan ini menunjukkan bagaimana perbezaan tahap Kebergantungan antara rakan niaga mampu mengubah tahap motivasi penggunaan B2B EC. Kajian ini juga turut menjelaskan keperluan untuk mengambil kira pandangan pihak rakan niaga bagi membolehkan penggunaan aplikasi B2B EC dilaksanakan dengan jayanya.

Kata kunci: *Business to Business Electronic Commerce*, difusi inovasi, Rangka Kerja Teknologi, Organisasi, dan Persekitaran (TOE), Teori Kebergantungan terhadap Sumber.

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RELATED PUBLICATION

1- Alsaad, A. K., Mohamad, R., & Ismail, N. A. (2015). Perceived Desirability and Firm's Intention to Adopt Business to Business E-Commerce: A Test of Second-Order Construct. *Advanced Science Letters*, *21*(8), 2028–2032.

2- Alsaad, A. K., Mohamad, R., & Ismail, N. A. (2014). The Moderating Role of Power Exercise in B2B E-commerce Adoption Decision. *Procedia - Social and Behavioral Sciences*, *130*(C), 515–523.

TABLE OF CONTENTS

LIST OF APPENDIXES

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
B2B EC	Business to Business Electronic Commerce
CB-SEM	Covariance-Based Structure Equation Modeling
CCD	Companies Control Department
DOI	Diffusion of Innovation
EDI	Electronic Data Interchange
ESC	Electronic Supply Chain
ESCWA	Economic and Social Commission for Western Asia
GDP	Gross Domestic Product
HOC	Higher-Order Construct
ICT	Information Communication Technology
IOIS	Inter-Organizational Information Systems
IOS	inter-organization system
IS	Information System
IS/IT	Information Technology/Information Systems
MOICT	Ministry of Information and Communications Technology
NRI	Networked Readiness Index
OR	Organization Readiness
PLS	Partial least square
RAT	Reasoned Action Theory
RDT	Resource Dependence Theory
REACH	Jordan's first national information technology strategy

RFID	Radio-Frequency Identification
SEM	Structure Equation Modeling
SME	Small and Medium-Sized Corporation
SPSS	Statistical Package for Social Sciences
TAM	Technology Acceptance Model
TCE	Transaction Cost Economics
TMS	Top Management Support
TOE	Technological, Organizational, and Environmental framework
TPB	Theory of Planned Behavior
TTF	Technology-Task-Fit
UTAUT	Unified Theory of Acceptance and Use of Technology
VAN	Added Network based
VB-SEM	Variance-based Structure Equation Modeling
WSC	Web Supply Chain
XML	Extensible Markup Language

CHAPTER ONE: INTRODUCTION

1.1 Research Background and Motivation

Nowadays, Information Technology (IT) is widely diffused in a firm's internal operations and processes. It is rare to find firms that do not automate all or some of their internal functions such as accounting, production, and/or human resources activities. The revolution in Information Communication Technology (ICT) offers many opportunities that enable firms to improve their relationship among customers, suppliers and other business partners. With this advancement, it seems there is no technical barrier that could prevent organizations from taking steps to transcend organizational borders and connect with trading parties electronically. In general, IT that mediates the inter-firm transaction is labeled in different ways. For instance, prior studies label these technologies as inter-organization information systems (Sila, 2010), e-commerce systems (Cullen & Taylor, 2009), e-business systems (Wiengarten, Humphreys, Mckittrick, & Fynes, 2013) or electronic supply chain management systems (Lin, 2013a). This study categorizes these technologies as Business to Business e-commerce (B2B EC), since it organizes transaction between businesses (Sila, 2013).

B2B EC systems provide several potentials. They enhance the transmission of information and communication in real time (Dedrick, Xu, & Zhu, 2008; Ranganathan, Teo, & Dhaliwal, 2011; Wu, Zsidisin, & Ross, 2007; Yao & Zhu, 2012). In addition, they enable tighter business process' integration between trading partners. In this manner, B2B EC assists in increasing information availability, processing capacity, and coordination efficiency. These potentials can also provide

1

opportunities for costs reduction (Dong, Xu, & Zhu, 2009; Sanders, 2007; Wiengarten *et al.*, 2013; Yao & Zhu, 2012; Zhou & Zhu, 2010). Other important opportunities may be achieved by using such technology in mediating buyer-supplier relationship include faster decision-making, reduced marketing time, increased efficiency and productivity, better control, reduced inventory, reduced bullwhip effect, and reduced bureaucratic systems (Elia, Lefebvre, & Lefebvre, 2007; Ranganathan *et al.*, 2011; Sanders, 2008; Yao & Zhu, 2012).

Due to its potential, B2B EC has been adopted widely in various industries such as manufacturing, transportation, retailing, banking, constructions, and others (Bouchbout & Alimazighi, 2009). The importance of global B2B EC increased extensively in the past decade. The volume of global B2B EC market surpassed $15 trillion in 2013 as estimated by United Nations Conference on Trade and Development (UNCTAD). More than three quarters of the total volume are dominated by United States, United Kingdom, Japan, and China respectively (UNCTAD, 2015). According to Forrester Research, B2B EC sales in the United States reached to $780 billion in 2015. It is constitutes 9.3% of the total $9.39 trillion US B2B market in 2015, meanwhile it is expected to reach 12.1% within five years. In Canada, almost 63% of sales by firms were attributable to B2B transactions in 2013. In 2013, the B2B e-commerce accounted for 91% and 53 % of all e-commerce revenue in the Republic of Korea and the Russian federation respectively (Forrester Research, 2015).

It can be seen from the above discussion that B2B EC appears to be accelerating in growth in developed countries. In the case of developing countries, adopting B2B EC

among firms is believed to be necessary in order to enable them to respond to the challenges of globalization. Firms in developed countries tend to merge and extend their supply chains to those operating in developing countries (Ali & Kurnia, 2010). In this situation, e-commerce has the potential to integrate developing countries into the global economy and improve trade efficiency globally (Ali & Kurnia, 2010). Despite all the potentials of e-commerce, B2B EC has not been adopted widely in developing countries. The level of acceptance is evidently low (Molla & Licker, 2005; Penttinen & Tuunainen, 2011; Tan, Chong, Lin, & Eze, 2009; Wong, Ngan, Chan, & Chong, 2012).

Jordan is grouped among the developing countries. The government of Jordan, has declared in its national agenda that by 2018, Jordan will be among the "World Class Competitors in Knowledge Economy" (Al-Jaghoub & Westrup, 2003; Ministry of Information and Communications Technology [MOICT], 2012). The government realizes the importance of e-commerce in achieving this mission. It lays greater emphasis on B2B EC because of the presence of sophisticated international and regional logistics firms in the country. Since the government has aimed to transform the country into a world class center of knowledge economy, it sets an objective to be one of the leading countries in the region that use e-commerce for B2B collaboration and trade (MOICT, 2012). Ever since Jordan adopted this vision, some researchers consider it as a country that has the potential to become the Singapore of the Middle East with respect to the adoption of ICT (Ciborra & Navarra, 2005; Mofleh & Wanous, 2008).

In view of this mission, the government has implemented several initiatives to motivate business firms to commence using e-commerce for trading. The government's role in increasing the diffusion rate is mainly an indirect one. It has adopted several different approaches to achieve its declared goal. These include developing infrastructure and services that will support e-commerce adoption. It has helped in preparing advanced educational and training programs in telecommunications and IT including e-commerce. Also included are development of a legal framework that incorporates electronic transactions and promulgation of a law to protect e-commerce consumers from 'cyber-crime'. In addition, relief from income tax has been provided for revenues generated from e-commerce transactions (Economic and Social Commission for Western Asia [ESCWA], 2013b).

These initiatives have provided a significant boost to improve the ICT environment and towards enhancing technological readiness necessary to prepare the economy for greater e-commerce diffusion (MOICT, 2012). As a result of the above mentioned initiatives, the ICT sector has undergone considerable development and there has been relatively high diffusion of ICT tools in Jordanian economy at large (ESCWA, 2013b; Information & Communications Technology Association - Jordan [Intaj], 2013). ICT is becoming the fastest growing industry in Jordanian economy and is growing at an average rate of 25% per annum. In particular, revenues from the ICT sector have increased from $560 million in 2001 to $2.424 billion in 2011. It presently contributes more than 14% to the Gross Domestic Product (GDP). ICT sector has grown enough to become the third largest contributor to Jordanian GDP (Intaj, 2013).

This development is also evidenced by the rapid growth of citizens who use the Internet. In 2009, the Internet penetration stood at approximately 25%. Within five years, it increased sharply to around 70% (Intaj, 2013). Additionally, the acceptance and usage of computers in private and public sectors has increased manifold. A survey conducted by the Telecommunications Regulatory Authority (TRA) in 2010 showed that virtually all government offices use computers in their daily activities. In the private sector, 87% of firms have computers and 82% have integrated them in their daily routine. Moreover, 74% of firms in private sector and 99% of governmental offices have access to the Internet (TRA, 2011). Finally, the Networked Readiness Index (NRI) shows that Jordan is ranked 52 worldwide in leveraging information and communications technologies to boost competitiveness and well-being of the country (Word Economic Forum, 2015).

Despite these advancements, the ultimate goal to increase the diffusion of B2B EC is still behind the government target. In spite of the extensive use of computers and the deep penetration of the Internet in the country, a recent survey conducted to explore the current e-commerce status in private and public sectors showed that only 16.2% of the businesses use and provide general e-commerce services (ESCWA, 2013b; MOICT, 2012; TRA, 2011).

The sluggishness in adopting e-commerce technology is not confined to Jordan. It is a global issue, especially in developing countries (Molla & Licker, 2005; Penttinen & Tuunainen, 2011; Tan *et al.*, 2009; Wong *et al.*, 2012). The unsatisfactory and slow adoption of IT innovations in general and e-commerce in particular have led to a spate of studies that are intended to understand, to manage and to predict e-

5

commerce diffusion (Chen & Holsapple, 2013; Fichman & Carroll, 2004; Hameed, Counsell, & Swift, 2012b; Jeyaraj, Rottman, & Lacity, 2006).

Examination of innovation diffusion as an area for research has been initiated to deal with the issue of adoption. It explores the process by which innovation spreads among organizations (Alshamaila, Papagiannidis, & Li, 2013; Fichman, 2014; Hameed *et al.*, 2012b). It also explains how, why, and when innovation adoption behavior could take place (Oliveira, Martins, & Lisboa, 2011). This stream of research assumes that innovation can transform business processes and organizational structures, facilitate transactions and collaboration across organizational boundaries, and eventually enhance firm performance and productivity (Hameed *et al.*, 2012b; Peng & Dey, 2014). Therefore, quick adoption of IT innovations and technologies are crucial for a firm to achieve business success.

In this area of research, scholars have considered various approaches to examine the determinants of e-commerce adoption. Generally, most of the influencing factors are derived from two different perspectives. These include the Efficiency-Choice and the Institutional perspectives (Alsaad, Mohamad, & Ismail, 2014; Ansari & Zajac, 2010; Barrett & Walsham, 2013; Fichman & Carroll, 2004; Messerschmidt & Hinz, 2013; Srivastava, Teo, & Subramanian, 2009; Tan & Fichman, 2002).

Efficiency-Choice perspective or Rational perspective predicts that innovation is adopted by rational decision makers who weigh costs and benefits of available alternatives and select accordingly (Alsaad, Mohamad, & Ismail, 2015; Ansari & Zajac, 2010; Hillebrand, Nijholt, & Nijssen, 2011). Scholars of this stream of

6

research argue that the degree of appropriateness of innovation (i.e. B2B EC) encourages potential adopters to accept or reject the innovation. They emphasize that appropriateness of innovation is, in turn, determined by evaluation of desirability of innovation and organizational capability (Barrett & Walsham, 2013; Basaglia, Caporarello, Magni, & Pennarola, 2008; Guo & Wu, 2010; Khalifa & Davison, 2006; Srivastava *et al.*, 2009; Tan & Fichman, 2002).

Desirability of innovation refers to the cognitive-based attitude toward innovation (i.e. B2B EC) derived from an evaluation of the attributes of the innovation. Potential adopters evaluate the innovation characteristics (i.e. Relative Advantage, Cost, Complexity, Compatibility and Security) to the cognition whether or not e-commerce is an appropriate choice (Khalifa & Davison, 2006; Lyytinen & Damsgaard, 2011; Moore & Benbasat, 1991; Tan & Fichman, 2002; To & Ngai, 2006). Diffusion of Innovation theory (DOI) emerges as one of the most widely used theories that provides causality using this perspective (Hillebrand *et al.*, 2011).

Other factor that plays a demonstrably substantial part in determining the appropriateness of innovation is an organizational capability (Barrett & Walsham, 2013; Guo & Wu, 2010; Lin, 2013b). It refers to the extent to which the available resources are perceived to be equivalent to the resources required for successfully adopting and maintaining specific innovation (Fathian, Akhavan, & Hoorali, 2008; Guo & Wu, 2010). This concept is closely linked with Organizational Readiness concept as proposed by Chwelos, Benbasat, and Dexter (2001) and Iacovou, Benbasat, and Dexter (1995).

7

On the other hand, the second perspective (Institutional perspective) speculates that the social context in which firms operate influences their behavior. Many studies have considered Institutional theory as a lens to investigate the effect of business environment on decision to adopt. Institutions are defined by as ''multifaceted, durable social structures, made up of symbolic elements, social activities, and material resources'' (Scott, 2001). An organization is considered an institution with particular rules, routines, social structures, and cultures that is embedded within larger institutions, including industry and country (Kurnia, Karnali, & Rahim, 2015). Researchers identify three types of pressure by which the environment affects the adoption of innovation namely; coercive pressure, normative pressure and mimetic pressure (Khalifa & Davison, 2006; Liang & Saraf, 2007; Messerschmidt & Hinz, 2013; Tan & Fichman, 2002; Teo, Wei, & Benbasat, 2003; Zheng, Chen, Huang, & Zhang, 2013). They assert that an organization should accept and follow the social pressure to gain organizational legitimacy, regardless of the appropriateness of innovation to the organization (Abrahamson & Fairchild, 1999; Mignerat & Rivard, 2009; Scott, 1995; Weerakkody, Dwivedi, & Irani, 2009).

An equally significant stream of research stresses that the decision to adopt is neither entirely rational action nor is it uniquely responsive to social pressure. Thus, many studies have mapped the 'rational and institutional perspective' into a single theoretical framework such as Technology–Organization–Environment (TOE) (Khalifa & Davison, 2006; Oliveira *et al.*, 2011; Ramdani, Chevers, & Williams, 2013; Tornatzky, Fleischer, & Chakrabarti, 1990; Weerakkody *et al.*, 2009; Yoon & George, 2013). Therefore, TOE is considered as an integrated perspective that classifies innovation characteristics (attributes) as technological factors,

Organizational Readiness as organizational factors, and institutional pressure as environmental factors (Bala & Venkatesh, 2007; Khalifa & Davison, 2006; Oliveira *et al.*, 2011; Soares-Aguiar & Antonio, 2008; Venkatesh & Bala, 2012; Wong, Lai, & Teo, 2009).

Despite the popularity of those perspectives (rational, institutional, and integrated) in explaining the decision to adopt B2B EC, many studies have voiced contradictory prescriptions and have reported contradictory findings on how innovation can be adopted and how it can be accelerated (Hameed & Counsell, 2012; Hameed *et al.*, 2012b). Researchers report that one of the most consistent themes in adoption literature is that research findings have been inconsistent (Hameed & Counsell, 2012; Hameed *et al.*, 2012b; Sharma & Rai, 2013; Sila, 2013; Sila & Dobni, 2012; Wymer & Regan, 2005).

For example, McElheran (2013) points out that organizational capabilities of potential adopters poorly explain the differential likelihood of adoption among leading firms. Cao, Gan, and Thompson (2013) found that even if there is a fit between e-commerce technology and an organization's needs, values and ability, the decision to adopt will not necessarily take place. Although the DOI theory considers their influence to be significant, several studies have found predictors such as Relative Advantage, Compatibility and Complexity, do not play an important part in the adoption of B2B EC (Chan & Chong, 2012a; Chong, Ooi, Lin, & Tang, 2009b; Hameed & Counsell, 2014; Henriksen, 2006; Ifinedo, 2011; Pan, 2013; Seyal & Rahman, 2003). Moreover, Kollmann *et al.* (2009) affirmed that although some nations have abundant potential for e-commerce as indicated by a high level of

Organizational Readiness, they exhibit low levels of adoption. Other nations seem to do better by taking greater advantage of their potentials. This is evidently observed by their low levels of Organizational Readiness while maintaining relatively high levels of e-commerce adoption (Kollmann *et al.*, 2009; Zhu & Thatcher, 2010).

As shown in the above analysis, contradictions and contingencies in rational and institutional logic are noted within and across studies. This would indicate that the logic of rational and institutional perspective is inadequate in explaining adoption decisions in the context of B2B EC. Social exchange theorists, however, provide a complementary insight into the adoption of B2B EC. Since B2B EC mediates the inter-organizational relationships between trading partners, proponents of this stream of research focus on the context of this relationship (Al-Hakim, Abdullah, & Ng, 2012; Chong & Bai, 2014; Chong, Chan, Goh, & Tiwari, 2013; Hart & Saunders, 1997; Ke & Wei, 2007). Their focus was grounded on the idea that partners depend on each other to supply particular resources that they themselves do not possess, in order to achieve the desired goals (Al-Hakim *et al.*, 2012; Hart & Saunders, 1997; Klein & Rai, 2009). Therefore, access to these resources is indispensable for successful inter-organizational relationships and thus affects firms' adoption decision (Chatterjee, 2013; Reimers, Johnston, & Klein, 2010b; Yang, 2013).

In this stream of research, IS researchers perceive adoption of B2B EC as a collective decision that involves two parties (buyer and supplier). In such case, no adoption can take place without participation of both parties (Ali, 2010; Lyytinen & Damsgaard, 2011). Since the adoption of B2B EC requires participation from two parties, Ali (2010) and Lyytinen and Damsgaard (2011) confirm that the decision to adopt will

be influenced by existing relationship characteristics such as trust and dependency structure between the involved parties (Al-Hakim *et al.*, 2012; Chae, Yen, & Sheu, 2005; Hart & Saunders, 1997).

More importantly, there are two competing views regarding the role of dependency on adoption decision. The first view suggests that a high level of dependency on a partner's resources entails uncertainty about the availability in a cost-effective manner of these resources. Dependent firms remain uncertain about the actions of those who control these resources. In a highly uncertain situation, firms tend to build strategic partnership with their supply chain members to share information, increase organizational flexibility, and reduce the risk associated with the uncertainty (Chatterjee, 2013; Iskandar, Kurokawa, & Leblanc, 2001a; Li & Lin, 2006; Reimers *et al.*, 2010b). In addition, dependent firms will create IT investment such as B2B EC to mediate this partnership, in order to manage, coordinate, and mitigate the consequences of dependency. Therefore, a high level of dependency on a partner's resources will act as a catalyst to motivate firms to adopt B2B EC (Rai, 2014; Reimers *et al.*, 2010b; Zaheer & Venkatraman, 1994).

Alternatively, the second view suggests that trading partner (buyer and supplier) often have different perceptions and interests towards adopting B2B EC. This, in turn, makes the adoption decision complex and difficult to achieve (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Chaparro-Peláez, Pereira-Rama, & Pascual-Miguel, 2014; Li & Ghosh, 2012). To overcome this difficulty, scholars suggest that firms should have interests and power. Interest motivates a firm to adopt and it is driven mostly by factors such as appropriateness related variables. Power enables a

11

firm to propel a change in the attitudes of trading partner and it is usually defined by the level of dependency (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Kim, Park, Ryoo, & Park, 2010; Turker, 2014). In a similar vein, Resource Dependency theory (RDT) suggests that high-dependence firms are in a weaker position to induce their trading partners to participate in B2B EC adoption. This is particularly true since whoever controls vital resources has power over those who need them (Casciaro & Piskorski, 2005; Drees & Heugens, 2013; Hillman, Withers, & Collins, 2009; Nienhüser, 2008). Consequently, high-dependence firms have less opportunity to implement their interests in adopting B2B EC due to the low level of power (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Kim *et al.*, 2010; Turker, 2014).

Another important aspect in social exchange perspective is trust between trading partners. Scholars suggest that the anxiety about the potential misuse of proprietary information that may become available through B2B EC is one of the main inhibitors of its adoption (Ke & Wei, 2007; Venkatesh & Bala, 2012). When a firm is convinced that B2B EC is an appropriate choice, a high level of trust between partners will breed a sense of psychological reassurance that the expected results from using B2B EC technology are predictable. Low level of trust between partners tends to diminish the assurance between parties and ultimately introduce uncertainty. Consequently, the cooperative effort becomes costly and difficult to be achieved (Andaleeb, 1995; Li, Pieńkowski, van Moorsel, & Smith, 2012).

After all, comparison of all perspectives (rational, institutional, and social exchange) reveals three important observations. First, despite the importance of rational and

institutional related factors, empirical studies reveal that the presence of these variables alone may not be sufficient for triggering firms' intentions to adopt B2B EC (Cao *et al.*, 2013b; Chan & Chong, 2012b; Chong, OOI, Lin, & Raman, 2009a; Ifinedo, 2011; Kollmann *et al.*, 2009; Teo, Ranganathan, & Dhaliwal, 2006). While rational and institutional perspectives emphasize motivational factors such as TOE factors, the impact of these factors on B2B EC adoption is not independent from the context of existing relationship between trading partners (Ibrahim & Ribbers, 2006; Lyytinen & Damsgaard, 2011). Therefore, proposing an interaction effect between relationship characteristics and TOE factors would provide valuable insights into B2B EC adoption.

Secondly, social exchange perspective emphasizes the influence of the relationship context including trust and dependency. While prior research suggests that the relationship context directly affects the adoption of B2B EC(Al-Hakim *et al.*, 2012; Chong & Bai, 2014; Chong *et al.*, 2013; Hart & Saunders, 1998; Huang, Janz, & Frolick, 2008; Son, Narasimhan, & Riggins, 2008; Son, Narasimhan, & Frederick, 2005), it also reported that these variables may not play a role in affecting the adoption of B2B EC (Al-Hakim *et al.*, 2012; Chong & Bai, 2014; Hart & Saunders, 1998; Huang *et al.*, 2008; Saunders & Clark, 1992). Hong, Chan, Thong, Chasalow, and Dhillon (2014) argue that the inconsistency in the role of such contextual factors is because of the fact that they have been incorporated into general IS models in an inappropriate manner. Therefore, rather than direct influence, relationship factors are suggested to play moderating role on adoption behavior (Abu-Elsamen, Chakraborty, & Warren, 2010; Chae *et al.*, 2005; Lyytinen & Damsgaard, 2011).

13

Third, there is an apparent shortage of empirical research in the area of distinguishing between the two sides of B2B EC namely; marketing and purchasing perspectives (Hollenstein & Woerter, 2008). Chwelos *et al.* (2001) and Whipple, Wiedmer, and Boyer (2015) affirmed that given that B2B EC is used on both sides of the buyer-seller dyad, two sample frames should be natural choices for this investigation, including marketing and purchasing departments. A review of the literature indicates surprisingly few empirical investigations attempting to separately explain the two sides of B2B EC. Recently, several empirical research in supply channel area confirm that both sides of B2B relationships do have different perception regarding joint action behavior as they have different motivations (Dong, Carter, & Dresner, 2001; Kim *et al.*, 2010; Nyaga, Whipple, & Lynch, 2010; Whipple *et al.*, 2015). Whether or not such differences can be deducted in B2B EC adoption behavior needs further investigations.

With aforementioned conjectures put forward, limited follow-up research have explored further how dependency and trust can moderate (facilitate or inhibit) the role of TOE factors on adoption of B2B EC and how they interact. Equally important is to investigate whether or not adopting B2B EC differs in view of marketing and purchasing departments. Dependency, trust, and the differences between the two sides of B2B EC are important issues that need to be addressed. There is a pressing need for more intense investigation in this field.

1.2 Problem Statement

The government of Jordan has announced its goal to be as one of the leading countries in the region that use e-commerce as a channel for international and domestic trade and collaboration (MOICT, 2012). Despite government efforts to promote adoption and diffusion of B2B EC among businesses, Jordan is still far away from its goal (ESCWA, 2013a; ESCWA, 2013b; TRA, 2011). Jordanian government concludes its e-commerce strategy by stating "Much of the resource and expertise necessary for e-commerce is already present in Jordan ….(but) the main barrier is the psychological block; businesses, academics and public servants are waiting for someone or something to take e-commerce initiatives" (MOICT, 2012: p 59).

The Jordanian experience shows an interesting and conflicting conclusion regarding the adoption of e-commerce. In fact, the adoption literature also has produced more conflicting conclusions regarding how B2B EC can be adopted. While research has consistently demonstrated the importance of technological, organizational, and environmental factors as key determinates of e-commerce adoption, prior studies have produced inconsistent results on their influence (Hameed & Counsell, 2012; Hameed & Counsell, 2014; Hameed *et al.*, 2012b; Sharma & Rai, 2013; Sila, 2013; Sila & Dobni, 2012; Wymer & Regan, 2005). Researchers confirm that inconsistency in results from adoption research and their conclusions are due to the large number of determinants related to IT innovation as well as due to the significant interaction among these determinants (Hameed & Counsell, 2012; Hameed *et al.*, 2012b; Sila, 2013; Sila & Dobni, 2012; Wolfe, 1994; Wymer & Regan, 2005). In addition, other

15

scholars suggest that the difference in findings is due to the fact that both side of B2B EC including buyers and suppliers have different perspective and motivation (Chwelos *et al.*, 2001; Hollenstein & Woerter, 2008).

This theme has encouraged and led scholars to explore factors that potentially explain such inconsistency (Cao *et al.*, 2013b; Hameed & Counsell, 2012; Hameed & Counsell, 2014; Hameed *et al.*, 2012b; Ifinedo, 2011; Pearson & Keller, 2009). While several moderating variables have been examined, less attention has been given to explore the moderating role of trust and dependency. The role of these factors has been overlooked in literature. This is because they have been disregarded by the widely used innovation theories and frameworks such as DOI theory and TOE framework (Chan, Chong, & Zhou, 2012b; Gibbs & Kraemer, 2004; Hovorka & Larsen, 2006; Hsu, Kraemer, & Dunkle, 2006; Lyytinen & Damsgaard, 2001; Pan, 2013). Moreover, whereas some scholars agreed that the influencing variables may differ according to the potential adopter's status in the channel, the discrepancies in the perspectives of two sides of B2B EC received surprisingly little attention in prior research. Hence, revisiting DOI theory and TOE framework by taking a closer look at the moderating role of the relationship characteristics (Dependency and Trust) and examining the differences in the perspectives of the two sides of B2B EC, could explain a part of the inconsistencies in prior research.

In prior research, trust and dependency have been investigated research as motivational factors, but limited support has been reported (Al-Hakim *et al.*, 2012; Chong & Bai, 2014; Chong *et al.*, 2013; Hart & Saunders, 1998; Huang *et al.*, 2008; Son *et al.*, 2008; Son *et al.*, 2005). While the motivational role of trust and

dependency is not well pronounced in prior research, an alternative view is to consider trust and dependency as factors that facilitate or inhibit (moderate) the role of other motivational factors instead of considering them as motivational factors themselves. The view expressed above is in line with recommendation from Abu-Elsamen *et al.* (2010), Alsaad, Mohamad, and Ismail (2014), Lyytinen and Damsgaard (2011), and Rodón and Sesé (2010). Lyytinen and Damsgaard (2011) argue that because adoption of B2B EC transpires simultaneously between two autonomous organizations bound in a symbiotic relationship, the adoption of this technology is contingent upon the nature of relationship between trading partners including trust and dependency. Furthermore, Kim *et al.* (2010), Mcelheran (2013), and Premkumar (2009) suggest that future research should explore the extent to which the dependency structure influences the adoption behaviors.

Responding to the above call from prior research, this study draws upon Resource Dependency Theory (RDT) to demonstrate the moderating role of dependency. It sheds the light on the role of dependency as moderating variable (Hillman *et al.*, 2009; Ma, Rhee, & Yang, 2013). It provides two possible roles of dependency (Casciaro & Piskorski, 2005). On the one hand, because dependency entails an element of uncertainty, dependent firms will seriously seek to reduce and to manage these uncertainties by engaging in inter-organizational arrangements such as adopting B2B EC (Chatterjee, 2013; Iskandar *et al.*, 2001a; Reimers *et al.*, 2010b; Yang, 2013). On the other hand, since adoption of B2B EC requires adequate level of power to induce trading partner's participation, a dependent firm is in the worse position to do so successfully due to its lack of power and to the limited control it has

17

over its decision-making (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Hart & Saunders, 1997; Kim *et al.*, 2010; Li & Ghosh, 2012; Turker, 2014).

Keeping in mind the above possibilities, it can be argued that a high level of dependency acts as an amplifier to the role of appropriateness related factors (TOE factors). Specifically, appropriateness related factors coupled with the serious need to manage and to mitigate uncertainty surrounding vital resources encourages dependent firm to adopt B2B EC. Alternatively, it is also plausible to argue that a high level of dependency acts as an inhibitor to role of appropriateness related factors. Particularly, appropriateness related factors coupled with restrictions in scope and latitude of decision-making will constrain the role of appropriateness related factors in motivating firm to adopt B2B EC.

With regard to the moderating role of trust, Dirks and Ferrin (2001) and Shaw and Staples (2004) argue that trust has two possible effects on behavior (i.e. adoption behavior). These include direct and moderating effects. They emphasize that when trust has a moderating effect on behavior, it will guide the potential adopter to selectively perceive and interpret factors that have a direct effect on behavior. Teo, Ranganathan, and Dhaliwal (2006) argue that, the presence of some factors may be necessary, but they are insufficient by themselves to drive e-commerce adoption. Recent studies have found that trust per se does not play a significant direct role on the decision to adopt (Al-Hakim *et al.*, 2012; Chong & Bai, 2014; Saunders & Clark, 1992). Therefore, trust may be better understood as a variable that influences how potential adopter directs its motivation to adopt B2B EC.

To provide further clarification about this argument, DOI theory and TOE framework suggest that adoption behavior is driven by motivational factors that are technological, organizational, and environmental but not by trust. In this case, it is suggested that trust directs the motivation towards reaching decision to adopt as it provides information about the advisability of engaging in particular joint-action behavior (i.e. B2B EC adoption). Therefore, high level of trust between trading partners can reduce the expectancy of opportunistic behavior; it also reduces the degree of uncertainty on B2B EC adoption when it is considered as an appropriate choice (Andaleeb, 1995; Chang & Wong, 2010; Li *et al.*, 2012).

Another important issue in the literature, however, is the differences in the perspective of marketing and purchasing departments regarding B2B EC adoption. Chwelos *et al.* (2001) report that both sides of B2B EC could have different views on the adoption of B2B EC. Nakayama (2000; 2003) and Angeles and Nath (2000) have found that adoption of B2B EC could have repercussions on existing structure of relationship between trading partners. For example, in many cases, adoption of B2B by buyer could result in a major shift in bargaining power to their supplier. Hence, the determinants of B2B EC adoption could be different in view of marketing and purchasing departments. Therefore, this study attempts to accommodate both perspectives to determine whether the perspectives differ.

Prevailing empirical research does not provide conclusive evidence regarding the aforementioned issues. Whether trust and dependency moderate the relevance of different TOE elements, is still an unanswered question. Moreover, differences and similarities in the two perceptions of B2B EC with respect to the determinants of

B2B EC adoption are still uncovered. Those issues merit further study; therefore, this thesis extends the previous studies by answering those questions.

1.3 Research Questions

If B2B EC enables organizations to achieve several competitive advantages and is a tool necessary for managing challenges in the global economy, the low level of adoption of B2B EC raises concerns about determinants that motivate firms to adopt this technology. It also raises questions about factors that may prohibit or facilitate these motivations. As shown in the foregoing reviews, the fundamental research problem lies on one broad research question "***From marketing and purchasing perspectives, do relationship-related factors (trust and dependency) moderate the effect of technological, organizational, and environmental factors on the firm's intention to adopt B2B EC***". Therefore, the specific research questions for this study are as the following:

1. From marketing and purchasing perspectives, what is the relationship between technological, organizational, and environmental factors and the firm intention to adopt B2B EC?

2. From marketing and purchasing perspectives, does trust moderate the relationship between the independent variables and the intention to adopt B2B EC?

3. From marketing and purchasing perspectives, does dependency moderate the relationship between the independent variables and the intention to adopt B2B EC?

20

1.4 Research Objectives

To obtain further clarification of the research questions, the objective of this study is to understand the nature of firms' intention towards the adoption of B2B EC. Particularly, this study examines the effect of determinants of adoption behavior under high and low levels of trust and dependency. More precisely, this study seeks to achieve the following objectives:

1. To examine the effect of technological, organizational, and environmental factors on the intent to adopt B2B EC from marketing and purchasing perspectives.

2. To examine the influence of trust as a moderator variable on the relationship between the independent variables and the intention to adopt B2B EC from marketing and purchasing perspectives.

3. To examine the influence of dependency as a moderator variable on the relationship between the independent variables and the intention to adopt B2B EC from marketing and purchasing perspectives.

1.5 Significance of Study

Recently, businesses in developing countries are becoming more attracted to embrace e-commerce (Chen & Holsapple, 2013). Thus, it is becoming necessary to understand the rationale that motivates them to invest in such technologies. It is imperative for managers and policy makers to be aware of the several determinants that influence the adoption. Therefore, this study sought to understand and to identify the factors that are critical to organizations in their decision regarding the adoption of

21

B2B EC. This understanding will lead to meaningful and practical guidelines for adopting and practicing e-commerce.

In terms of contribution to the existing body of knowledge, this study adds to both, theory and practice. With regards to the theoretical contribution, this study identifies two interacting effects (trust and dependency) that could moderate the influence of some variables in explaining the intention to adopt B2B EC. Thus, it could explain part of the observed inconsistencies in previous studies. It could also generalize more robust results. This is because the inconsistencies in previous studies are a consequence of an interaction between determinants of the adoption (Hameed & Counsell, 2012; Hameed *et al.*, 2012b; Wolfe, 1994).

Moreover, use of multiple theories to explain the phenomena of adoption could overcome the blind spots in a single theory (Reimers *et al.*, 2010b; Robey, Im, & Wareham, 2008; Wolfe, 1994). This study used some assumptions of RDT to organize the relevance of TOE dimensions. By doing so, the predictive and explanatory power of TOE adoption model increases and produces results that serve both academicians and practitioners.

In term of the practical contributions, this study provided important insights to business decision makers and change agents, especially in the Jordanian private sector. Findings of this study offered a number of suggestions to senior management and change agents to facilitate greater diffusion of e-commerce technologies. They could use the study's framework to assess the capability of their organizations to adopt B2B EC and to assess the nature of relationship with their partnering

22

businesses before taking the decision to adopt B2B EC. Furthermore, it will help the firm's managers to initiate their agenda to overcome all obstacles before committing the decision to adopt B2B EC.

The results of this study also provide beneficial information to government officers. The results can be useful input to initiate and design appropriate policies and programs toward increasing the rate of diffusion. More extensive deployment of B2B EC ensures better efficiency and productivity of the national economy. Additionally, e-commerce consultants and vendors could use the expected findings to develop better sales and marketing plans, as well as to focus on companies that have greater capability to adopt B2B EC.

1.6 Scope of Study

This study focused on studying the determinants of B2B EC's adoption. The B2B EC was operationalized, in line with Sila (2013), as all internet technologies that enable inter-organization linkage. Such definition is widely used in B2B EC literature, see for example (Bell, Lai, & Li, 2012; Hsu *et al.*, 2006; Lai, Tong, & Lai, 2011; Liu, Sia, & Wei, 2008; Liu, Ke, Wei, Gu, & Chen, 2010; Zhu, Kraemer, & Xu, 2003). However, adoption literature offers several ways to measure and to examine adoption behavior. These include intention to adopt, adoption (adopter or non-adopter), and usage or usage intensity (Jeyaraj *et al.*, 2006; Liu & Min, 2008). This study chooses the "intent to adopt" to examine B2B EC adoption behavior for at least two reasons. First, intention to adopt has been widely used by previous researchers to identify factors that lead to initial adoption (Karahanna, Straub, & Chervany, 1999; Li,

23

Troutt, Brandyberry, & Wang, 2011; Lin, 2013a; Son & Benbasat, 2007); and thus it is compatible with the research objective of identifying factors that lead to initial adoption. Second, the results of previous studies suggest that adoption behavior appears to be determined by adoption intention (Salwani, Marthandan, Norzaidi, & Chong, 2009; Venkatesh, Davis, & Morris, 2007).

In this research, however, data was obtained from surveys distributed across two independent samples: the first sample targeted purchasing department and the second sample targeted marketing department. This approach is in line with recommendation from Chwelos *et al.* (2001). This is an appropriate strategy given that the firm's intention to adopt e-commerce with its business customer could be different from its intention to adopt B2B EC with its supplier (Chwelos *et al.*, 2001; Hollenstein & Woerter, 2008; Kim *et al.*, 2010).

Companies listed in Jordanian Companies Control Department (CCD) with large registered capital were the research population. There are two reasons behind the selection of those companies. Firstly, B2B EC technologies are complex systems and the adoption of such systems requires substantial technical and financial resources (Lin, Huang, & Burn, 2007; Venkatesh & Bala, 2012). Secondly, B2B EC adoption is correlated with high transactions volumes (Grover & Saeed, 2007; Liu *et al.*, 2008; Son & Benbasat, 2007). These parameters are most likely existing in companies with adequate resources. There is a greater likelihood that such companies have large registered capital (Akintoye, Mcintosh, & Fitzgerald, 2000; USAID, 2007).

24

In order to determine specific dimension within the context of TOE, this study considers only the variables that existing literature accepts as important determinants for B2B EC adoption even with inconsistency about their relevance. In the context of technology, several meta-analyses have determined that Relative Advantage, Complexity, and Compatibility to have an important influence on IS innovation diffusion (Hameed & Counsell, 2014; Jeyaraj *et al.*, 2006; Tornatzky & Klenin, 1982). Moreover, Al-Qirim (2010) has explored the most important technological variables that affect e-commerce in Jordan. He suggests that Relative advantages, Complexity, and Compatibility are more likely to influence the direction of e-commerce in Jordan.

Jeyaraj et al. (2006) reviewed IT adoption literature and conducted an analysis of 99 studies at an organization level. The result showed that Top Management Support is one of the best predictors for IS innovation adoption. In addition, a traditional principle in literature highlights the need for alignment between the nature of the technological change and the capabilities of potential adopters (Abernathy & Clark, 1985; Elia *et al.*, 2007; Guo & Wu, 2010; Mcelheran, 2013; Tarofder, Marthandan, Mohan, & Tarofder, 2013). In Jordanian business environment, Al-Qirim found that both Top Management Support and Organization Readiness are the most important organizational variables to adopt e-commerce initiatives. Therefore, they incorporated in the research model.

Lastly, in the environmental context of TOE, prior studies consistently propose the significant effect of competition on IS innovation diffusion (Ifinedo, 2011; Tarofder *et al.*, 2013). Since competition motivates firms to innovate, this study includes

25

competition in the environmental context. However, this study excludes other environmental factors such as government support and institutional pressures because they are perceived to be less important in the Jordanian environment. The Jordanian government merely played an indirect role by creating an environment that was appropriate to conduct online transactions (Al-qirim, 2010a; Al-qirim, 2010b; MOICT, 2012). It does not provide any technical or financial support. Moreover, this study excludes the role of institutional pressure because it is assumed that institutional pressures play a significant role only in the later stages of innovation diffusion (Beatty, Shim, & Jones, 2001; Jeyaraj, Balser, Chowa, & Griggs, 2008; Shih, 2012). Since the diffusion of such technology is still in its early stage in Jordan (Al-qirim, 2010a), institutional pressures are perceived to be less important in the Jordanian context.

1.7 Organization of Thesis

This thesis comprises of five interrelated chapters. This chapter consists of research background and motivation, statement of problem, questions of research, objectives of the study, and the significances and important of conducting the study. The second chapter discusses IT/ICT development in Jordan, relevant literature on in the domain of e-commerce adoption, determinants of B2B EC in previous research, and underpinning theories related to B2B EC adoption. The third chapter develops workable research framework that dealt with literature voids, presents the research hypotheses, explains the research design, and demonstrates the data collection, describe the descriptive statics regarding research variable and respective respondent, and finally justifies the data analysis strategy. Chapter four elaborates further on application of PLS-SEM in order to achieve the proposed research objectives and to test the proposed framework. Finally, chapter five provides an in-depth discussion of

26

the research findings, highlights the theoretical and practical implications of the study, specifies research limitations, and outlines future research directions that could extend the present study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview of the Chapter

The chapter proceeds as follows. In section 2.2, the literature review relating to ICT development in Jordan is discussed. Section 2.3 presents the e-commerce strategy and e-commerce adoption in Jordan. Section 2.4 describes the B2B EC by reviewing its definition and potential. Section 2.5 and 2.6 discuss the adoption research and the related literature, followed by section 2.7, which highlights the major innovation diffusion theories underpinning this study. The succeeding section 2.8 discusses the literature concerning B2B EC determinants. Finally, the chapter summary is presented in section 2.9.

2.2 Overview of ICT Development in Jordan

The Hashemite Kingdom of Jordan is a developing country with less than 7 million population and limited natural resources. The Jordanian government recognizes its weakness and its resource limitation. In the past four decades, Jordan has invested heavily on the development of human capabilities and focused on building strategic human resources. As a result, Jordan was able to develop educated and qualified human resources and send many of its workforces to the neighboring countries. King Abdullah II realized the importance of Jordan's human resource capabilities. He saw that ICTs, in conjunction with human resource capability, can provide outstanding opportunities for Jordan. His vision was to make Jordan a leader and pioneer in the field of ICT in the Arab region and to compete in the global ICT market (Al-Jaghoub & Westrup, 2003).

In view of this vision, the Jordanian government undertook aggressive steps by launching several smart initiatives that aimed to transform the country into a world-class competitor in the knowledge economy. Ever since Jordan adopted this vision and mission, some researchers consider it as a country that has the potential to become the Singapore of the Middle East in the adoption of ICT (Ciborra & Navarra, 2005; Mofleh & Wanous, 2008).

The Ministry of Information and Communications Technology (MOICT) was founded to be the government institution responsible for the formulation and design of ICT policies. Since 1999, the government has been launching new programs such as the REACH which was intended to reform the ICT sector. Further, Jordan issued the national ICT strategy (2007-2011) and (2013-2017) for developing a strong ICT industry. The main objective of all the initiatives and strategies was to boost Jordan's emerging IT sector and to maximize its ability to compete in local, regional, and global markets. These initiatives include action plans to improve various factors that influence ICT development such as capitalizing and financing of IT sectors, IT infrastructure, legislations and regulations, human resource development, and education and training (ESCWA, 2013b; Mofleh & Wanous, 2008; REACH, 2000).

As a result of these initiatives, Jordan became an outstanding example of a poor and developing country that has depended on ICT to enhance their interaction with the global business markets (Stafford, Turan, & Khasawneh, 2006). ICT became the fastest growing industry in the Jordanian economy with an average growth of 25% per annum. Figure 2.1 shows how the revenues of the ICT sector have swelled from

29

$560 million in 2001 to $2.424 billion in 2011. Further, ICT sector became the third contributor to Jordanian GDP. It presently contributes more than 14% thereof while other sectors such as agriculture and construction contributed less than 5% to GDP. With respect to opening new job opportunities, the ICT sector has created more than 84,000 jobs (direct and indirect) and has shared in 1.23% of total direct job opportunities in Jordan (Intaj, 2013).
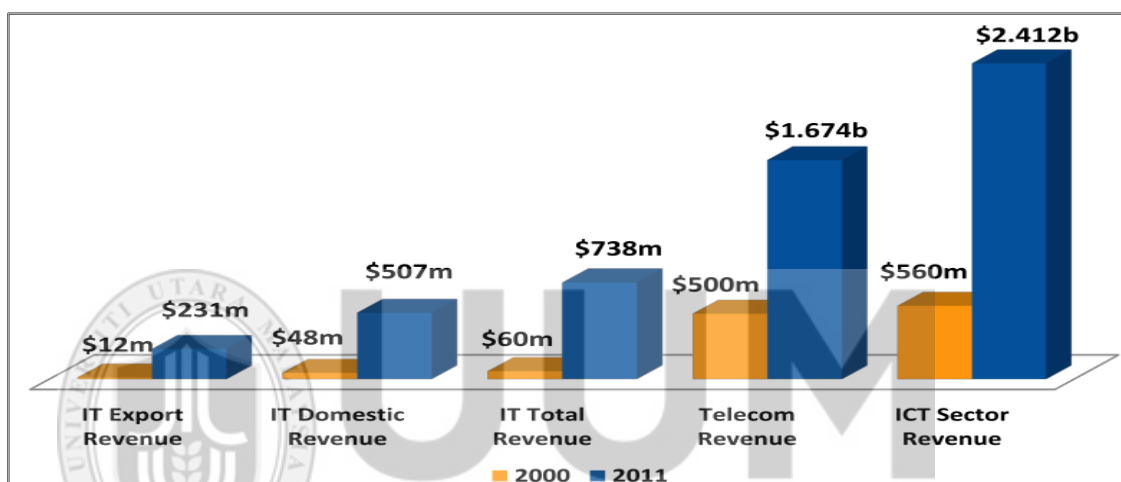
Source: (Intaj, 2013)
Figure 2. 1
ICT Industry Revenue, Comparison between 2001 and 2011
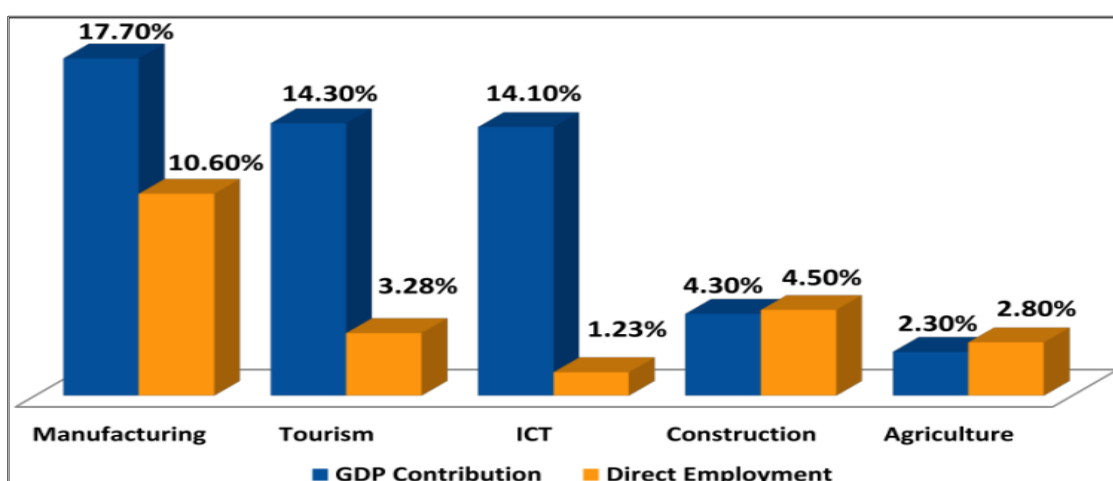
Source: (Intaj, 2013)
Figure 2. 2
ICT Industry GDP Contribution, Comparison between Sectors

In another respect, the influence of the above initiatives and policies clearly became evident in the rapid growth of internet users and internet penetration. In 2009, as depicted in Figure 2.3, the internet penetration stood at approximately 25%. Within seven years, the rate sharply increased to around 76% which indicated that more than two-thirds of the people have internet access (ESCWA, 2013b; The Jordan Times, 2015).
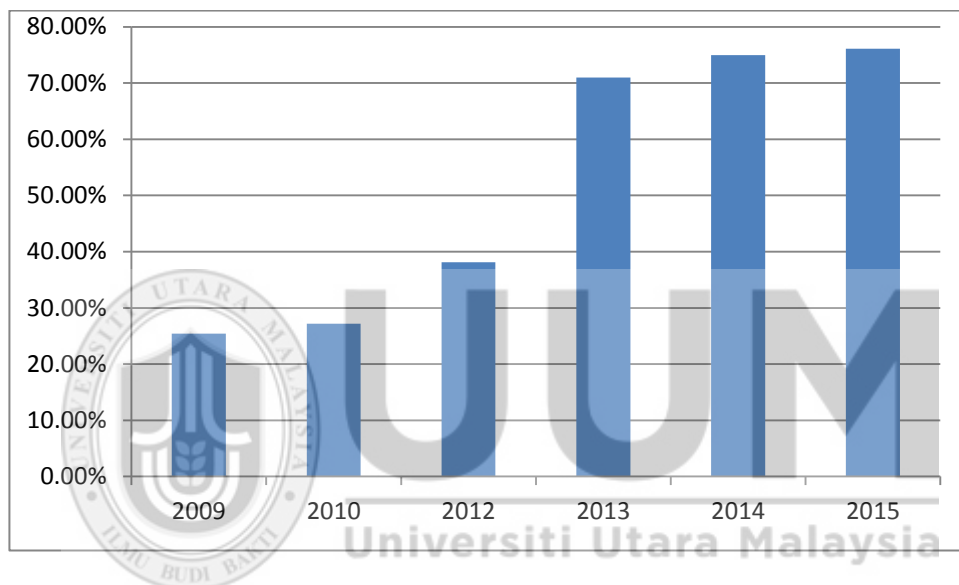
Figure 2. 3
Internet Penetration Rate between 2009 and 2015.

Furthermore, in private and public sectors, the diffusion and usage of computers was very notable. The result of the survey conducted by Telecommunications Regulatory Authority (TRA) in 2010 showed that all government offices use computers in their daily activities. In the private sector, 87% of the firms have computers and 82% use them in their daily transactions. Moreover, 74% of the private firms and 99% of the government offices have internet access (TRA, 2011).

In addition, Al Rawabdeh (2007) examined the status of e-commerce in Jordan. He stated that the successful penetration of e-commerce services into Jordanian business offices, factories, universities and schools, public sectors and households is becoming a reality. Due to the popularity of internet services, many businessmen in Jordan are more inclined to conduct their business over the internet (Al Rawabdeh, 2007).

The government also recognizes the role of e-commerce in achieving e-society. In line with that, the government has developed new strategies to enable e-commerce diffusion in the Jordanian business. The next section provides brief details about these strategies and the status of Jordanian e-commerce.

2.3 E-Commerce Strategy and Adoption Status in Jordan

In order to achieve Jordan's national agenda to be a world-class competitor in the Knowledge Economy by 2018, the Jordanian government recognizes the opportunities and the valuable input from the use of e-commerce. It recognizes e-commerce not only as an activity of selling and buying over Internet, but also as a means for collaboration that will enable firms to perform all value chain activities. Thus, e-commerce in the view of the government is regarded as a tool to enhance and support the industrial base which, in turn, leads to greater value added in all sectors that adopt e-commerce (MOICT, 2012).

In order to increase e-commerce diffusion in the business sector, the Jordanian government created a new strategy in 2012 to overcome various obstacles

32

confronting the development and usage of e-commerce. The government paid greater attention to e-commerce that enables businesses to interact and cooperate using online means (B2B EC). The focus on this type of e-commerce is attributed to the presence of sophisticated international and regional logistics firms in Jordan. (MOICT, 2012).

The e-commerce strategy envisions "Jordan to become a leading e-commerce center in the region through the exploitation of its information technology capacity and the creativity of its people". To achieve this vision, the strategy formulates four objectives:

1. To increase the wealth of the Jordanian people through the development and exploitation of e-commerce,
2. By 2012, to be a regional leader for IT systems development, applications and services associated with e-commerce,
3. To be one of the leading countries in the region that uses e-commerce, and
4. To be one of the leading countries in the region that uses e-commerce as a channel for domestic and international business to business collaboration and trade (MOICT, 2012).

The government has taken several steps in order to encourage businesses within the industrial and service sectors to adopt e-commerce in their activities. The government role was indirect one. It manifested by developing infrastructure and services that will support e-commerce adoption. It also includes preparing advanced education and training programs about telecommunications and information technology including e-commerce. Besides, taking actions to develop a legal

33

framework that would cover various electronic transactions and create laws that discourage 'cyber-crime' to protect e-commerce consumers (Al-qirim, 2010a; Al-qirim, 2010b; ESCWA, 2013b; MOICT, 2012).

As part of the government's efforts to implement the proposed actions resulting from the e-commerce strategy, an e-procurement pilot project is underway to increase the diffusion rate among businesses. This project is being executed by the Ministry of Finance with the United Nations Development Program (Sarayrah & Al-Utai, 2011). Furthermore, the government has created and revised a number of laws in order to support and enhance the e-commerce environment. For instance in 2010, the Government agreed to give an income tax exemption for any revenue generated from the e-commerce services (ESCWA, 2013b).

Consequentially, Jordan rated relatively high in the network readiness index in the region as shown in Table 2.1. This ranking was achieved because a lot of infrastructures were in place or nearly in place. Moreover, Jordan has good institutions and laws that facilitate e-commerce diffusion (Word Economic Forum, 2015).

Table 2. 1
Network Readiness Index Ranks

Countries	Rank
United Arab Emirates	23
Qatar	27
Bahrain	30
Saudi Arabia	35
Oman	42
Jordan	52
Kuwait	71
Morocco	78

Table 2. 1
Network Readiness Index Ranks

Countries	Rank
Tunisia	81
Egypt	94
Lebanon	99

Source: (Word Economic Forum, 2015)

Despite these advancements and the government efforts to increase e-commerce diffusion in general B2B EC in particular, the ultimate goal of Jordanian government to lead countries in the region in using B2B EC is still lag behind. In spite of the extensive use of computers and the deep penetration of the Internet in the country, a recent survey (see table 2.2) conducted to explore the current e-commerce status in private and public sectors showed that only 16.2% of the businesses use and provide general e-commerce services (ESCWA, 2013b; TRA, 2011).

Table 2. 2
Percentage of E-commerce Usage in 2008 and 2010.

Type of usage	Percentage	
	2008	2010
Percentage of businesses that have e-commerce activities*	10.03%	16.20%
Percentage of businesses that use the internet to contact with other private networks purchasing propose (orders/services) **	84.69%	66.60%
Percentage of businesses that use e-payment for their sales **	26.20%	28.90%
Percentage of firms that use the internet to receive sales' orders **	68.95%	64.10%
Percentage of firms that use e-payment for their purchases**	31.92%	31.40%

*Calculated from the total of firms that have internet access

** Calculated from the total of firms that have e-commerce activities
Source: (ESCWA, 2013b).

For that reasons, Jordanian government concludes the e-commerce strategy by stating "Much of the resource and expertise necessary for e-commerce is already

35

present in Jordan (…but) the main barrier is a psychological block; businesses, academics and public servants are waiting for someone or something to take e-commerce initiatives"(MOICT, 2012, p. 59).

The low level of e-commerce acceptance among businesses poses many questions about the reasons that encourage businesses to adopt B2B EC. An equal important question is what are the factors that lead the government to conclude the above conclusion? In particular, those factors that related to psychological factors. As well, those parties that acting as a catalyst for e-commerce adoption.

In summary, the statistical data show rapid development in ICT sector in Jordan. The Jordanian environment is ready for e-commerce usage indicating big opportunities for Jordanian organizations to explore advantages of e-commerce. In contrast, another statistical data show slow progress in adopting e-commerce especially when comparing the government target with the actual advancement. Therefore, the need for more explicit attention to investigate of e-commerce adoption is still an important issue that needs to be addressed.

However, to understand the adoption issue, the next sections discusses in detail the e-commerce, its potential and opportunities with more focus on B2B EC. Also, it provides some details on technology diffusion research and the reasons that motivate business to adopt new technology.

2.4 Business to Business Electronic Commerce (B2B EC)

Before delving into an in depth definition of B2B EC, all concepts surrounding it must be first clarified. This clarification is necessary because most of these terms are overlapping and at times used interchangeably in the literature. In general, e-business and e-commerce are the basic and comprehensive concepts which are used to describe any activity undertaken using internet or computers.

2.4.1   E-Commerce and E-Business Definition

E-business is considered a universal and broad concept which embraces any business activity conducted using electronic means. For example, Zhu, Kraemer, and Xu (2006) described e-business to refer to all value chain activities from inbound logistic to outbound logistics that are conducted using Internet technology. Hinton and Barnes (2009) defined e-business as conducting business within and between organizations using internet based ICTs. The foregoing definitions considered any activity conducted by a firm using web technology as e-business. These activities could be either within the firm (e.g. production activities, accounting, or human resource) or inter-firm activities (e.g. purchasing, selling, and marketing). Recently, however, some scholars restricted the concept of e-business to refer only to internet technology that supports activities between organizations, mainly between the firms and their business customers and suppliers. For example, Wiengarten *et al.* (2013) defined this concept as information systems that are implemented by an organization to support and enable electronic processes and activities with its key business customers and/or suppliers.

37

By contrast, e-commerce is the process of selling, buying, or exchanging services, products, and information using computer networks including the web based technology (Turban & David, 2012). This definition focuses more on activities that enable the company to interact with their environment. These activities include both inbound logistics and outbound logistics activities such as buying and selling activities. Other scholars stressed that e-commerce is not only limited to the purchasing and selling activities but also includes all activities that support the trading process (Quaddus & Achjari, 2005).

This overlap between e-business and e-commerce was a source of confusion. Since e-business has a general scope focusing on all the activities of the value chain as compared to e-commerce which has a narrow scope focusing on a firm's external activities, it is reasonable to consider that e-commerce is a subset of e-business.

E-commerce provides firms the ability to interact with a large number of stakeholders such as organization's employees, business partners and/or individual customer (Turban & David, 2012). This study will focus more on e-commerce which supports transactions between a firm and its trading partners. This type of web transaction is characterized in literature as B2B EC (Sila, 2013). Therefore, the rest of this section will be focusing more on B2B EC and its potentials.

2.4.2 B2B EC Definition

Ranganathan *et al.* (2004) defined B2B e-commerce as the "use of the Internet and Web-technologies for conducting inter-organizational business transactions". On the other hand, Sila (2013) defined it as an inter-organizational technological innovation that enables inter-firm process integration and allows supply chain partners to trade and share information using online technologies.

Because B2B EC transactions transcend organizational boundaries, it is linked to other concepts such as such Inter Organizational Information Systems (IOIS) and web /internet based supply chain (W/ESC) (Cao *et al.*, 2013b; Lin, 2013a; Ranganathan *et al.*, 2011; Sila, 2010). Subramani (2004) defined ESC as instances of information technologies employed in inter-organizational contexts to mediate buyer-supplier transactions. Reimers *et al.*(2010), on the other hand, defined IOS as information systems that span multiple organizations. The definitions of IOIS and ESC bear similarity to those of B2B EC, respectively.

2.4.3 B2B EC Types

There is a wide range of technologies that fall under the umbrella of B2B EC. Some B2B EC technologies are configured to support dyadic relationship. Others such as E-marketplace, are designed to support large number of buyers and suppliers (Lyytinen & Damsgaard, 2011). This section discusses types of these technologies.

2.4.3.1   Dyadic B2B EC

Dyadic B2B EC is an automated inter-organizational information system emerges when two independent organizations work together electronically (Ali, Kurnia, & Johnston, 2008; Lyytinen & Damsgaard, 2011). The exchange of documents and information is typically between two different companies, referred to as business partners or trading partners. This includes traditional Electronic Data Interchange (EDI), Forecasting and Replenishment, and Collaborative Planning systems (Lyytinen & Damsgaard, 2011). The most common documents and information exchanged via these systems are purchase orders, invoices and advance shipment notices, bill of lading, inventory documents, customs documents, payment documents, and shipping status documents. These technologies were important technologies in firms' transactions before the beginning of internet. With the advent of internet, such technologies are changing to by operated over the internet such as web EDI (Jung *et al.*, 2011).

2.4.3.2   B2B web portals

A B2B portal is a website gateway between a company and its prospects, institutional customers, suppliers and other institutional stakeholders (Baglieri, Secchi, & Croom, 2007; Chakraborty, Srivastava, & Warren, 2005; Kumar, 2012; Lin, Huang, & Stockdale, 2011). This differs from B2C web sites in that the prospects and customers are other businesses rather than end consumers. B2B portal provides a unified application access, knowledge management, and information management between both enterprises and their trading partners (Benbya, Passiante,

40

& Belbaly, 2004). A firm's B2B portal is typically used to provide general information about the company, trade or application-specific information and news, and product information and actual commercial transactions which often include order-placement, payment, tracking of shipment, etc. (Chakraborty *et al.*, 2005).

2.4.3.3   B2B E-marketplace

Jung *et al.* (2011) defined B2B E-marketplace as a web inter-organizational information system that supports exchanging information of products and services between buyers, suppliers and agents in the market. There are various ways of trading on B2B e-marketplaces. The most popular way is to categorize B2B e-marketplaces according to the number of participants (Dai & Kauffman, 2006; Jung *et al.*, 2011). One-to-one, many-to-many, and many-to-one are the most regularly mentioned scenarios. Another classification specifies B2B e-marketplaces as either public or private (Dai & Kauffman, 2006; Jung *et al.*, 2011). Public B2B e-marketplaces are available to all participants. Such B2B e-marketplaces are typically established by a third party. On the other hand, private B2B e-marketplaces are usually used by large companies and only available to specific suppliers or buyers to improve the procurement and/or sell process (Jung *et al.*, 2011).

Despite that each of these technologies has its own nature and purpose, most of them need a special standard to coordinate and manage transactions between participants (Lyytinen & Damsgaard, 2011). Those standards defines message guidelines, interfaces for business processes, and implementation frameworks for supply chain interactions between firms (Chan & Chong, 2012a).

41

To conclude, B2B EC involves at least two participators and no transaction takes place outside of this configuration. Some B2B EC technology configures to support dyadic relationship while others are designed to support a large number of buyers and suppliers such as E-marketplace (Lyytinen & Damsgaard, 2011).

2.4.4 B2B EC Potentials and Impacts

A large number of studies have been undertaken to determine the benefits achieved from using B2B EC and examine the firm performance after adopting a variety of IT applications such as EDI, IOS, e-procurement systems, as well as e-commerce (Dong *et al.*, 2009; Ramanathan, Ramanathan, & Hsiao, 2012; Ranganathan *et al.*, 2011; Saeed, Malhotra, & Grover, 2005; Wiengarten *et al.*, 2013; Yao & Zhu, 2012).

In general, the literature that described and analyzed how e-commerce affects the firm's performance depends heavily on Transaction Cost Economics (TCE) theory (Dong *et al.*, 2009; Pani, Agrahari, De, & Sahoo, 2011; Ramanathan *et al.*, 2012; Ranganathan *et al.*, 2011; Saeed *et al.*, 2005; Yao & Zhu, 2012). According to this theory, transaction cost is the result of conducting economic exchange. The main sources of cost are the coordination cost, information and search costs, governance cost, and asset specificity cost (Williamson, 1979). Thus, the usage of electronic commerce to perform organizational transactions could reduce the cost of doing these transactions and lead to different performance results (Dong *et al.*, 2009; Saeed *et al.*, 2005; Sanders, 2007; Wiengarten *et al.*, 2013; Yao & Zhu, 2012; Zhu & Kraemer, 2005).

42

Prior studies have identified two potentials of B2B EC to organizations. First, it enables the transmission of information and exchange of communication in real time. Therefore, using e-commerce is supposed to reduce the cost of communications (Dedrick *et al.*, 2008; Malone, Yates, & Benjamin., 1987; Ranganathan *et al.*, 2004; Ranganathan *et al.*, 2011; Wu & Lee, 2005; Wu, Mahajan, & Balasubramanian, 2003; Wu *et al.*, 2007; Yao & Zhu, 2012; Zhu & Kraemer, 2002). Second, using B2B EC in buyer-supplier relationship enables tighter business processes integration. In this manner, B2B EC provides the capability to increase information availability and processing capacity. Consequently, it reduces the costs of coordination among partners including the costs of monitoring, processing and information exchange (Dong *et al.*, 2009; Ray, Muhanna, & Barney, 2005; Sanders, 2007; Wiengarten *et al.*, 2013; Yao & Zhu, 2012; Zhou & Zhu, 2010; Zhu & Kraemer, 2002). In addition, benefits such as faster decision-making, reduced marketing time, increased efficiency and productivity, better control, and reduced bureaucratic systems have been recorded (Elia *et al.*, 2007; Ranganathan *et al.*, 2011; Sanders, 2008; Scupola, 2009).

In the literature, however, there is ample evidence of the relationship between the use of B2B EC and firm performance. For example, Ranganathan *et al.*(2011) examined the impact of web SCM on the firm's performance. They found that the frequent use of Internet technology in the supply chain operations (e.g. order processing, demand management, invoicing, etc.) led to more benefits in reducing cycle time, improving customer service, improving inventory control, and achieving greater competitive advantage. Wiengarten *et al.* (2013) reported that B2B EC promotes cooperation between partners which has a positive effect on several dimensions of operational performance, i.e., cost, quality, innovation, and flexibility.

In addition, Sanders (2008) confirmed that the use of B2B EC technology in the supply chain provides high order processing capabilities that lead to better performance. Also, he emphasized that using B2B EC technology that enables real-time collaboration among partners improves inventory management, production, planning, and distribution function. Sila (2010) studied the consequences of e-commerce usage and found that the adoption of e-commerce does not have a direct impact on the operational performance of the firm. Instead, it improves the performance of business operations first and later enhances operational performance. He also argued that the impact of e-commerce on financial performance is also not direct but through the mediation of the operational performance and business process performance.

Moreover, Johnston, Wade, & Mcclean (2007) found that e-commerce helped firms reduce costs and increase profits. Ranganathan *et al.* (2004) found that adopting web technologies in the firms' supply chains led to improved performance. Further, the adoption of internet technology allows firms to achieve various competitive advantages such as cost reduction, differentiation, and alliance advantages. Many studies reported positive association between B2B EC usage and firm performance (Ramanathan *et al.*, 2012; Ranganathan *et al.*, 2011; Sila, 2010; Subramani, 2004; Wiengarten *et al.*, 2013; Zhu & Kraemer, 2002; Zhu & Kraemer, 2005).

On the other hand, some research has refuted the idea of economic power of IS (Cao, Wiengarten, Humphreys, & McHugh, 2013a; Masli, Richardson, & Smith, 2011; Schryen, 2012). In this respect, large body of research was conducted to prove the positive influence that IS could bring to the firm. For example, one stream of

44

research emphasized that IT/IS business value is a function of alignment between IT capability and business strategy (Chan, Sabherwal, & Thatcher, 2006; Sila & Dobni, 2012; Yayla & Hu, 2011). Recently, other research streams focused on the alignment between business processes and B2B EC capability in examining the IT business value rather than focusing on strategic level of alignment specially among SMEs (Mohamad & Ismail, 2012; Tallon, 2012).

2.4.5 Application of B2B EC in Manufacturing and Services Sectors

B2B technologies are an infrastructure of a supply chain management system in manufacturing industries. It is designed to automatically process electronic business communications such as orders, shipping notifications, or invoices (Sila, 2010). Several types of B2B applications are now already in use in several manufacturing sectors. This includes purchasing and procurement applications (e.g., communicating vendors, purchasing from catalogs, with checking vendor price quotes, etc.), Inventory management applications (e.g., JIT delivery programs, communicating stock-outs, raw material and finished goods inventory levels, etc.),Transportation applications (e.g., monitoring pickups, drop-offs and on-time arrivals, managing claims, etc.), Order processing applications (e.g., Monitoring vendor orders, checking customer and vendor credit, tracking returned customer merchandise, etc.), Customer service applications (e.g., Receiving customer complaints, providing technical service, notifying customers of emergencies, etc.), Vendor relations applications (e.g., Monitoring vendor deliveries to depots, receiving queries from vendors, monitoring vendor raw material stock levels etc.), and

45

Production scheduling applications (e.g., Coordinating schedules with vendors and field depots, coordinating with JIT of vendors, etc.) (Sila, 2010).

B2B technologies also have been widely adopted in services sectors. In Healthcare industries for example, B2B e-commerce involves transactions and the exchange of information among hospitals, insurance agencies, vendors, state and federal regulators, and doctors' offices (Fung, Chee, & Yazdanifard, 2011; Lin, Huang, Jalleh, Liu, & Tung, 2010) . In financial sectors, the growth of international trade has created interdependencies between buyers and suppliers across geographies, resulting in the globalization of the financial supply chain. Due to the global nature of the financial services industry, there are numerous file format and communications protocols in use today, along with a number of regional B2B networks (Teo *et al.*, 2003).

Meanwhile, the retail sector has enjoyed the benefits of B2B technologies for decades. Pioneered by the likes of Walmart and Proctor & Gamble in the 1980s, vendor managed inventory (VMI) has become a driving force for the industry to cut costs while increasing customer service. It is the concept at the core of the grocery industry's "quick response" approach to product flow across the supply chain (Kamalapur, Lyth, & Houshyar, 2013). In VMI, the supplier makes the main inventory replenishment decisions for the institutional customer. The result is that leading to less waste or over-supply and the replenishment cycle, the supplier has much greater control of inventory, increasing customer service (Kamalapur *et al.*, 2013).

The B2B EC also value of wholesale trade, an intermediate step in product distribution, is also a major theme in B2B EC. In United Stat, B2B EC made up roughly 18 percent of the entire merchant wholesale trade sales in 2013, with a value of over 2.5 trillion U.S. dollars (Hiwale, Wayal, & Yendhe, 2015). Likewise, Tourist Service Providers like airlines, hotel sells their products to other business like tour operators. To promote tourism, B2B EC model works with the collaboration of different businesses (i.e. Airlines, Hotels, Tour Operators, and Agents etc.) (Kabir, Jahan, Adnan, & Khan, 2012). Along with, in the insurance service industry, insurance companies have adopted e-commerce as integral part to their strategy. B2B technologies such as E-marketplaces or B2B portals enable insurance companies to promote their institutional customers to purchase policies, lodge and track claims, renew policies, and advertise their products over the Internet (Yao, 2004).

In summary, there is sufficient literature that acknowledges the potential of B2B EC and its positive effect on business performance. It is worthy to investigate the reasons behind the low level of acceptance of such technology. In order to investigate this issue, the next section discusses what adoption research is and what has been done in prior research.

2.5 What Is E-Commerce Adoption Research?

IT adoption research has been initiated to investigate the slow and often unexpected adoption of IT innovations. This issue has motivated scholars and practitioners to understand, manage, and predict its diffusion. Most adoption studies seem to address the same research question: What factors facilitate or hinder the adoption and diffusion of IT based innovations within a population of potential adopters? (Fichman, 2014; Fichman & Carroll, 2004; Ghobakhloo, Hong, Sabouri, & Zulkifli, 2012; Jeyaraj *et al.*, 2006; Lin, 2013a; Mohamad & Ismail, 2009; Robey *et al.*, 2008; Yoon & George, 2013).

Innovation is 'an idea, practice or object that is perceived as new by an individual or other unit of adoption (Rogers, 1995). Fichman (2014) define digital innovation as a business model, process, or product that is perceived as new, entails some substantial changes on the part of adopters, and is enabled by or embodied in IT. Scholars argue that innovation adoption could be understood as a process consisting of several stages. The process of IT innovation adoption has been divided by several scholars into a variety of stages. For example, Zmud (1982) divided the innovation adoption into three stages that include initiation, adoption, and implementation stages while Premkumar (1995) divided it into four stages comprising of comprehension, adoption, implementation, and assimilation. For Meyer & Goes (1988), adoption process consists of five stages which include knowledge awareness, evaluation, adoption, implementation, and expansion while Zhu, Kraemer, and Xu (2006), Chan, Chong, and Zhou (2012b) and Wu and Chuang (2010) divided it into three stages that involve initiation, adoption, and routinization .

48

Lin (2013a; 2013b), Rogers (2003), Thong (1999) and Hameed *et al.* (2012) argued that all of these stages can be classified into two general stages: initial adoption stage (pre-adoption) and post adoption stage (usage stage). The pre-adoption stage inquires on what made/makes the adopter likely to respond to the change. It focuses on the factors that led to the decision to adopt (Hameed *et al.*, 2012a; Karahanna *et al.*, 1999; Lin, 2013b; Son & Benbasat, 2007). On the other hand, post-adoption stage focuses on understanding how to put an innovation into use. This stage is concerned about innovation design and implementation process and procedures to increase widespread and rapid acceptance of the innovation (Lin, 2013b; Ramdani & Kawalek, 2007; Rogers, 2003).

The present IT adoption research shows diversity in the dependent variables that are used to measure the adoption behavior. Most of adoption research fall under three categories (Jeyaraj *et al.*, 2006; Liu & Min, 2008). The first category examined the "adoption intention" which refers to pre-adoption stage (Lin, 2013a; Lin, 2013b). Researchers asked the respondent to assess their willingness to adopt a particular technology (Jeyaraj *et al.*, 2006). The second category focused on the adoption decision, whether the respondent is an adopter or non-adopter. It is also refers to pre-adoption stage (Karahanna *et al.*, 1999; Sharma & Rai, 2013). The researchers measured adoption by asking the respondent whether they are currently adopters or non-adopters (Mohamad & Ismail, 2009). The third category examined the usage or usage intensity which refers to post-adoption stage. Scholars in this research area examined the determinants of usage or usage intensity (Chen & Holsapple, 2013; Hameed *et al.*, 2012a; Jeyaraj *et al.*, 2006; Liu & Min, 2008; Mohamad & Ismail,

2009). Mohamad & Ismail (2009) labeled the last category as e-commerce diffusion, which refers to the extent to which e-commerce technology assimilates into the firm's operation or the degree of e-commerce intensity. Table 2.3 provides selected articles that used these dependent variables.

Table 2. 3
Dependent Variables (DV) in Diffusion Research

DV	Selected Reference
Intention to use or adopt	(Chwelos *et al.*, 2001; Khalifa & Davison, 2006; Lin, 2013a; Pan, 2013; Quaddus & Hofmeyer, 2007; Son & Benbasat, 2007; Teo *et al.*, 2003; Tsai, Lai, & Hsu, 2013; Tsai, Lee, & Wu, 2010; Zhu *et al.*, 2003).
Adoption decision	(Al-Qirim, 2007; Grandon & Pearson, 2004; Henriksen, 2006; Kuan & Chau, 2001; Pearson & Grandon, 2005; Ramdani *et al.*, 2013; Teo, Lin, & Lai, 2009; Thong & Yap, 1995)
Diffusion	(Soares-Aguiar & Antonio, 2008; Son *et al.*, 2005; Wu & Lee, 2005; Wu *et al.*, 2003; Zhu & Kraemer, 2005)

The presence of several variables to measure adoption would create a question on whether factors that affect intention, adoption decision, or usage are the same. Karahanna *et al.* (1999) were the first scholars who conducted comparative study to examine whether potential adopters (pre adoption) and current users of IT (post adoption) hold the same perceptions and beliefs. Further, they examined whether the influencing factors in determining behavioral intention are the same for potential adopters and current users of IT. They studied this theoretical question by examining the individual (potential adopter and actual adopter) decision to adopt and use windows technology in a single organization. The result showed that the determinants of intention to use and actual usage are very different.

The rationale behind these differences has been provided by cognitive dissonance theory (Cummings & Venkatesan, 1976) and consumer behavior research (Howard

& Sheth, 1969). According to these theories, the perceptions and beliefs of the adopter may be changed after usage behavior. As a result, beliefs and perceptions held by users may not be the same as the set of beliefs and perceptions that have led to initial adoption (Karahanna *et al.*, 1999; Lin, 2013a; Son & Benbasat, 2007).

Lin (2013a; 2013b), Tornatzky *et al.* (1983), and Son *et al.* (2005) confirmed this logic. They stated that adoption is a prerequisite for usage. Therefore, factors affecting the initial adoption could have the opposite effect on the later decisions to continue to use the innovation. One example regarding this issue is the influence of power exercise in the context of B2B EC adoption. Some research found that it is significantly affecting the intention to adopt (Son & Benbasat, 2007; Teo *et al.*, 2003) while others found it insignificant and even has negative influence on the usage of B2B EC technology (Hart & Saunders, 1998; He, Ghobadian, & Gallear, 2013; Son *et al.*, 2005).

In summary, adoption research focuses on two different stages including pre-adoption stage and post adoption stage. Pre-adoption stage involves intention to adopt and adoption decision (yes/no). The pre-adoption research focuses on factors that motivate and lead the potential adopter to adopt an innovation. On the other hand, post-adoption stage involves usage and/or usage intensity. It focuses on factors that motivate the adopter to continue to use or the degree of usage. In sum, choosing the adoption intention to investigate the low level of B2B EC could be more appropriate than usage or usage intensity since adoption intention reflects the perception and belief that lead to initial adoption (Karahanna *et al.*, 1999; Lin, 2013a; Son & Benbasat, 2007). In addition, Venkatesh, Davis, and Morris (2007)

51

reported that limited research challenges the basic tenets of intention theories. The next section reviews the work done in prior research.

2.6 Overview of Prior Studies

In e-commerce adoption research, there are different perspectives that have been considered to investigate and to analyses the influencing factors, namely efficiency-choice perspective, institutional perspective, integrative perspective, and social exchange perspective. The first perspective is oriented to examine of intra-organizational factors (Alsaad *et al.*, 2014; Fichman & Carroll, 2004; Khalifa & Davison, 2006; Messerschmidt & Hinz, 2013). The second perspective examines the impact of the institutional environment (Currie, 2009; Messerschmidt & Hinz, 2013; Pearson & Keller, 2009; Teo *et al.*, 2003; Weerakkody *et al.*, 2009; Yoon & George, 2013). The third perspective integrates the first and second perspectives (Alsaad *et al.*, 2014; Oliveira *et al.*, 2011; Yoon & George, 2013). Finally, the fourth perspective examine the role of relationship factors (Al-Hakim *et al.*, 2012; Alsaad *et al.*, 2014; Chong & Bai, 2014; Chong *et al.*, 2013; Hart & Saunders, 1997; Son *et al.*, 2008).

2.6.1   Efficiency-Choice (Rational Perspective)

Efficiency-choice (rational perspective) focuses mainly on technological and organizational factors (Alsaad *et al.*, 2014; Barrett & Walsham, 2013; Basaglia *et al.*, 2008; Khalifa & Davison, 2006; Tan & Fichman, 2002). Proponents of this perspective argue that the adoption of a new innovation is a rational decision and is

independent of any external influence in the social sphere (Lyytinen & Damsgaard, 2011; Tan & Fichman, 2002). They predict that innovation is adopted by rational decision makers who weigh costs and benefits of available alternatives and select accordingly (Ansari & Zajac, 2010; Hillebrand *et al.*, 2011). They emphasize that the degree of appropriateness of innovation (i.e. B2B EC) encourages potential adopters to acceptance or rejection it. They stress that appropriateness of innovation is, in turn, determined by evaluation of desirability of innovation and organizational capability (Alsaad *et al.*, 2014; Basaglia *et al.*, 2008; Guo & Wu, 2010; Khalifa & Davison, 2006; Srivastava *et al.*, 2009; Tan & Fichman, 2002).

With regard to innovation desirability, potential adopters evaluate first the innovation characteristics to build cognition that whether or not B2B EC is an appropriate choice. Then, they decide whether to accept or to reject the innovation (Alsaad *et al.*, 2014; Khalifa & Davison, 2006; Lyytinen & Damsgaard, 2011; Moore & Benbasat, 1991; Tan & Fichman, 2002; To & Ngai, 2006). Therefore, the higher the appropriateness of innovation, the higher the innovation will be adopted (Ansari & Zajac, 2010; Hillebrand *et al.*, 2011; Lyytinen & Damsgaard, 2011; Rogers, 2003). Several theories have been commonly associated to innovation characteristics evaluation such as Technology-Task-Fit (TTF), Technology Acceptance Model (TAM), Reasoned Action Theory (TRA), Theory of Planned Behavior (TPB) and DOI (Lyytinen & Damsgaard, 2011).

DOI stands out as one of the most popular theories used in adoption research to examine the appropriateness of innovation (Hameed & Counsell, 2012; Mohamad & Ismail, 2009; Sila, 2013). Rogers' innovation characteristics such as Relative

Advantage, Complexity, Observability, Compatibility, and Triability are widely used in adoption research. Prior research found that innovation characteristics significantly affect information system adoption (Ahmad, Rahim, Bakar, & Mohamed, 2014; Alam, 2009; Khalifa & Davison, 2006; Lin, 2013a; Quaddus & Shah, 2011; Ramdani *et al.*, 2013; Tarofder *et al.*, 2013). Through a meta-analysis, Hameed and Counsell (2014), Jeyaraj *et al*. (2006), and Tornatzky and Klenin (1982) examined the innovation adoption determinants and reported that Relative Advantage, Complexity, and Compatibility are the most important factors that affect innovation evaluation.

In addition to Rogers' innovation characteristics, some studies have focused on some technical factors related to the virtual nature of e-commece. This includes factors such as data security, network reliability, scalability, and innovation costs. They have been found to have a significant influence on e-commerce adoption (Khalifa & Davison, 2006; Sila, 2010; Sila, 2013; Soliman & Janz, 2004; Tan *et al.*, 2009; Thi & Lim, 2011).

Meanwhile, Cao, Gan, *et al*.(2013) and Setia, Sambamurthy and Closs (2007) relied upon TTF theory to examine innovation adoption determinant at the organization level. The TTF theory assumes that technology will be used only if there is technological fit between the requirement of the task and functions of innovation (Goodhue & Thompson, 1995). System reliability, Data quality, Ease of use, Compatibility, and Authorization are the major dimensions of this theory (Goodhue, 1998). In the context B2B EC, Cao, Gan, *et al*.(2013) and Setia *et al*. (2007) found empirical support for the influence of these factors on adoption decision.

In addition, researchers examined the influence of behavioral factors such as managers' attitudes, perceptions, and beliefs on adoption decision. For instance, theories such as TRA, TAM, TBP, or UTAUT have been used to investigate the B2B EC adoption (Aboelmaged, 2010; Chan *et al.*, 2012b; Grandón, Nasco, & Mykytyn, 2011; Li & Ghosh, 2012; Nasco, Toledo, & Mykytyn, 2008; Oh, Cruickshank, & Anderson, 2009; Quaddus & Hofmeyer, 2007; Yu & Tao, 2009). The main explanation of using these theories at an organization level is that a firm's decision to adopt an innovation is driven by its individual beliefs about the focal innovation, i.e., e-commerce (Hossain & Quaddus, 2011). For example, Grandón *et al*. (2011) and Nasco *et al*. (2008) used TRA and TPB to examine the e-commerce determinants. These theories claim that potential adopters behave rationally. They gather and evaluate information about an innovation, consider the consequences of accepting an innovation, and finally decide whether to adopt or reject (Hossain & Quaddus, 2011). Furthermore, Li and Ghosh (2012), Obal (2013), Oh *et al*. (2009), and Tao (2009) used the TAM model and found that perceived usefulness and perceived ease of use significantly influence the decision to adoption.

Moreover, Transaction Cost Theory (TCT) has been considered by Iskandar, Kurokawa, & Leblanc, (2001), Son & Benbasat (2007), and Son *et al.* (2005) to determine the circumstances under which organizations should benefit from a particular type of IT innovation. The main concept of TCT is that both internal coordination and external interaction increase the transaction costs. Coordination mechanisms or governance structure, i.e., B2B EC should be used to reduce costs. There are varieties of coordination mechanisms such as e-marketplace and private

IOS that offer several levels of coordination capability. Efficient mechanisms are based on an alignment between coordination needs and coordination mechanisms (Dong *et al.*, 2009; Grover & Saeed, 2007; Yao & Zhu, 2012; Zipkin, 2012).

In this stream of research, scholars focused on the transaction characteristics and relationship characteristics between partners. For example, Grover & Saeed (2007) examined the influence of demand uncertainty, component complexity, market volatility, and market fragmentation. These factors coupled with an open information-sharing environment are hypothesized to influence IOS usage. The result showed that firms tend to use IOS under three conditions including (i) high transaction complexity, (ii) presence of open information sharing environment, and (iii) low market fragmentation.

Furthermore, Son and Benbasat (2007) report that product characteristics, demand uncertainty, and market volatility exhibit a significant influence on adoption intent and/or usage intensity. Other scholars found that the transaction volume and higher transaction frequency influence the B2B EC usage and/or the intent to use (Iskandar *et al.*, 2001a; Lin, 2010; Liu *et al.*, 2008; Son *et al.*, 2008).

An equally significant aspect of determining the appropriateness of innovation is organization capability and characteristics. It focuses on set of internal organizational characteristics that enables a firm to adopt an innovation in successful manner (Ghobakhloo *et al.*, 2012; Khalifa & Davison, 2006; Lin, 2013b). Ramdani and Kawalek (2007) stated that the rationale behind the influence of organization

capability corresponds to the Resource Based View (RBV) theory. It assumes that the firm will exploit its core competencies to gain competitive advantage.

These factors (characteristics) are more discretionary and controllable by the organization and its top management (Damanpour & Schneider, 2006; Ghobakhloo *et al.*, 2012). Scholars investigated the effects of a wide range of organizational factors. Some of them examined the influence of factors related to the organization's ability to adopt innovation successfully. The organization's ability variables such as IT sophistication, technology readiness, technology competence, IT Intensity, IS infrastructure, and back-end capabilities have been extensively examined (Chan *et al.*, 2012b; Chwelos *et al.*, 2001; Ifinedo, 2011; Khalifa & Davison, 2006; Teo *et al.*, 2009; Vize, Coughlan, Kennedy, & Ellis-Chadwick, 2013; Zhu & Kraemer, 2005; Zhu *et al.*, 2006b). In addition, financial readiness which involves variables such as organization slack, feasibility, and financial commitment (Khalifa & Davison, 2006; Tsai *et al.*, 2013; Zheng *et al.*, 2013) have been also examined. All of these variables highly participate in predicting the adoption behavior.

Other scholars examined variables related to organizational structure such as firm size (Al-Hakim *et al.*, 2012; Oliveira & Martins, 2010; Teo, 2007; Zhu & Kraemer, 2005; Zhu *et al.*, 2006b), firm scope (Chan, Chong, & Darmawan, 2012a; Salwani *et al.*, 2009; Soares-Aguiar & Antonio, 2008; Yoon & George, 2013; Zhu *et al.*, 2006b; Zhu *et al.*, 2003), centralization (Hameed *et al.*, 2012b; Ranganathan *et al.*, 2011; Unsworth, Sawang, Murray, Norman, & Sorbello, 2012), and formalization (Claycomb, Iyer, & Germain, 2005; Hameed *et al.*, 2012b).

Lastly, some researchers follow leadership research. The main idea of this stream is that top managers or strategic leaders heavily affect the organizational capabilities to adopt technology. They are forces that work with or against innovation adoption. These forces manifested by enabling and motivating lower level managers and employees, establishing organizational culture, and building capability for change and adopting new innovation (Ahmad *et al.*, 2014; Damanpour & Schneider, 2006; Damanpour & Schneider, 2008; Ghobakhloo & Tang, 2013; Hameed & Counsell, 2012). Researchers in this field assume that managers have personal qualities predisposing them to innovate (Slappendel, 1996). Thus, factors such as CEO attributes relating to age, education, tenure (Alam, 2009; Al-Qirim, 2007; Damanpour & Schneider, 2008; Peltier, Zhao, & Schibrowsky, 2012; Thi & Lim, 2011), CEO's innovativeness, CEO involvement and support (Al-qirim, 2007; Liang & Saraf, 2007; Lin, 2013a; Ramdani *et al.*, 2013; Thong, 1999; Thong & Yap, 1995; Zheng *et al.*, 2013), managerial IT Knowledge (Ranganathan *et al.*, 2004; Teo *et al.*, 2006; Zhang & Dhaliwal, 2009), managerial obstacles (Thatcher, Foster, & Zhu, 2006), managerial productivity (Kollmann *et al.*, 2009), and managerial belief and attitude (Aboelmaged, 2010; Ahmad *et al.*, 2014; Chan *et al.*, 2012b; Grandón *et al.*, 2011; Nasco *et al.*, 2008; Oh *et al.*, 2009; Quaddus & Hofmeyer, 2007; Yu & Tao, 2009) have been examined.

In conclusion, this perspective assumes that adoption is a rational behavior and the potential adopter enjoys complete freedom in deciding whether to adopt or reject the innovation. The potential adopter builds his decision based on cognitive state about innovation desirability and its capability to adopt such technology. The influence of

external environment is almost ignored in this perspective. Next section discuses in details the role of external environment on decision to adopt.

2.6.2   Institutional Perspective

The second perspective focuses on the influence of institutional environment on decision to adopt. Researchers considered an institutional theory as a lens to investigate the effects of business environment. This perspective assumes that organization's decision and behaviors cannot be explained by emphasizing only on the rational actions of managers (Currie, 2009; Hertwig, 2012; Heugens & Lander, 2009; Mignerat & Rivard, 2009; Teo *et al.*, 2003). The researchers argued that organizations accept and follow the social norms to gain organizational legitimacy regardless of the actual impact of the innovation on the performance (DiMaggio & Powell, 1983; Hertwig, 2012; Mignerat & Rivard, 2009; Scott, 1995).

In their seminal work, DiMaggio and Powell (1983) suggest that there are three processes by which an innovation became socially accepted namely; coercive, mimic, and normative pressures. Coercive pressures refer to pressures exerted on organizations by other organizations upon which they are dependent. Mimetic pressures appear at times of uncertainty, when organizations will tend to model themselves on other organizations in their fields that are perceived to be more legitimate or successful. Normative pressures are about pressures exerted by professionalization such similar educational backgrounds, inter-organizational networks, and mimetic behaviours in a profession (DiMaggio & Powell, 1983; Hertwig, 2012; Mignerat & Rivard, 2009; Scott, 1995). Those pressures make

organizational practices and organizational innovations to become more socially accepted among particular population. However, empirical research has showed that institutional pressures need long time to be established in particular environment. Therefore, many researchers found that institutional pressures play a significant role only in the later stages of diffusion (Beatty *et al.*, 2001; Jeyaraj *et al.*, 2008; Shih, 2012).

In addition to the institutional pressures, IS researchers have found multiple variables in organization environment have a significant influence adoption behavior (i.e. B2B EC). In this literature, industry pressure (Ali & Kurnia, 2010; Kurnia, Alzougool, Ali, & Alhashmi, 2009), vendor support, suppliers support (Al-Qirim, 2007; Hossain, 2011; Hossain & Quaddus, 2010), government support, legal environment, social and culture (Gibbs & Kraemer, 2004; Kshetri, 2007; Kshetri, 2010; Tsai, 2012; Zhu & Thatcher, 2010), network externality (Cao *et al.*, 2013b; Huang *et al.*, 2008; Lanzolla & Suarez, 2010), and competition (Ifinedo, 2011; Ranganathan *et al.*, 2004; Tarofder *et al.*, 2013; Xiao, Wang, & He, 2010; Zhang & Dhaliwal, 2009; Zhu *et al.*, 2006b) have also been examined.

In summary, institutional perspective explains how e-commerce adoption is constrained by institutional forces. An institutional force provides more insights into the complex process of innovation adoption in business organization where the adoption is not only an internal decision but also influenced by external environments. Next section elaborates on how researchers integrate the previous perspectives to predict e-commerce adoption.

2.6.3 Integrative Perspective

In order to explain how adoption decision is neither entirely goal-oriented nor uniquely it is response to institutional pressure, several studies have integrated the rational and institutional perspective into a single theoretical framework (Bala & Venkatesh, 2007; Messerschmidt & Hinz, 2013; Oliveira & Martins, 2010; Soares-Aguiar & Antonio, 2008; Venkatesh & Bala, 2012; Wong *et al.*, 2009; Yoon & George, 2013). One of the frameworks that combine both perspectives is the Technological–Organization–Environment (TOE). The TOE classifies innovation characteristics as technological factors, organizational characteristics and leadership characteristics as organizational factors, and institutional pressures are considered as environmental factors (Oliveira *et al.*, 2011; Weerakkody *et al.*, 2009; Yang, Kankanhalli, Ng, Tuang, & Lim, 2013).

In general, most of prior studies follow this perspective. It explains high percentage of adoption variance. Also it permits researchers to include wide range of variables under each context (Arpaci, 2012; Baker, 2012; Khalifa & Davison, 2006; Oliveira *et al.*, 2011; Teo *et al.*, 2009). In sum using this perspective to examine the adoption of B2B EC could be good starting point. It holds the causality of rational and institutional perspectives. Next section describes the last perspective that used to demonstrate the adoption of B2B EC.

2.6.4   Social Exchange Perspective

This view is provided by social exchange theorists. They provide a complementary insight into the adoption of B2B EC. They understood adoption of B2B EC as a collective decision involved two parties (buyer and supplier). No adoption can take place without participation of both parties (Ali, 2010; Lyytinen & Damsgaard, 2011). Buyer and supplier often have different perceptions and interest about adoption of B2B EC. This, in turn, makes the adoption of this technology complex and difficult to be achieved (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Kim *et al.*, 2010; Turker, 2014). Scholars claim that collective decision can be explained very well by relationship related factors, particularly power and trust (Al-Hakim *et al.*, 2012; Chong & Bai, 2014; Chong *et al.*, 2013; Hart & Saunders, 1997; Hart & Saunders, 1998; Son *et al.*, 2008; Son *et al.*, 2005).

In this perspective, researchers rely on RDT and social exchange theories to explain the role of relationship characteristics (Hart & Saunders, 1997; Hart & Saunders, 1998; Obal, 2013; Son *et al.*, 2008; Son *et al.*, 2005). Prior studies have identified several aspects of relationship characteristics that influence the decision to adopt B2B EC. Al-Hakim et al. (2012) and Hart and Saunders (1997, 1998) stress on the role of dependency and trust. Chong and Bai (2014) and Chong *et al*. (2013) suggest that information sharing, trading partner power in addition to role dependency and trust play significant role in adoption behavior. Section 2.6.4 discusses in details the role of these factors.

In summary, researchers in this perspective focus on relationship factors, in particular trust and dependency. This is because B2B EC is reflection of existing relationship between partners. In this manner, these factors provide complementary view on B2B EC adoption.

To summarize this section, Table 2.4 and Figure 2.4 show that prior studies used many approaches and several theories to study the determinants of e-commerce adoption. Most of the influencing factors can be segmented into four different categories. Foremost among these follow the innovation diffusion approach. These studies mainly focused on the perceptions regarding the attributes of an innovation, i.e., Compatibility, Relative Advantage, and Complexity which are referred to as technological factors. Studies that fall under the second category follow Resource Based View (RBV) and leadership research that are regarded as organizational factors. The studies in the third category focused on institutional environment which are referred to as environmental factors and institutional forces. Lastly, some research focused on transactional factors and the nature of relationship between firms, otherwise distinguished as relational factors and Transactional Factors.

However, this study attempts to investigate B2B EC adoption from the views of all perspectives. TOE, DOI and RDT have the ability to explain all perspectives. The next section explores those theories while the following section discusses its applications to B2B EC as it is documented in prior studies.

Table 2. 4

Underpinning Theories Used in Prior Studies

Theory	References
Behavioral Theories (TAM,TRA,TPB,UATUT)	(Aboelmaged, 2010; Chan *et al.*, 2012b; Grandón *et al.*, 2011; Nasco *et al.*, 2008; Oh *et al.*, 2009; Quaddus & Hofmeyer, 2007; Yu & Tao, 2009)
DOI Theory	(Alam, 2009; Chan & Chong, 2012a; Chong *et al.*, 2009a; Ghobakhloo & Tang, 2013; Hossain & Quaddus, 2010; Pan, 2013; Tan *et al.*, 2009; Tarofder *et al.*, 2013; Zhu & Kraemer, 2005; Zhu *et al.*, 2006b; Zhu *et al.*, 2003)
TOE Framework	(Ahmad *et al.*, 2014; Chan *et al.*, 2012b; Chong *et al.*, 2009a; Gibbs & Kraemer, 2004; Ifinedo, 2011; Lin, 2013a; Oliveira & Martins, 2010; Pan, 2013; Tarofder *et al.*, 2013; Teo *et al.*, 2009; Zhu & Kraemer, 2005; Zhu *et al.*, 2006b; Zhu *et al.*, 2003)
Institutional Theory	(Gibbs & Kraemer, 2004; Hertwig, 2012; Ke, 2006; Ke, Liu, Wei, Gu, & Chen, 2009; King, Kraemer, Mcfarlan, & Raman, 1994; Kshetri, 2007; Ravichandran, Han, & Hasan, 2009; Srivastava *et al.*, 2009; Standing, Sims, & Love, 2009; Teo *et al.*, 2003; Thatcher *et al.*, 2006; Tsai *et al.*, 2013; Wong & Boon-itt, 2008; Zhang & Dhaliwal, 2009; Zheng *et al.*, 2013)
Resource Dependency Theory	(Ali *et al.*, 2008; Ali, Kurnia, & Johnston, 2009; Hart & Saunders, 1997; Hart & Saunders, 1998; Huang, Fang, & Liu, 2013; Iskandar *et al.*, 2001a; Iskandar, Kurokawa, & Leblanc, 2001b; Ke & Wei, 2007; Nagy, 2006; Son *et al.*, 2008; Son *et al.*, 2005)
TCT Theory	(Grover & Saeed, 2007; Iskandar *et al.*, 2001a; Iskandar *et al.*, 2001b; Ke & Wei, 2007; Liu *et al.*, 2008; Mithas, Jones, & Michell, 2008; Son & Benbasat, 2007; Son *et al.*, 2005)
TTF Theory	(Cao *et al.*, 2013b; Setia *et al.*, 2007)
Social exchange theory	(Hart & Saunders, 1997; Hart & Saunders, 1998; Obal, 2013; Son *et al.*, 2008; Son *et al.*, 2005)
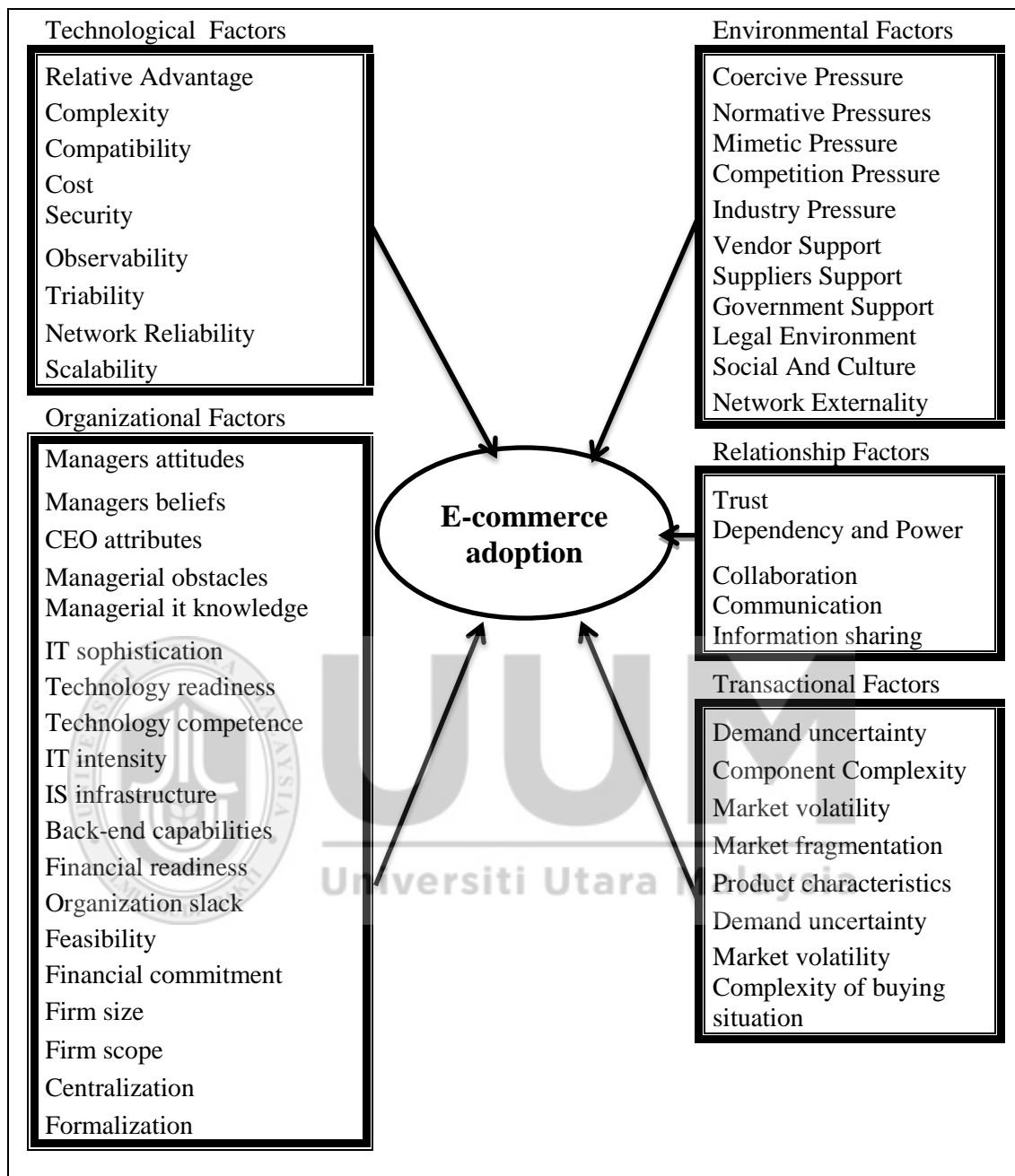
Figure 2. 4
Summary of Independent Variables that Influence B2B EC as Reported in Previous Research

2.7 Underpinning Theories

To understand how and why adoption takes place, it is essential to rely on the available theories. Some theoretical perspectives focus on human behavior and organization's willingness to adopt while other theoretical perspectives focus on economic benefits or institutional pressure (Weber & Kauffman, 2011). This section firstly discussed Behavioral Intention Models that utilized in adoption research, including Theory of Reasoned Action (TRA), Theory of Planed Behavior (TPB), Technology Acceptance Mode (TAM), and The Unified Theory of Acceptance and Use of Technology (UTAUT). Furthermore, this study discussed the Diffusion of Innovation theory (DOI) and Resource Dependence Theory (RDT), and TOE framework, to support the research proposition.

2.7.1 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen (1975) in social psychology field to predict an individual's behavior in a specific situation. It is a very broad model that can be applied to wide aspects of human behaviors. Several researchers have relied on this theory to explain the adoption and acceptance behavior (Faaeq, Ismail, Osman, Al-Swidi, & Faieq, 2013). The basic assumption of TRA is that individuals behave in a rational way and utilize the available information when they are performing an action. The theory considered behavioral intentions as the main predictor of the actual behavior (Fishbein & Ajzen, 1975). In the language of TRA, the actual behavior of an individual (i.e. adoption behavior) is driven by the intention to perform the behavior. Both subjective norms and individual's attitude are

the main drivers towards behavioral intention (Fishbein & Ajzen, 1975). Attitude

refers to an individual's positive or negative feeling, and tendency towards an idea or

behavior. Meanwhile, subjective norm reflects individual's perception of whether

people who are important think the behavior should be performed by the individual

(Fishbein & Ajzen, 1975). The Figure 2.5 below depicts the basic components of this

theory.
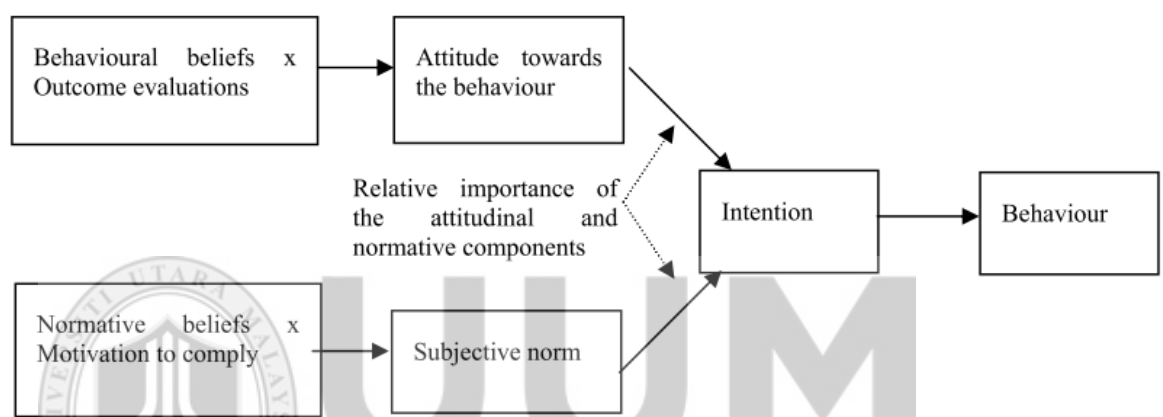
Figure 2. 5

Theory of Reasoned Action TRA (Fishbein & Ajzen, 1975).

This theory has been widely used as a theoretical framework to explain the adoption

behavior of several kinds of information technologies, particularly at individual

level. The theory showed success in predicting and explaining the adoption behavior

in a variety of areas, such as, computer technology (Davis, Bagozzi, & Warshaw,

1989), internet banking (Nor, Shanab, & Pearson, 2008), e-commerce (Nasco *et al.*,

2008), and green information technology (Mishra, Akman, & Mishra, 2014).

However, the TRA suffers from several limitations. Ajzen (1985) and Warshaw and

Davis (1985) suggest that TRA only accounted for behavior under an individual's

volitional control, and that a number of behaviors of interest did not meet that criterion. Moreover, TRA is often criticized for being very simple to explain a wide range of technologies, or adoption situations (Chan *et al.*, 2012b). Furthermore, although individual decision making is the basis of organizational adoption of technology, the determinants of individual adoption behavior differ from those of organizational adoption behavior (Khalifa & Davison, 2006; Oliveira *et al.*, 2011).

2.7.2   The Theory of Planned Behavior

The theory of planned behavior (TPB) was introduced basically to expand the latitude of the TRA, in order to explain behaviors that are mainly outside the volitional control of individuals (Ajzen, 1985; 1991). The TPB modified the TRA by introducing the role of Perceived Behavioral Control (PBC). PBC refers to an individual's beliefs about the ability to control particular behavior (Ajzen, 1985; Ajzen, 1991). TPB suggest that PBC plays two roles; one on behavioral intention and the second directly on the actual behavior, see Figure 2.6. PBC contains two distinct elements including internal and external (Taylor & Todd, 1995). The first element refers to an internal sense of control which is similar to self–efficacy, while the second element is external aspects of control that are required to perform the particular behavior, such as training and technical support (Bandura, 1986). Ajzen (1985) suggests that internal and external aspects of control embodied in PBC are essential to perform most planned behaviors. Ajzen (1985) argues that when behaviors are not entirely under volitional control, PBC directly predicts and explains both behavioral intention and the actual behavior. Therefore, Ajzen (1985,

68

1991) claimed that the TPB would explain more variance in behavioral intention and the actual behavior in comparison with the TRA.
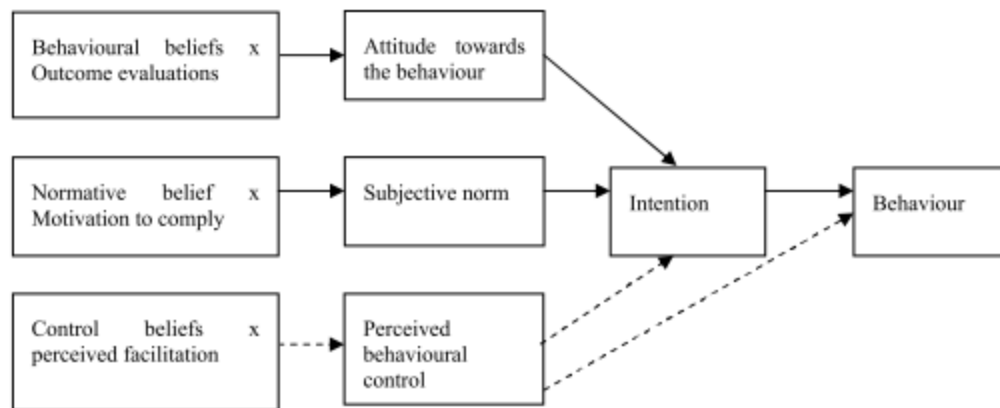
Figure 2. 6
The Theory of Planned Behaviour –TPB- (Ajzen, 1985, 1991).

This theory has been extensively used as a theoretical basis to explain the adoption behavior of information technologies, particularly at individual level. The theory showed success in predicting and explaining the adoption behavior in a variety of areas such as e-procurement (Aboelmaged, 2010) , internet banking (Shih & Fang, 2004), e-commerce (Nasco *et al.*, 2008), student internet usage (Fusilier & Durlabhji, 2005). However, TPB provides very simple explanation that predict a wide range of technologies, or adoption situations (Chan *et al.*, 2012b). Furthermore, although individual decision making is the basis of organizational adoption of technology, the determinants of individual adoption behavior differ from those of organizational adoption behavior, such as, B2B EC (Khalifa & Davison, 2006; Oliveira *et al.*, 2011). In fact, B2B EC is joint action behavior technologies and adopted by several parties. Therefore, predicting how B2B EC is adopted requires explanatory theories that account for such characteristics. TPB and TRA ignored the role of relationship factors including trust and dependency that influence the adoption of B2B EC. For

69

this reason, exploring B2B EC adoption will require explanatory theory rather than individualist predictive theories such as TRA and TPB.

2.7.3   Technology Acceptance Model

The Technology acceptance model (TAM), similar to the TRA and TPB, aims to predict IT adoption and acceptance. TAM is IT–focused and was introduced by IS scholars for specific application in the context of information technology usage. Davis (1993) suggests that external variables, include all system design features, which shape an individual's perception regarding new technology. These features form the individual's perception regarding system' usefulness (PU) and ease of use (PEOU). PU refers to the extent to which an individual believes that using a specific system would enhance his/her job performance. PEOU refers to the degree to which an individual believes that using a specific system would be free of physical and mental effort (Davis, 1993; Venkatesh & Bala, 2008; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000). Similar to TRA, individuals' beliefs determine the attitude towards using the system. When the attitude toward system is established, it will significantly drive the behavior intention to use which eventually lead to actual system use. A figure 2.7 depicts the relationships between technology acceptance determinants as suggested by TAM.

Venkatesh and Davis (2000) pointed out a weak point of TAM, which is, TAM do not account for social influence and cognitive instrumental process. Accordingly, Venkatesh and Davis (2000), proposed an extension of TAM, the TAM2 which incorporated the role of subjective norm and cognitive instrumental process, such as,

70

output quality, image, job relevance, and result demonstrability. A figure 2.8 depicted the extension of TAM as suggested by TAM2.

TAM is one of the most widely accepted and well-known models explaining the acceptance of information technology (Faaeq *et al.*, 2013). It has been proved to be a strong explanatory model that predicts computer technology adoption and usage (Venkatesh & Davis, 2000; Venkatesh *et al.*, 2007). Despite its popularity, several researchers have pointed out that the TAM's weakness lies on its exclusion of other variables that are important to explain an organization adoption behavior (Khalifa & Davison, 2006; Oliveira *et al.*, 2011). Additionally, this model neglected explanation on joint action behaviors such as B2B EC adoption behavior (Lyytinen & Damsgaard, 2011).
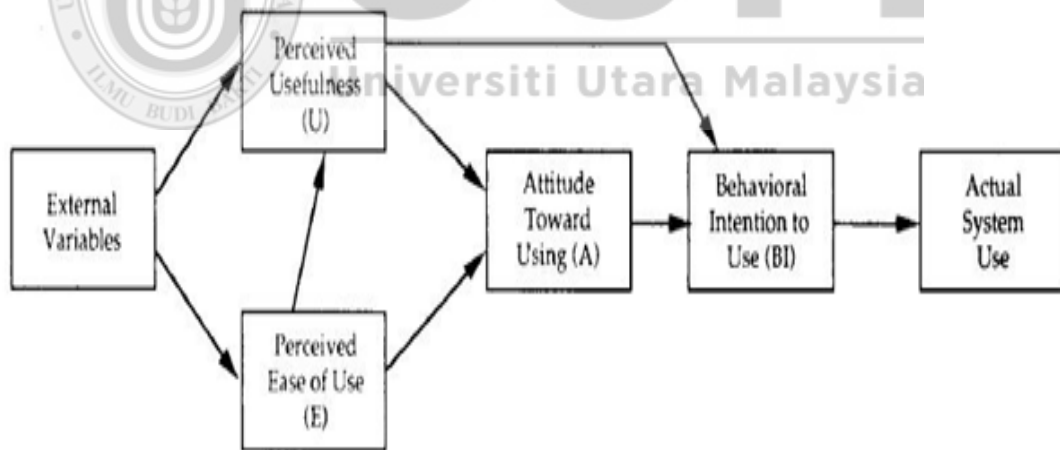
Figure 2. 7
The original Technology Acceptance Model
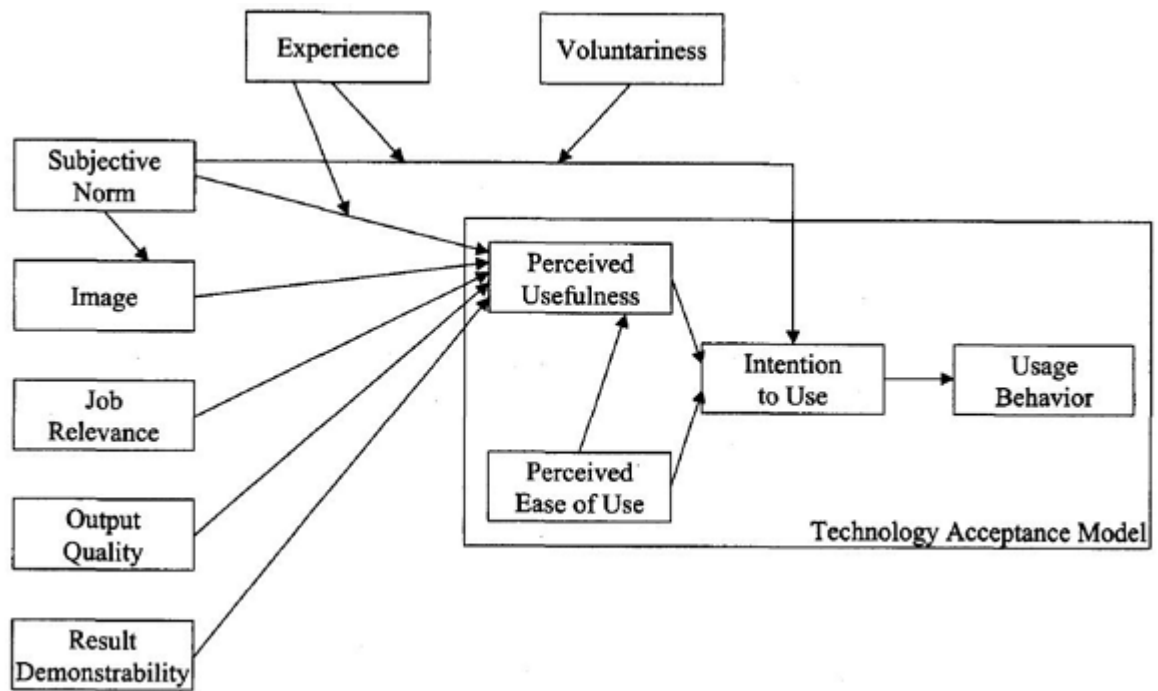
Figure 2. 8
A Theoretical Extension of the Technology Acceptance Model

2.7.4   The Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT is another technology acceptance model which integrates the major theories and acceptance models into a single theoretical model (Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2012). Specifically, grounded on expectancy theory, UTAUT integrates the causality of such TAM, TRA, and TPB (among others) to explain technology adoption and acceptance (Abushanab, Pearson, & Setterstrom, 2010). The UTAUT model suggests that technology acceptance and usage behavior are determined by performance expectancy, facilitating conditions, effort expectancy, and social influence. Performance expectancy is defined as the degree to which an individual believes that using particular system will help him/her to achieve his/her goals. Effort expectancy is defined as the degree of ease associated with using particular system. Social influence is defined as the degree to which an

72

individual perceives that others believe he or she should use particular system. Facilitating conditions is defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the usage of particular system. All of these determinants affect the usage behavior either directly or mediated by behavior intentions. The model suggests that the relationships between usage behavior and the behavior determinants vary based on user' gender; age, experience, and whether or not usage behavior is voluntary (Abushanab *et al.*, 2010; Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012). Figures 2.9 depicted the relationships between technology acceptance determinants as suggested by UTAUT.

UTAUT has been widely adopted in different studies that tend to be relevant and recent in the realm of technology acceptance studies. This model has been validated by Venkatesh *et al.* (2003) in a longitudinal study. They found that UTAUT accounts for 70% of the variance in Behavioral Intention and about 50% in actual use. However, despite its potential to explain the behavioral intention and the actual behavior at individual level, researchers suggest that it has little to do with organizational adoption behavior particularly the adoption of B2B EC (Lyytinen & Damsgaard, 2011; Oliveira *et al.*, 2011). The UTAUT does not capture the complexity of B2B EC technologies. This is apparent as it largely ignores the complex relationships between B2B trading partners and takes no account of the idiosyncrasies of joint action behavior that exists in B2B EC context (Lyytinen & Damsgaard, 2011).
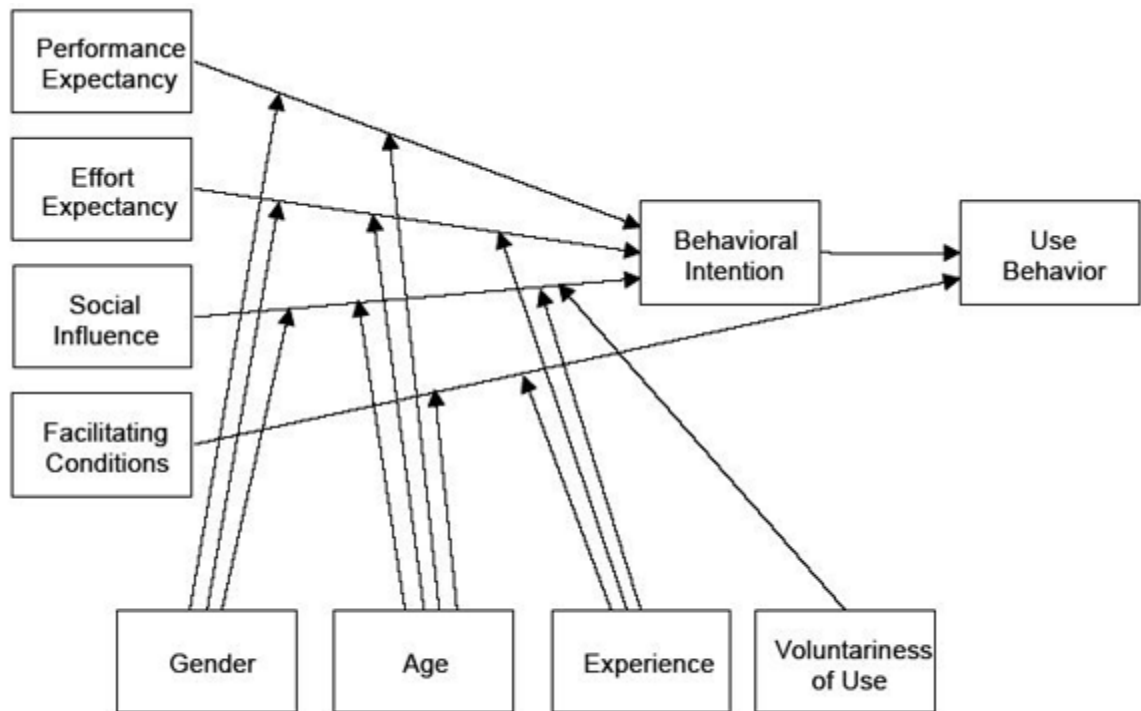
Figure 2. 9

The Unified Theory of Acceptance and Use of Technology (UTAUT)

2.7.5 Diffusion of Innovation Theory (DOI)

This theory was introduced by Rogers since 1962. It is one of the most popular theories used to study IS adoption (Hameed *et al.*, 2012a; Mohamad & Ismail, 2009; Oliveira *et al.*, 2011; Pervan, Bajwa, & Lewis, 2005; Weerakkody *et al.*, 2009). This theory explains innovation diffusion as a process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003). As stated in this definition, there are four elements of innovation diffusion: innovation, time, communication channels, and social system. Table 2.5 shows the definition of each element.

Table 2. 5
Diffusion Innovation Elements as Defined by Rogers (2003)

Items	Description
Innovation	An idea, practice, or project that is perceived as new
Communication Channels	A process in which participants create and share information with one another in order to reach a mutual understanding
Time	Length of time required to pass through the innovation-decision process
Social System	A set of interrelated units engaged in joint problem solving to accomplish a common goal

For Rogers (2003), the adoption of an innovation is a decision making process. It involves activities of information searching and processing. The adoption process goes through five stages. This process, as depicted in Figure 2.10, starts from the knowledge stage where the potential adopters become aware of the existence of innovation. In the next stage, the persuasion stage, the potential adopter engages in information search and gathering activities to shape favorable or unfavorable attitude toward an innovation. The potential adopter is heavily influenced by the innovation characteristics in this stage. Subsequently, the potential adopter in the decision stage weighs the advantages and disadvantages of using an innovation and then decides whether to accept or reject the focal innovation. Rogers (1985) argued that the innovation characteristics account for 49% to 85% rate of the adoption of any innovation. If the innovation is accepted, the adopter will proceed to the implementation stage where an innovation will be placed into practice.
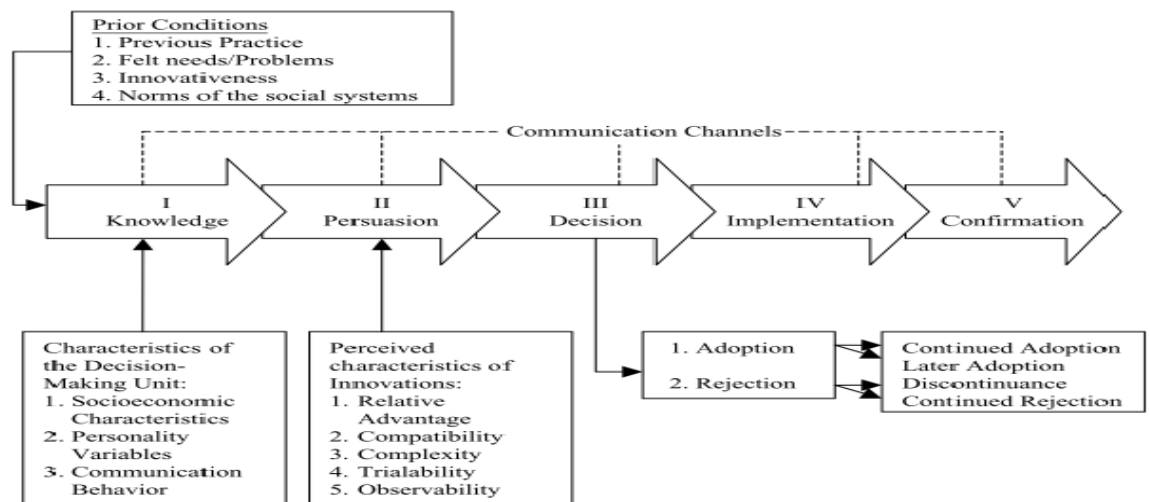
Figure 2. 10
Diffusion Innovation Stage
Source: (*Rogers, 2003*)

For Rogers, potential adopters hold different degrees of willingness to adopt an innovation. As a result, decision to adopt an innovation is almost normally distributed over time (Rogers, 1995). Rogers classified the adopters into the following five categories: innovators, early adopters, early majority, late majority, and laggards (Rogers 1995). Further, Rogers' empirical work showed that adoption has a life cycle and it follows the pattern of S-shaped curve. Rogers explained that at the initial stage of the life cycle of innovation, the proportion of adopters starts low. With the passage of time, the proportion of adopters regularly increases until it reaches the peak in the mature stage of the life cycle of innovation. However, the adoption rate will decrease in the final stage of the life cycle of innovation.

As depicted in Figure 2.11, the DOI theory at the organization level identifies three influencing contexts affecting the organization's innovativeness. These are leader characteristics, organizational structure, and the organizational openness. DOI theory suggests that the presence of leaders' positive attitude toward change, higher

76

Complexity in organization, higher organizational openness, and large size organization structure positively affect an organization's innovativeness while formalization and centralization negatively affect an organization's innovativeness.
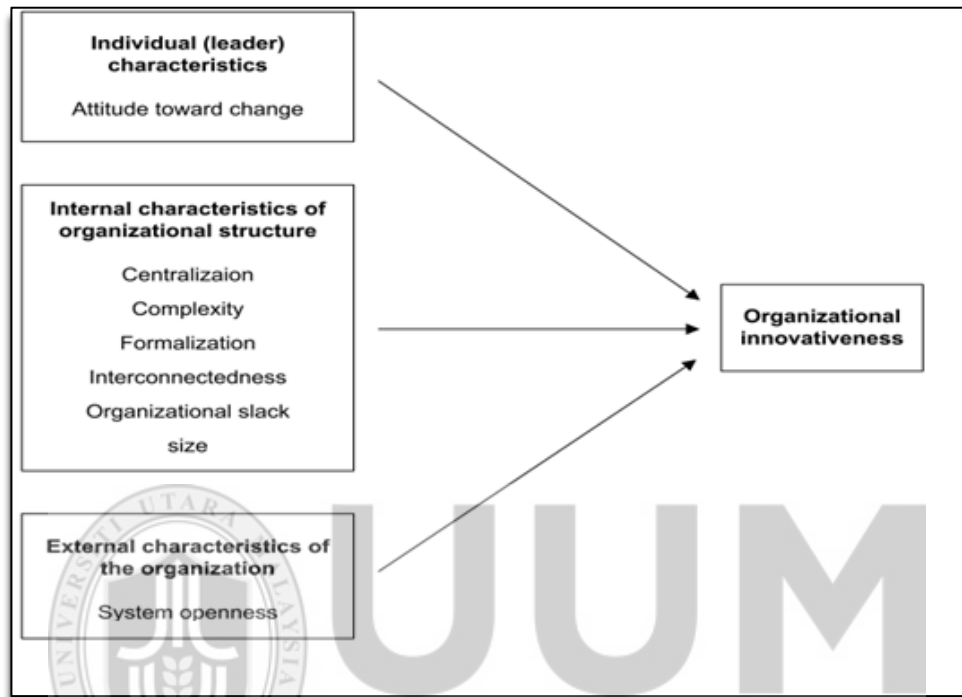
Figure 2. 11
Organization's Innovativeness Determinants
Source: (Rogers, 2003)

Prior studies have used DOI to demonstrate the adoption of B2B EC. Researchers have confirmed its ability to explain the B2B EC decision (Zhu, Kraemer, & Xu, 2006; Zhu et al., 2003; Zhu &Kraemer, 2005). By contrast, some researchers have refuted the ability of this theory to explain the adoption of B2B EC. They argue that the adoption of B2B EC is a collaborative behaviour. In such case, there are two independent organizations adopting B2B EC at the same time and depend on each other's actions in exploiting it (Ali *et al.*, 2008; Lyytinen & Damsgaard, 2011). They argue that DOI have inadequate constructs to deal with collaborative behavior such as trust and dependency (Chau & Tam, 1997; Hovorka & Larsen, 2006; Lyytinen &

77

Damsgaard, 2001; Lyytinen & Damsgaard, 2011). Therefore, the major deficiency in this theory lies in the lack of respect for inter-organizational determinants (Lee & Cheung, 2004; Lyytinen & Damsgaard, 2001; Lyytinen & Damsgaard, 2011). Parker and Castleman (2009) and Frank, Zhao, and Borman (2004) argued that DOI theory does not provide a lens through which to study these complex social and relational dimensions.

In summary, DOI seeks to explain a single organization's tendency to adopt the B2B EC. It also focuses on internal cognitive states of a single adopter and uses them as salient predictors for an organizational adoption decision. It assumes that adopters are independent and make voluntary decisions to accept or reject an innovation based on their own assessment of innovation attribute. This theory, however, does not consider inter-organization variables. Therefore, it is imperative to examine the role of relationship factors together with DOI's predictors.

2.7.6   TOE Framework

The TOE is one of the most commonly used models to explain technology adoption. Tornatzky and Fleischer (1990) built this framework based on Contingency theory which postulates that an effective organizational structure should have fit with its organizational and environmental needs (Lawrence & Lorsch, 1967). Tornatzky and Fleischer (1990) emphasized that the adoption of an innovation in an enterprise is a multidimensional decision influenced by factors from several contexts (Tornatzky & Fleischer, 1990). In this framework, Tornatzky and colleague identified and classified the factors that influenced innovation adoption into three contexts: the

technological, the organizational, and the environmental context (Figure 2.12). The three contexts of this framework act as opportunities and/or constraints for technological innovation (Tornatzky and Fleisher, 1990).
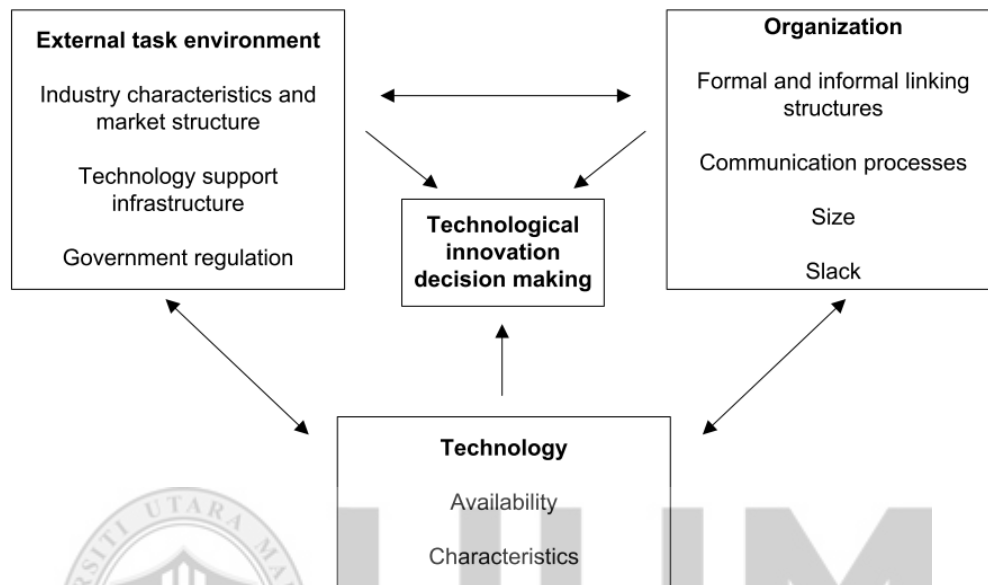
Figure 2. 12
TOE Original Framework
Source: (*Tornatzky & Fleischer, 1990*)

Technological context refers to the pool of technologies that are available to the firm including current technology and the technology in market. Technological context determines the ability of the firm to move toward new innovation (Ahmad *et al.*, 2014; Chau & Tam, 1997; Scupola, 2009). Characteristics of technology itself determine the innovation appropriateness while current technologies facilities or inhabits the technological change that could be undertaken by the firm (Baker, 2012; Lyytinen & Damsgaard, 2001; Lyytinen & Damsgaard, 2011).

Organizational context refers to the organization's characteristics, attributes, and resources. These factors may hinder or facilitate the adoption of innovations (e.g. e-

79

commerce adoption). Common organization characteristics include centralization, formalization, firm size, managerial structure, amount of available slack resources, and the quality of its human resources (Tornatzky & Fleischer, 1990).

Environmental context refers to the arena where the firm conducts its businesses. Firm environment may be considered as either constraints or opportunities for technological innovations (DePietro, Wiarda, & Fleischer, 1990). Competitors of a firm, government intervention, and characteristics of the firm's industry are environmental factors that influence the firm's adoption behavior.

Many studies have indicated that TOE framework is consistent with other adoption theories such as the DOI and institutional theory (Arpaci, 2012; Oliveira *et al.*, 2011; Yoon & George, 2013; Zhu *et al.*, 2006b; Zhu *et al.*, 2003). For example, the adoption predictors in DOI include individual leader characteristics and internal organization characteristics which are stated to be compatible with the organizational context of TOE. With respect to system openness in DOI, it is compatible with the environmental context of TOE. Finally, researchers implicitly emphasized that Rogers's innovation attributes are compatible with the TOE's technological context (Baker, 2012; Zhu *et al.*, 2006b; Zhu *et al.*, 2003).

Scholars agree that TOE framework is a useful analytical tool to study technology adoption determinants. However, they believe also that it lacks theoretical foundation and it is just an arrangement or classification for variables (Dedrick, 2003; Guo & Wu, 2010; Ramdani & Kawalek, 2007; Teo *et al.*, 2009; Zhu *et al.*, 2006b). Guo and Wu (2010) stated that TOE framework does not provide causality among the factors

that have been provided and that the underlying decision making process is unclear. Furthermore, TOE framework did not offer adequate constructs to explain inter-organization behavior (Chan *et al.*, 2012b; Hsu *et al.*, 2006). Thus, Alshamaila *et al.* (2013) argued that TOE is more capable to explain intra-firm innovation adoption.

Despite the above limitation, TOE framework presents a valuable starting point in analyzing several factors that would help in understanding the innovation adoption behavior. Because it has consistent empirical support, this study will adopt this framework as the main theoretical lens to achieve the objective of this study.

2.7.7   Resource Dependency Theory (RDT)

RDT attempts to answer the question of why organizations enter into inter-organizational arrangement. (Drees & Heugens, 2013; Hillman *et al.*, 2009; Nienhüser, 2008). RDT theorists postulate that an organization's environment provides "critical" resources desired by an organization. Resource criticality means the extent to which an organization is able to continue its functions in the absence of the specific resource and/or in the absence of the market for its output (Pfeffer & Salancik, 2003).

The central idea of RDT is that whoever controls the critical resources has the power over those actors who need these resources (Drees & Heugens, 2013; Hillman *et al.*, 2009; Nienhüser, 2008; Pfeffer & Salancik, 2003). This theoretical hypothesis corresponds to the Power Dependency theory by Emerson (1962). Emerson argued that the greater the dependency of actor X upon actor Y, the more power actor Y has

over X. He suggested that power is not the actor's attribute. Rather, it is an attribute of social relations between actors because it exists implicitly in the other's dependency.

Theorists argue that dependency in terms of critical resources endangers firm's decision-making autonomy which, in turn, increases firm's uncertainty (Casciaro & Piskorski, 2005; Drees & Heugens, 2013; Hillman *et al.*, 2009; Nienhüser, 2008; Pfeffer & Salancik, 2003). Autonomy refers to firm's freedom to make its decisions about the allocation and use of its internal resources without regard or reference to the expectations or demands of potential partners (Oliver, 1991a). Firms attempt to mitigate others' power over them. RDT proposes that firm responses to resource deficiencies by restructuring or managing their dependencies. This is in order to reduce uncertainty about these resources (Casciaro & Piskorski, 2005; Drees & Heugens, 2013; Hillman *et al.*, 2009; Nienhüser, 2008; Pfeffer & Salancik, 2003).

There are several tactics to restructuring and managing dependencies. One of most popular tactics is 'constraint absorption'. It means giving the rights to control the resources that create dependencies to the dependent actor (Casciaro & Piskorski, 2005). Organizations can absorb external constraint (resources) by either 'complete absorption' such as mergers and acquisitions or 'partial absorption' by engaging in inter-organization arrangements such as electronic linkage (B2B EC) (Casciaro & Piskorski, 2005; Chatterjee, 2013).

In fact, the relationship between resource dependency and entering inter-organization arrangements stands at the center of the debate among resource dependency theorists.

82

On one hand, scholars predict that organizations characterized by a high degree of dependence on others are more likely to absorb the sources of dependence (Drees & Heugens, 2013; Hillman *et al.*, 2009; Pfeffer & Salancik, 2003). On the other hand, scholars argue that in case of high level of dependency, the dependent organization is likely to be more motivated but less able to absorb constraint (Casciaro & Piskorski, 2005; Gargiulo, 1993).

To demonstrate this puzzling issue, Pfeffer & Alancik (2003) and Emerson (1962) argue that 'whoever controls critical resources has the power over those actors who need these resources' (Pfeffer & Alancik, 2003, p. 44). In such case, if the less power firm is likely to absorb external constraints as suggested by the first view, the higher power firm will not relinquish its power advantage and favorable exchange conditions that accompany it (Casciaro & Piskorski, 2005; Gargiulo, 1993). The higher power firm is, therefore, likely to resist the lower-power organization's attempt at constraint absorption. The less powerful firm is unlikely to overcome the resistance of the dominant firm, which is, by definition, in a better position to impose its desire on the power-disadvantaged party (Casciaro & Piskorski, 2005).

In sum, power as manifested in the net dependence between two organizations regarded as the most important aspect of an inter-organizational relationship when one exchange party needs to influence another's decisions. Because firms react to the possessor or controller of resources by anticipating the effective use of these resources to control their own actions, the sources of power can coordinate social interaction and thus explain firm behavior.

To summarize this section, the present section highlights the Behavioral Intention Models (TRA, TPB, TAM, and UTAUT), the theory of DOI and RDT, and TOE framework. Behavioral Intention Models provide very simple explanation that predict the adoption and acceptance of a wide range of technologies from individuals perspective (Chan *et al.*, 2012b). Furthermore, although individual decision making is the basis of organizational adoption of technology, the determinants of individual adoption behavior differ from those of organizational adoption behavior, such as, B2B EC (Khalifa & Davison, 2006; Oliveira *et al.*, 2011). For this reason, exploring B2B EC adoption requires explanatory theory rather than individualist predictive theories such as Behavioral Intention Models.

 DOI theory and TOE framework have investigated the diffusion of innovations at organizational level. They have emphasized the role of technological, organizational, and environmental factors. In fact, B2B EC is joint action behavior technologies and adopted by several parties. Therefore, predicting how B2B EC is adopted requires explanatory theories that account for such characteristics. However, TOE framework and DOI theory do not emphasize the role of relational factors indicating that the logic of TOE and DOI is incomplete in explaining the adoption of B2B EC. In the context of B2B EC the characteristic of relationship between business partners in particular, trust and dependency play predominant role in inter-organization behavior. RDT provides complementary view to interpret and explain adoption of B2B EC. It offers adequate constructs to deal with collective behavior, such as, Dependency and Trust. In view of this, incorporating the causality of RDT into the DOI theory and TOE framework could overcome the blind spots in DOI theory and TOE framework (Reimers *et al.*, 2010b; Robey *et al.*, 2008; Wolfe, 1994). By doing

84

so, the predictive and explanatory power of TOE adoption model and DOI theory would increase and produce results that serve both academicians and practitioners. Therefore, this study employed the DOI and RDT theories and TOE framework in order to explain the adoption of B2B EC. The preceding section discusses the application of the theories in adoption literature.

2.8 Factors Affecting B2B EC Adoption

In this section, the focus of discussion concentrates on the most important B2B EC determinants. Those determinants are classified based on TOE framework. Because TOE is an integrative perspective, it includes also the casualty of DOI. Consequently, this section reviews those factors as reported in previous works.

2.8.1   Technological Factors

2.8.1.1   Relative Advantage

Economists believe that the existing technologies in organizations is product of adopting of innovations that provide new benefits and critical advantages (Liu *et al.*, 2008). In view of that, many theories which attempt to explain "adoption behavior" relied mainly on the premise that the expected benefits of innovations are key players in an adoption decision (Choudhury & Karahanna, 2008; Liu *et al.*, 2008; Lyytinen & Damsgaard, 2011).

The concept of perceived benefit, performance expectation, Relative Advantage, and perceived usefulness are used interchangeably in most innovation theories. They are used to reflect the anticipated benefits or efficiencies that an innovation adoption, i.e., e-commerce can provide to an organization compared to the old practice or idea (Ahmad *et al.*, 2014; Chan *et al.*, 2012b; Hossain & Quaddus, 2011; Jeyaraj *et al.*, 2006; Weber & Kauffman, 2011). For the propose of this study, Relative Advantage will be used.

Rogers (2003) defines Relative Advantage as the degree to which an innovation is perceived as better than the idea it supersedes. He theorizes that potential adopters will perform an explicit or implicit cost benefit analysis. Therefore, potential adopters will adopt an innovation that returns more benefits than the previous idea (Ahmad *et al.*, 2014; Cao, Jones, & Sheng, 2014; Ramdani *et al.*, 2013; Rogers, 2003; Tarofder *et al.*, 2013; Venkatesh & Bala, 2012; Yoon & George, 2013; Zhu *et al.*, 2006b).

A considerable literature examines the influence of Relative Advantage on adoption behavior as shown in Table 2.6. Despite the soundness of the "Relative Advantage" as important IS adoption indicator (Hameed & Counsell, 2014; Jeyaraj *et al.*, 2006; Tornatzky & Klenin, 1982), research results on the effect of Relative Advantage on adoption of innovation are mixed (Hameed & Counsell, 2014; Ke & Wei, 2007). Table 2.6 shows that the earlier studies produced contrasting results regarding influence of Relative Advantage variable.

Researchers attempt to find an explanation for these unexpected results. Some of these attempts have interpreted this issue based on rhetorical explanation while others have solid theoretical justification but without empirical evidence. For example, Wang *et al.* (2010) reported that in order to decide whether to accept or to reject new technology, firms seem to pay considerable interest on the adoption inhibitors such as risks or problems, i.e., complexity, more than innovation advantages. They claim that firms will prefer to maintain their current systems if they believe that they do not have sufficient human, technical, and financial capabilities to adopt new technology.

87

Table 2. 6

Selected Studies Related to Relative Advantages Variable

Authors	DV	Context	Sample	Result	
				Sig	Insig
Chwelos*et al.* (2001)	Intent to adopt EDI	Canada	268	√+*	
Chan and Chong (2012)	decision to adopt RosettaNet	Malaysian	212		√
Chong, OOI, *et al.* (2009)	decision to adopt Collaborative e-commerce	Malaysian	109		√
Khalifa and Davison (2006)	intent to adopt ETS	Hong Kong	92	√+	
Yoon and George (2013)	Intent to adopt virtual worlds	USA	130		√
Kuan and Chau (2001)	EDI adoption	Hong Kong	575	√+	
Thiesse, Staake, Schmitt, and Fleisch (2011)	RFID adoption	German	159		√
Lin (2013)	Extent of e-SCM adoption	Taiwan	283		√
	Likelihood of e-SCM adoption			√+	
Liu *et al.* (2008)	Intent to become virtual (B2B EC)	Singapore		√+	
Seyal and Rahman (2003)	E-Commerce Adoption	Brunei Darussalam	95		√
Wang et al. (2010)	RFID adoption	Taiwan	133		√
Tarofder*et al.* (2013)	Diffusion of Web Technologies in SCM functions	Malaysian	251	√+	
Pan (2013)	Intent to adopt MSCM	South Korean	168		√
Henriksen (2006)	Adoption of EDI	Denmark			√
Tsai *et al.* (2010)	RFID adoption intention	Taiwan	134	√+	

*+ the direction of relationship is positive

Gao, Leichter, and Wei (2012) and Karahanna, Agarwal, and Angst (2006) found empirical support for the previous argument. They found that perceived organization readiness and perceived ease of use (opposite of complexity) will increase perception of Relative Advantage. For that reason, Wang *et al.* (2010) contend that lack of organizational and financial capabilities could make perception of Relative Advantage an insignificant discriminator between adopters and non-adopters.

For Seyal and Rahman (2003), the story is different. They suggest that the effect of Relative Advantage still has a strong influence on adoption decision but its influence depends mainly on the prior awareness about characteristics of technology and its capability. Thus, inadequate awareness about innovation characteristics may lead to restricting the influence of perception of Relative Advantage on the adoption behavior.

Other possible justification for this issue is provided by Geri and Ahituv (2008). They confirm that two types of benefits are supposed to affect the adoption of B2B EC, namely strategic and transactional benefits. They found that only strategic benefits have influence on adoption of such technology while transactional benefits have no influence. Furthermore, Kuan and Chau (2001) divide the perceived benefits into two types which are direct and indirect. They discovered indirect benefits to be an insignificant factor.

On the other hand, institutional theory may present theoretical justification for this issue (Thiesse *et al.*, 2011). It understood the innovation adoption as irrational decision guided by institutional environment (Currie, 2009; Heugens & Lander, 2009; Hillebrand *et al.*, 2011; Mignerat & Rivard, 2009). In this stream, researchers emphasized that adoption behavior sometimes responds to the external environment pressure. This pressure makes the top management anxious of being perceived as having lagged behind (Teo *et al.*, 2003; Wu & Lee, 2005). Accordingly, the adoption decision will be a product of institutional pressures rather than product of a rational assessment that focuses on innovation advantages (Huang, Gattiker, & Schroeder,

2010; Son & Benbasat, 2007; Tsikriktsis, Lanzolla, & Frohlich, 2004; Yoon & George, 2013).

In addition, researchers also suggest that the influence of this factor is important but it is insufficient in itself to determine the adoption behavior (Chae *et al.*, 2005; Lyytinen & Damsgaard, 2011; Rodón & Sesé, 2010; Teo *et al.*, 2006). They proclaim that B2B technology is a reflection of the existing relationship between organizations. In this manner, the characteristics of this relationship will play a predominant role not only on the adoption decision, but also on the relevance of other factors.

In summary, Relative Advantage was the main construct in several adoption theories. It has significant influence on innovation adoption. Because B2B EC adoption is an organizational-level decision executed in an inter-organizational context, Relative Advantage alone cannot explain the adoption of B2B EC. Therefore, there is a need for 'alignment' between the influence of Relative Advantage and the characteristics of relationship between parties. In order to understand how the relationship characteristics, affect the relevance of other factors, a new conceptual framework that extends the innovation literature is required.

2.8.1.2   Compatibility

Acquiring new technology may lead to significant changes on the work practices of a firm. Resistance to change is considered a normal organizational reaction (Cao *et al.*, 2014; Rafferty, Jimmieson, & Armenakis, 2012). Greater fit and consistency between existing operating practices and the innovation, i.e., B2B EC, increase the degree of achieving successful e-commerce diffusion by way of reducing the modification and resistant effort (Rogers, 2003; Wu & Chuang, 2009).

Innovation researchers use Compatibility concept to reflect the degree of fit between different organization components and an innovation. Rogers offers one of the earliest definitions of Compatibility. He defines it as the degree to which using an innovation is perceived as consistent with the existing sociocultural values and beliefs, past and present experiences, and needs of potential adopters. Moore and Benbasat (1991) use the same definition. Karahanna *et al.*(2006) and Kim and Kim (2009) define Compatibility as the perceived cognitive distance between an innovation and precursor methods for accomplishing tasks. For the purpose of this study, Rogers's (2003) definition is adopted.

There are various types of Compatibility; Tornatzky and Klenin (1982) distinguish between two types of Compatibility: practical and value Compatibility. Practical Compatibility is the consistencies between an innovation and the prevailing practice in organization ecology while value Compatibility is the consistency between an innovation and the values and norms of the potential adopters. Karahanna *et al.*(2006)   reconceptualised the Compatibility concept into four different types:

91

Compatibility with existing work practices, Compatibility with preferred work style, Compatibility with prior experiences, and Compatibility with values. Recently, Rajaguru and Matanda (2012) identify three types of Compatibility at inter-organization level: technical, strategic, and cultural Compatibility. They argue that inter-organizational Compatibility is a resource that can enhance supply chain capabilities.

However, prior e-commerce adoption literature reports that a high level of innovation Compatibility will encourage an organization to adopt the e-commerce innovation (Ahmad *et al.*, 2014; Al-Qirim, 2007; Beatty *et al.*, 2001; Rajaguru & Matanda, 2012; Ramdani *et al.*, 2013; Thong, 1999; Venkatesh & Bala, 2012). The underlying principle behind the role of Compatibility is that high level Compatibility will reduce the adjustments cost thus requiring the organization to make marginal changes only in their current status (Hollenstein & Woerter, 2008; Mcelheran, 2013; Rogers, 2003; Thong, 1999; Wu & Chuang, 2009). For example, if a firm has previously invested in IT, hires employees with IT-related skills, and has up-to-date infrastructure that integrates easily with next-generation technology, it will carry out the process of selecting, adapting, and implementing new IT-based business processes at a lower cost (Fichman, Hall, & Ave, 1997; Mcelheran, 2013).

Furthermore, high degree of Compatibility proposes to decrease the perception of risk and increase the perception of benefit (Gao *et al.*, 2012; Grover, 1993). Gao *et al.*(2012), Karahanna *et al.*(2006), van Rijnsoever *et al.* (2009) examine the interaction effect among innovation characteristics. They found that Compatibility

92

has a significant positive effect not only on adoption decision but also on perceived Relative Advantage, perceived risk, and perceived complexity.

A considerable literature examines the influence of Compatibility on adoption behavior as shown in Table 2.7. Despite the popularity of the " Compatibility " as IS adoption indicator (Jeyaraj *et al.*, 2006; Tornatzky & Klenin, 1982), consistent relationship between Compatibility and innovation adoption has not been established (Hameed *et al.*, 2012a). Table 2.7 shows some of these mixed results.

Table 2. 7
Selected studies related to Compatibility variable

Authors	DV	Context	Sample	Result	
				Sig	Insig
Thiesse *et al.*(2011)	RFID adoption	German	159		√
Cao, Gan, *et al.* (2013)	Intent to adopt ESCM	North American	200	√+	
Chan and Chong (2012)	Decision to adopt Rosettanet	Malaysian	212		√
Chong, OOI, *et al.* (2009)	Decision to adopt Collaborative e-commerce	Malaysian	109		√
Al-Qirim (2007)	EC adoption	New Zealand	129	√+	
Yoon and George (2013)	Intent to adopt virtual worlds	USA	130		√
Luqman and Abdullah (2011)	E-business adoption	Malaysian	337		√
Rajaguru and Matanda (2012)	IOIS Integration	Australia	302	√+	
Ramdani *et al* .(2009)	Adoption of a set of enterprise systems	Northwest of England	102		√
Teo (2007)	Modes of Internet adoption	Singapore	159		√
Beatty *et al.*(2001)	EC adoption	USA	286	√+	
Ifinedo (2011)	E-business adoption	Canada	214		√
Wang *et al*. (2010)	RFID adoption	Taiwan	133	√+	
Huang *et al.*(2008)	I-EDI adoption	USA	219		√
Henriksen (2006)	Adoption of EDI	Denmark			√

*+ the direction of relationship is positive

These mixed results in prior studies show confusion in understanding the relevance of Compatibility on adoption decision. Researchers attempt to find an explanation for these unexpected results. For example, scholars proclaim that the influence of Compatibility play a different role in different adoption stages (Chan *et al.*, 2012b; Wu & Chuang, 2010; Zhu *et al.*, 2006b). For example, Chan, Chong, and Zhou (2012b) argue that Compatibility may have greater influence in the initial adoption stage rather than in the implementation stage. They claim that potential adopters in the initiation and adoption stages made necessary adjustments to adopt an innovation. As a result, Compatibility issues are resolved in those stages and the need for Compatibility in the implementation stage will only be a minor concern. By contrast, Zhu, Kraemer, and Xu (2006) emphasis that technology Compatibility is a significant factor in all assimilation stages.

Furthermore, Chan & Chong (2012) argue that RosettaNet is a flexible web-based standard and thus it is more compatible with other technology which makes Compatibility as an issue not important. Teo (2007) contend that the reason behind this result could be attributed to the high level of internet infrastructure in the study context (Singapore).

In summary, Compatibility has a significant influence on adoption behavior. The inconsistent results about its influence, however, increase the need to examine some contingencies that may change the relevance of this factor. Very few studies have examined the moderating effect of relationship characteristics between Compatibility and the adoption of B2B EC

94

2.8.1.3   Complexity

Perceived Complexity is an important factor in innovation evaluation. Complexity refers to the degree to which a new technology is comparatively difficult to apply and understand (Rogers, 2003). Perceived ease of use and perceived Complexity are used interchangeably in e-commerce adoption literature (Chan, Chong, & Zhou, 2012).

The main reason behind the influence of Complexity on adoption is that adoption decision depends on the length of time that the firms take to understand the intricacies of e-commerce technology mechanism, its application, and the advantages and benefits that can be reaped through its proper utilization in their businesses (Almoawi & Mahmood, 2011). In addition, complex innovation such as B2B EC requires not only technological adjustments, i.e., merging the web platform with the existing IT infrastructure, but also demands administrative adjustments like changes in internal operation. Furthermore, Complexity increases uncertainty about successful adoption and increases the risk perception (Premkumar & Roberts, 1999; Ramdani, Kawalek, & Lorenzo, 2009). Therefore, the easier the technology and its implementation are understood, the faster the adoption process takes place and vice versa (Oliveira, Thomas, & Espadanal, 2014).

According to a comprehensive literature review of IS innovation adoption, a significant negative relationship between degree of Complexity and diffusion of technologies have been reported (Alam, 2009; Penttinen & Tuunainen, 2011; Quaddus & Shah, 2011; Ramdani *et al.*, 2013; Tarofder *et al.*, 2013; Tsai *et al.*,

2010). Despite of this, a wide variety of studies reports insignificant role (Hameed *et al.*, 2012a). Table 2.8 shows some of these mixed results.

Table 2. 8
Selected Studies Related to Complexity Variable.

Authors	DV	Context	Sample	Result	
				Sig	Insig
Cao, Gan, *et al.* (2013)	Intent to adopt ESCM	North American	200	√-	
Tsai et al. (2010)	RFID adoption intention	Taiwan	134	√-	
Chan and Chong (2012)	Decision to adopt RosettaNet	Malaysian	212		√
Chong, OOI, *et al.* (2009)	Decision to adopt Collaborative e-commerce	Malaysian	109		√
Ahmad *et al.* (2014)	E-commerce Adoption	Malaysia	307		√
Seyal and Rahman (2003)	E-Commerce Adoption	Brunei Darussalam	95		√
Wang *et al.* (2010)	RFID adoption	Taiwan	133	√-	
Ifinedo (2011)	E-business adoption	Canada	214		√
Luqman and Abdullah (2011)	E-business adoption	Malaysian	337		√
Tarofder*et al.* (2013)	Diffusion of Web Technologies in SCM functions	Malaysian	251	√-	
Henriksen (2006)	Adoption of EDI	Denmark			√
Li (2008)	E-procurement adoption	China	120		√
Huang *et al.*(2008)	I-EDI adoption	USA	219		√
Tan *et al.*(2009)	Internet-based ICT adoption	Malaysian	368	√-	
Thiesse *et al.*(2011)	RFID adoption	German	159		√

*+ the direction of relationship is positive

Researchers attempt to provide an explanation for these unexpected results. For example, Chan & Chong (2012) and Chan *et al.*(2012) argue that perceived Complexity has less influence on the adoption decision given that internet technologies are easier to understand and implement compared to traditional EDI systems. On the other hand, researchers have investigated firms' migration from traditional EDI to web-based IOS. They confirm that Complexity is an important

96

element for this migration (Chatterjee, Segars, & Watson, 2006; Zhu, Kraemer, Gurbaxani, & Xu, 2006a).

In summary, the inconsistent findings of prior research suggest that the relationship between Complexity and adoption is more complicated than previously thought. It seems possible that other factors moderate the role of complexity. Very limited studies investigated in the contingent role of relationship characteristics on the relationship between Complexity and the adoption of B2B EC.

2.8.2 Organizational Factors

2.8.2.1   Organization Readiness

Organizational resources and capability play a significant role in shaping the structure and determining the behavior of a firm. Organizational resources act either as a change enabler or change inhibitor (Unsworth *et al.*, 2012). Adopting B2B EC requires a change in organization technology, people, process, and structure (Lin *et al.*, 2007; Rafferty *et al.*, 2012). To adopt such technology in a proper manner, a traditional principle in the organization as well as IT literature highlights the importance of alignment between the nature of the technological change and the capabilities of firms (Abernathy & Clark, 1985; Elia *et al.*, 2007; Guo & Wu, 2010; Mcelheran, 2013; Tarofder *et al.*, 2013).

In e-commerce adoption literature, organizational capability to adopt new technology is conceptualized as an Organizational Readiness. Fathian, Akhavan, and Hoorali

(2008) identify it as "the ability of a firm to successfully adopt, use and benefit from information technologies" (p. 8). Others defined readiness as managers' perception of the extent to which their organizations has awareness, resources, commitment and governance support to adopt e-commerce (Molla & Licker, 2005; Seyal, Mohammad, & Abd Rahman, 2012). Kurnia *et al.* (2009) and Ogunyemi and Johnston (2012) extend readiness to include variables such as industrial readiness, and national readiness, partner readiness in addition to Organizational Readiness. This work follows Iacovou *et al.* (1995) and Khalifa and Davison (2006) who relate Organizational Readiness to the level of the available financial and technical resources to undertake the e-commerce initiative. In order to understand the role of Organizational Readiness, this study emphasis two concepts as the process by which organization readiness affects the adoption decision, namely IT sophistication and financial readiness.

2.8.2.2 Financial Readiness

Implementing e-commerce technology entails investment in software, hardware, and employee training and process reengineering (Lin *et al.*, 2007; Rafferty *et al.*, 2012; Zhu *et al.*, 2006b). For that reason, adequate financial resources dedicated to e-commerce project aid firms to acquire these necessary resources to develop superior e-commerce functions.

Financial resource is popular antecedent to IS diffusion. Prior studies suggest that firms with greater financial resources are more probable to adopt and achieve successful e-commerce implementation (Chwelos *et al.*, 2001; Iacovou *et al.*, 1995;

98

Khalifa & Davison, 2006; Li *et al.*, 2011; Li, 2008; Ramdani *et al.*, 2013; Ramdani *et al.*, 2009). Geri and Ahituv (2008) argue that preferences of senior management about the innovation depend on financial resources. Hence, in case where B2B EC technology is considered compatible with a firm needs and values but the firm does not allocate or have the necessary financial resources, the senior management preferences for B2B EC will be low.

2.8.2.3   IT Sophistication

Previous literature suggests that IS adoption requires technological resources to be implemented in proper way. IT sophistication are usually used in most previous studies to reflect these resources (Cooper & Zmud, 1990; Rai, Brown, & Tang, 2009; Zhu & Kraemer, 2005; Zhu *et al.*, 2006b). IT sophistication refers to technology infrastructure and IT human resources (Chwelos *et al.*, 2001; Iacovou *et al.*, 1995). Technology infrastructure offers a platform in which e-commerce technology can be constructed while IT human resources offer the required knowledge and skills to develop and manage e-commerce applications (Zhu & Kraemer, 2005). This suggests that e-commerce application cannot be an integral part of firm operation without IT infrastructures and IT technical skills (Lin *et al.*, 2007; To & Ngai, 2006).

However, several empirical studies confirm the significant relationship between organization readiness and adoption of e-commerce, but at the same time insignificant relationship also reported. Table 2.9 shows selected studies.

99

Table 2. 9

Selected Studies Related to Organizational Readiness Variable.

Authors	DV	Context	Sample	Result	
				Sig	Insig
Chan and Chong (2012)	Decision to adopt Rosettanet	Malaysian	212		√
Chong, OOI, et al. (2009)	Decision to adopt Collaborative e-commerce	Malaysian	109		√
Zheng, Chen, Huang, and Zhang (2013)	Intention to adopt G2G EC	China	112	√+	
Wu and Subramaniam (2011)	RFID adoption	Multi nation	85		√
Tsai et al.(2013)	Intention to adopt RFID	Taiwan	130	√+	
MacKay, Parent, and Hobday (2004)	EC adoption	Canada	6 case studies		√
Grandon and Pearson (2004)	e-commerce adoption	USA	100		√
Ramdani *et al* .(2009)	Adoption of a set of enterprise systems	Northwest of England	102	√+	
Hameed *et al* (2012a)	IS adoption	Meta- analysis	59 studies		√
Beatty et al.(2001)	EC adoption	USA	286	√+	
(Naicker, 2006)	EDI adoption	South Africa	105		√
Son & Benbasat (2007)	Intent to adopt of B2B E-Marketplace Usage intensity of B2B E-Marketplace		183		√
Ifinedo (2011)	E-business adoption	Canada	214		√
Wang *et al*. (2010)	RFID adoption	Taiwan	133		√
Huang *et al*.(2008)	I-EDI adoption	USA	219	√+	
Tan *et al*.(2009)	Internet-based ICT adoption	Malaysian	368		√

*+ the direction of relationship is positive

Researchers attempt to provide an explanation for these unexpected results. For example, Hameed *et al.* (2012) prove that stage of adoption significantly moderate the influence of resource availability on adoption. Furthermore, they report that in case of small organizations, resource availability plays a weak role on IT adoption. For large organizations, however, resource availability has no role on IT adoption.

In addition, Mcelheran (2013) found that internal capability poorly explain the disparity of likelihood to adopt e-commerce technology among leading firms. The need for a partner to invest in the innovative process appears to be the biggest hurdle to the engagement of leaders in this type of business process innovation.

Kollmann *et al.* (2009) also noted that some nations that have great prospect for e-commerce as indicated by a high level of Organizational Readiness have exhibited only low levels of e-commerce adoption. On the other hand, other nations having low levels of Organizational Readiness seem to have better capitalized on their potentials by showing relatively high levels of e-commerce adoption. They suggest culture as a moderating variable between organization readiness and adoption of e-commerce (Kollmann *et al.*, 2009).

In summary, it is not easy to draw conclusion about the role of Organizational Readiness on adoption decision due to contradictory results in prior research. This issue requires further investigation. As mentioned in the above discussion, most of the studies focus on the organization's internal evaluation and assessment without considering co-adoption attribute of e-commerce technology.

2.8.2.4   Top Management Support

Developing countries have less experience in using e-commerce technology. Top managers usually do not support innovation and adoption of new technology (Chan *et al.*, 2012b; Kraemer, Dedrick, Melville, & Zhu, 2006; Salwani *et al.*, 2009). To adopt e-commerce in successful manner, Top Management Supports are needed

101

(Oliveira *et al.*, 2014). It has been defined as the degree to which the firm's leadership understands the importance of IT investments and is involved in these efforts (Jitpaiboon, Vonderembse, & Asree, 2010).

Management support is often found to be positively influencing the adoption of IT innovation (Liang & Saraf, 2007; Zheng *et al.*, 2013). Jeyaraj *et al.* (2006) reviewed the IT adoption literature and conducted an analysis on 99 studies at an organization level. The result showed that Top Management Support was one of the best predictors for IT innovation adoption.

There are two reasons why 'Top Management Support' positively influences the innovation adoption. Firstly, top management controls most of the firm's resources (i.e. technical, financial, and human resources). Strong management support ensures efficient allocation of these resources which are necessary for smooth adoption of an IT innovation (Damanpour & Schneider, 2006; Liang & Saraf, 2007; Oliveira *et al.*, 2014; Quinn, 1985; Zheng *et al.*, 2013). Secondly, top management is a powerful force that works with or against innovation. If top managers work positively with adopting a new innovation, they will reduce the organizational resistance by creating the cultural values that support innovation adoption (Ahmad *et al.*, 2014; Damanpour & Schneider, 2008; Elenkov, Judge, & Wright, 2005; Hameed & Counsell, 2012; Quinn, 1985; Ramdani *et al.*, 2013).

Researchers who examine the role of Top Management Support focus on two concepts, namely manager's belief and participation (Chatterjee, Grewal, & Sambamurthy, 2002; Jitpaiboon *et al.*, 2010; Liang & Saraf, 2007). Jarvenpaa and

Ives (1991) and Liang and Saraf (2007) treat manager's belief and participation as two separate constructs. Manager's belief refers to a subjective psychological state regarding the potential of e-commerce while manager's participation refers to the actions and behavior performed to enable e-commerce.

Srivastava (1983) emphasizes that organizational decisions, strategies, and behavior are directed by top managers' mental image that relates to the future state of organization. Hambrick and Mason (1984) assert that organizational decisions are a reflection of the cognitive bases and values of top management. In addition, Chatterjee *et al*. (2002) argue, "through their beliefs, top management can offer visions and guidelines to managers and business units about the opportunities and risks in assimilating the Web technologies" (pp. 70-71).

By contrast, Resource Dependency theory challenges the previous view on top management role. This theory claims that managerial discretion is largely a myth. They assume that managers lack the power to do anything except the allocation of the required resources to implement innovative programs that are required by demanding customers and investors (Christensen & Bower, 1996; Nienhüser, 2008; Pfeffer & Salancik, 2003; Slappendel, 1996).

In the context of e-commerce adoption, several anecdotal evidences support the above argument. For example, a recent qualitative study attempts to explain why manufacturing firms use collaborative e-commerce at low level in Malaysia. Haji-Pakir and Alina (2010) reported that the firms' decision to adopt these technologies was dependent on their partners. Other studies report insignificant relationship between Top Management Support and adoption. For instance, Wang *et al*. (2010)

found that Top Management Support insignificantly influence the RFID adoption decision. Also, Teo & Pian (2003), Oliveira *et al.* (2014), and Thong (1999) arrived at a similar result.

In summary, the influence of top management is still unresolved. Previous studies focus on causal relationship between top management and adoption behavior or through mediation effect. Hence, it is interesting to examine the moderation effect of dependency and trust on the relationship between Top Management Support and adoption behavior.

2.8.3 Environmental Factors

IS researchers have found many variables in organizational environment that influence the decision to adopt B2B EC. In this literature review, the list of factors has been identified. The focus of this study will only be on Competition Pressure because it is consistently found to discriminate between adopters and non-adopters of information system (Ghobakhloo, Arias-aranda, & Benitez-amado, 2011; Li & Lin, 2006; Oliveira & Martins, 2010; Premkumar, 1995; Tarofder *et al.*, 2013).

Other environmental factors such as government support and institutional pressures are excluded from this study because they are not important in Jordanian settings. Jordanian government played only an indirect role by building the suitable environment to conduct online transaction but it did not provide any technical or financial support (Al-qirim, 2010a; Al-qirim, 2010b; MOICT, 2012). On the other hand, institutional pressure plays an important role only in the late diffusion stage

(Beatty *et al.*, 2001; Jeyaraj *et al.*, 2008; Shih, 2012). In Jordan, however, the diffusion of such technology is still in early stage. The next section provides more insight into the role of Competition Pressure.

2.8.3.1   Competition Pressure

In 21st century, it is obvious that businesses tend to have been more responsive and careful about the actions of rivals especially in the global environment (Ciganek, Haseman, & Ramamurthy, 2014; Tarofder *et al.*, 2013). It was found that competitiveness of environment discriminates between adopters and non-adopters of information system (Ghobakhloo *et al.*, 2011; Li & Lin, 2006; Oliveira & Martins, 2010; Premkumar, 1995; Tarofder *et al.*, 2013).

Competition Pressure refers to the degree of pressure resulting from a threat of losing competitive advantage which forces firms to adopt and diffuse innovation in their operation (Lin, 2013a). To emphasize the role of competition, Tingling and Parent (2002,2004) examine how managers behave under high competition. They found that managers tend to adopt IT innovation even if this innovation is inconsistent with their organization needs. This is because they afraid from a threat of being lagging behind (Tingling & Parent, 2002).

It has been suggested that using a new technology such as B2B EC could affect the industry structure, alter the rules of competition, and leverage new ways to transcend rivals. Along with, it could change the competition landscape (Porter & Millar., 1985; Zhu *et al.*, 2006b; Zhu, Kraemer, Xu, & Dedrick, 2004; Zhu *et al.*, 2003).

Accordingly, competition has been found to be an important driver of e-commerce adoption (Chan *et al.*, 2012b; Chong *et al.*, 2009a; Ifinedo, 2011; Lin, 2013a; Oliveira *et al.*, 2014; Tarofder *et al.*, 2013; Wang *et al.*, 2010; Zhu *et al.*, 2006b; Zhu *et al.*, 2003). Despite of this, recent studies show that competitive pressure has different influence on different adoption stages. Chan, Chong, and Zhou (2012) and Zhu, Kraemer, and Xu (2006) found that competitive pressure drives adoption decision only at an initiation stage and not in the later stage such as routinization. The reason behind these differences is that competition may force the firm to pursue the latest technologies without the ability to learn how to use a new technology (Chan *et al.*, 2012b; Fichman & Kemerer, 1999; Wang, 2010; Zhu *et al.*, 2006b).

Furthermore, some researchers reported insignificant relationship between Competition Pressure and B2B EC adoption (Ahmad *et al.*, 2014; Jeon, Han, & Lee, 2006; Ranganathan *et al.*, 2004). Iskandar *et al.* (2001) arrived at a similar result. Researchers argue that the reason for this result could stem from the fact that respondents do not consider B2B EC as a significant tool to increase their competitiveness in the marketplace (Khazanchi, 2005; Simmons, Armstrong, & Durkin, 2008; Xu, Rohatgi, & Duan, 2007). Meanwhile, Elia *et al.* (2007) argue that if firms invest too much on technologies in order to compete with rivals, they may not be able to sustain all the technologies in the long run.

In sum, due to contradictory results in prior research, it is not easy to draw conclusion about the role of competition. Most of prior studies focus on how Competition motivates innovation adoption but without considering co-adoption

attribute of e-commerce technology. In such case, relationship characteristics (dependency and trust) could direct the role of competition.

2.8.4   Relationship Factors

Chae *et al*. (2005) argue that B2B EC technology is a reflection of an existing relationship between partners. In such situations the characteristics of relationship between adopters, particularly dependency and trust, assumed to play a predominant role in determining the adoption behavior (Al-Hakim *et al.*, 2012; Chae *et al.*, 2005; Chong *et al.*, 2013; Gefen, Rose, Warkentin, & Pavlou, 2005; Hart & Saunders, 1997; He *et al.*, 2013; Lyytinen & Damsgaard, 2011; Rodón & Sesé, 2010).

Recently, studies indicate that unfavorable relationships often exist among trading partners which makes B2B EC adoption difficult (Ali, 2010; Ali & Kurnia, 2010; Ali *et al.*, 2008; Ibrahim & Ribbers, 2006). They argue that the actions of the focal firm are not only influenced by the nature of technology, capability of organizations, and environmental factors but also modified by relationship factors. Thus, understanding these relationship attributes (dependency and trust) will provide more understanding about the adoption phenomena. The next section discusses in detail these two attributes.

2.8.4.1   Perceive Dependency

Inter-organization arrangements   is grounded on the idea that no firm is self-sufficient in terms of resources and it depend on external environment such as its

partners to supply those resources (Al-Hakim *et al.*, 2012; Hart & Saunders, 1997; Klein & Rai, 2009). Therefore, access to these resources is indispensable for firms' success and survival (Chatterjee, 2013; Reimers *et al.*, 2010b). This phenomenon is known as resource dependency. Emerson (1962) defined dependence as the extent to which valued and scarce resources are mediated by firm's partner. Frazier (1983) defined it as the extent to which one business party is required to sustain a particular relationship with another business party to secure necessary resources or to achieve specific objectives. The degree of dependence is the root of power in an inter-organization relationship, in which the less dependent party has power over the more dependent one (Pfeffer & Salancik, 2003; Pfeffer & Salancik, 1978).

The literature suggests that dependence is affected by three factors:(i) resource criticality, (ii) degree of discretion over it, and (iii) alternatives availability (He *et al.*, 2013; Iskandar *et al.*, 2001a; Ravichandran *et al.*, 2009). For instance, dependency on suppliers exists when it is costly or difficult for focal firm to switch to other suppliers. In contrast, dependency on customers exit when it accounts for a large proportion of the focal firm's sale or are easily able to shift to alternative source of supply (Ravichandran *et al.*, 2009).

However, a vital dimension of managing resource dependency is the creation and design of operational linkages between trading partners. Such linkages purposively seek to integrate and coordinate operational process between the involved parties (Chatterjee, 2013; Rai, 2014; Reimers *et al.*, 2010b; Subramani & Venkatraman, 2003; Wang, Tai, & Grover, 2013). For example, firms can share forecasting data, coordinate the production, delivery of items, transportation, and create common

inventory (Chatterjee, 2013; Wang *et al.*, 2013). In this manner, there is a widespread belief that B2B EC can enhance the information processing capabilities of operational linkage in inter-organizational relationships, thereby supporting and enabling greater inter-organization cooperation and coordination as well to reducing uncertainty about resource allocation (Chae *et al.*, 2005; Sanders, 2008; Wang *et al.*, 2013; Wiengarten *et al.*, 2013).

Resource dependency theorists argue that dependency influences the actions of organizations in a dyadic exchange relationship (Casciaro & Piskorski, 2005). According to particular degree of dependency, organizational decisions and actions can be explained (Drees & Heugens, 2013; Hillman *et al.*, 2009; Nienhüser, 2008). With regard to adoption decision, the influence of resource dependence has been studied from two different views including uncertainty and power view.

The first perspective, the less popular one, suggest that a high level of dependency on partner's resources increases the level of uncertainty about allocation of these resources and it increases the need to manage and coordinate this dependency in effective way. Dependent firm is concern about what the actions will be of those who control these resources (Chatterjee, 2013; Iskandar *et al.*, 2001a; Reimers *et al.*, 2010b). B2B EC would be assumed as a strategy to lessen the consequences of dependence on other firms by managing the operational linkage between the involved parties (Chatterjee, 2013; Reimers *et al.*, 2010b; Zaheer & Venkatraman, 1994). For example, if a firm depends on distributors who provide it with sales information in order to coordinate its marketing activities, that information represents a vital resource which is controlled by another firm. The firm is then motivated to

109

create B2B EC technology which automates this process and facilitates the capturing and transmission of such data (Reimers *et al.*, 2010b). Furthermore, adopting B2B EC technology will help a firm to restructure its dependency with its partners. It is allow dependent firm to lock in its trading partners in high IT-asset specificity. This is because B2B EC requires high level of investment in asset such as hardware, software, human resources and others (Amit & Zott, 2001; Amit & Zott, 2012; Chatterjee, 2013; Rai, 2014). Hence, researchers have acknowledged that dependency has a motivational role of on adoption of B2B EC (Al-Hakim *et al.*, 2012; Mollenkopf, White, & Zwart, 2001; Pan, 2013; Ranganathan *et al.*, 2004; Yeh, 2005) but not by Huang *et al*. (2008) and Saunders and Clark (1992).

The second view suggests that dependency is the greatest source of power, assuming that if party X is highly dependent on party Y, Y is more powerful than X (Son *et al.*, 2008). This is because when critical resources are controlled by others, the dependent party will lose some of its autonomy and discretion in making decisions (Casciaro & Piskorski, 2005; Drees & Heugens, 2013; Oliver, 1991a; Oliver, 1991b). Therefore, power can provide one firm with the ability to exercise its power to get compliance from another firm.

In context of B2B EC, it has been suggested that unfavorable relationships often exist among trading partners (Ali, 2010; Ali & Kurnia, 2010; Ali *et al.*, 2008; Ibrahim & Ribbers, 2006). They have different interest and perception about adoption of B2B EC making the decision to adopt difficult to be achieve (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Chaparro-Peláez *et al.*, 2014; Li & Ghosh, 2012). Scholars suggest that to resolve the conflicting issue in adoption

decision, potential adopter should use his power to do so successfully. In this manner, the dependent firm will not be able to do that, while the powerful firm (the less dependent one), which is, by definition, in a better position to induce its desired on the dependent party. Therefore, several studies found partner dependence and its counterparty partner power significantly affect the adoption of B2B EC (Chwelos *et al.*, 2001; Deeter-schmelz, Graham, & Howdyshell, 2001; Huang *et al.*, 2013; Ke *et al.*, 2009; Premkumar, 1995; Son *et al.*, 2008; Zhang & Dhaliwal, 2009). Wednesday

In the same vein, the effect of power and dependency on the adoption decision has been investigated using different theoretical lens. Researchers have used the lens of Resources Dependency theory, Institutional theory or Stakeholder theory (Nienhüser, 2008). The main rationale in all of these lens corresponds to argument of resource dependency theory (Teo *et al.*, 2003).Table2.10 shows selected studies from each lens.

Institutional theory used the concept of 'coercive pressure' to examine the influence of powerful party on the firm decision (DiMaggio & Powell, 1983; Teo *et al.*, 2003). This concept is interrelated with theoretical assumption that an innovation (i.e. e-commerce) is the best way of conducting business in organizational environment (Reimers *et al.*, 2010b; Standing, Standing, Love, & Gengatharen, 2013). Therefore, researchers find that the influence of coercive pressure will take place only in the later stage of the innovation life cycle where the number of adopters is high (Beatty *et al.*, 2001; Jeyaraj *et al.*, 2008; Shih, 2012).

111

Table 2. 10

Theories Focus on Power

Perspective	Studies
Resource Dependency Theory	(Ali *et al.*, 2008; Ali *et al.*, 2009; Hart & Saunders, 1997; Hart & Saunders, 1998; Huang *et al.*, 2013; Iskandar *et al.*, 2001a; Iskandar *et al.*, 2001b; Ke & Wei, 2007; Nagy, 2006; Son *et al.*, 2008; Son *et al.*, 2005).
Institutional Theory	(Gibbs & Kraemer, 2004; Hertwig, 2012; Ke, 2006; Ke *et al.*, 2009; King *et al.*, 1994; Ravichandran *et al.*, 2009; Srivastava *et al.*, 2009; Standing *et al.*, 2009; Teo *et al.*, 2003; Thatcher *et al.*, 2006; Tsai *et al.*, 2013; Wong & Boon-itt, 2008; Zhang & Dhaliwal, 2009; Zheng *et al.*, 2013).
Stakeholder Theory	(Boonstra & de Vries, 2008; Chua, Straub, Khoo, Kadiyala, & Kuechler, 2005; Govindaraju, Chandra, & Siregar, 2012; Pouloudi & Whitley, 1997; Roberts, 2009).

In another respect, researchers apply Resource Dependency theory to investigate power or power exercise on adoption decision. Many studies have found the influence of power exercise on decision to adopt B2B EC consistent with the reasoning of this theory. In contrast, others found insignificant and even negative relationships between the power exercised and B2B EC adoption (Hart & Saunders, 1998; Huang *et al.*, 2013; Huang *et al.*, 2008; Ke *et al.*, 2009; Son *et al.*, 2005; Zhao, Huo, Flynn, & Yeung, 2008).

Son *et al.* (2005) argue that exercising power could work well only in the early adoption stages when the powerful firm asks the target firm to accept the idea of B2B EC or to adopt the minimum requirement of B2B EC. By contrast, exercising power would not be an appropriate strategy in increasing the level of usage (Son *et al.*, 2005). The use of power in usage stage may create conflict between trading partners which, in result, increases the level of the focal firm's resistance (He *et al.*, 2013; Son *et al.*, 2005).

112

To conclude, it is important to point out that previous research investigating the relationship between dependency (power) and adoption is somewhat scarce and generally suffers from several limitations (He *et al.*, 2013). The majority of publications focus on the direct relationship between dependency and adoption while the contingency role of power is mostly ignored in the literature. Thus, additional research is required to shed more understanding about this issue. The next section discusses the role of trust.

2.8.4.2   Trust

Transactions in B2B EC are composed of more than one independent actor. Each actor attempts to act on his interest to achieve his goals. In many cases, the action taken by an actor may touch the performance of another actor in the network (Moldoveanu & Baum, 2011). Further, B2B EC is not only an online transaction but it also involves information sharing and maintaining business relationships (Lai *et al.*, 2011; Li *et al.*, 2012).   In order to achieve successful and sustainable supply chain relationship, trust is a key (Al-Hakim *et al.*, 2012; Kim, Ferrin, & Rao, 2008a; Obal, 2013). According to Social Exchange theory, inter-organizational trust is more able to explain the inter-organizations interaction than economical calculation (Gefen, Karahanna, & Straub, 2003; Gefen *et al.*, 2005; Wu, Chuang, & Hsu, 2014). Trust, as a feature of inter-organizational relationship, has been defined in many ways. Anderson and Narus (1990) define trust as "a firm's belief that another company will perform actions that will result in positive outcomes for the firm, as well as not take unexpected actions that would result in negative outcomes for the firm". Morgan and Hunt (1994) use trust to refer to the willingness of one firm to

113

rely on the partner on whom one has confidence and it exists when one party has strong faith in the partner's reliability and integrity.

In prior research, trust has been studied on three levels: inter-personal trust, system trust, and dispositional trust (Li *et al.*, 2012; Mcknight & Chervany, 2002; Thatcher, Carter, Li, & Rong, 2012). Table 2.11 provides description about each level. Li *et al.* (2012) reviewed the concept of trust in more than 1,290 published articles in ISI journal between 1970 and 2010. They point out that there is no fundamental difference between the notions of inter-organizational and interpersonal trust.

Table 2. 11
Level of Analysis of Trust In Prior Studies

Trust level	Description
Interpersonal	Refer to the perceived reliability of the specific characteristics of the individuals involved (competence, benevolence, integrity, predictability, dependability)
System	Refer to the perceived reliability of a system or institution involved, derived from structural assurances (regulations and laws)
Dispositional	Refer to the general attitude of one actor towards trust such as their propensity to trust and risks, and their personal strategy in dealing with others when seeking favorable outcomes

Source: *(the definitions adopted from, Li et al. (2012)).*

In addition, trust has been operationalized as a multidimensional structure of trusting belief. It is considered as a high order construct that consists of conceptually distinct dimensions but closely interrelated (Li *et al.*, 2012; Son & Benbasat, 2006). Literature suggests various dimensions for measuring trust but the three main dimensions of trusting beliefs are integrity, benevolence, and competence (Bhattacherjee, 2002; Gefen *et al.*, 2003; Li *et al.*, 2012; Mcknight & Chervany, 2002; Son & Benbasat, 2006). Table 2.12 defines those dimensions based on Ba and Pavlou (2002) and Mayer, Davis, and Schoorman (1995).

114

Table 2. 12

Trust Dimensions

Trust dimension	Description
Integrity	Refers to the belief that a trusted party will honour its commitments to another party
Benevolence	Refers to the belief of the trusting party that the trusted party will not take advantage of it
Competence	Refers to the belief that a trusted party will behave competently

Many studies emphasis that inter-organizational collaboration and inter-firm interaction rely heavily on a relationship characterized by a high level of trust (Kumar, Dissel, & Han, 1996; Sridharan & Simatupang, 2013). The main rationale behind the role of trust in inter-organizational relationship is that trust breeds a sense of psychological reassurance that the expected results in the relationship will be obtained. Therefore, low level of trust diminishes the assurance between parties and introduces uncertainty making the cooperative effort costly and difficult to achieve (Andaleeb, 1995; Li *et al.*, 2012).

Additionally, a high level of trust would encourage the participators to open communication channel and increase information sharing. It also increases the participators' willingness to take risks with his partner by mitigating the uncertainties in inter-organizational relationships such as opportunistic behaviors, imbalance of power, and conflicts (Chong *et al.*, 2013; Chong *et al.*, 2009b; Corsten & Kumar, 2005; Hart & Saunders, 1997; Kwon & Suh, 2005; Pavlou, 2003; Pavlou, Liang, & Xue, 2007; Shih, Lin, & Ke, 2013; Son *et al.*, 2005; Wu *et al.*, 2014).

115

Moreover, trust increases the focal firm's perception about system usefulness, value, and 'ease of use' (Gefen *et al.*, 2003; Obal, 2013; Ratnasingam & Pavlou, 2002). It has been also proven that trust leads to positive outcomes such as performance advantage, competitive, satisfaction, and perceived risk reduction (Ba & Pavlou, 2002; Obal, 2013; Perrone, Zaheer, & McEvily, 2003; Zaheer, Mcevily, Perrone, & Barney, 1998).

Beth, Burt, Copacino, and Gopal (2003) and Chae *et al.* (2005) stressed that building relationships between business partners is more important than investing in advanced technologies alone in SCM. Researchers confirm that B2B EC may not succeed without the existence of trust (Ali & Kurnia, 2010; Chang & Wong, 2010; Pavlou, 2002; Soliman & Janz, 2004; Son & Benbasat, 2006). Ali and Kurnia (2010) investigated the influence of trust in Bahrain grocery industry. They examined six case studies and found that the lack of trust in the industry makes many firms believe that there is no need for IOS adoption.

Despite the importance of trust in inter-organizational relationship, some studies report insignificant relationship between adoption and trust. For example, Al-Hakim *et al.* (2012) find that the level of trust does not influence positively the e-procurement adoption decisions. Chong and Bai (2014) and Saunders and Clark (1992) also arrived at a similar result. These results could be justified by Ali's (2010) work. He argues that the influence of trust on adoption decision is related to the level of IOS sophistication. Based on eight cases in Australia, he found that trust does not influence transactional IOS. However, when the level of IOS sophistication increases, trust plays a more important role.

116

A contrary explanation is to consider trust as a factor moderate the role of other factors as recommended by Abu-Elsamen *et al*. (2010), Alsaad *et al.* (2014), Lyytinen and Damsgaard (2011), and Rodón and Sesé (2010). In this manner, Dirks and Ferrin (2001) and Shaw and Staples (2004) argue that trust has two type of effect on behavior (i.e. adoption behavior) which include direct and moderating effect. In case of having moderating role on behavior (i.e. e-commerce adoption), it will guide actors to selectively perceive and interpret factors that have a direct effect on behavior.

To demonstrate, DOI and TOE suggest that adoption behavior is driven by motivational factors such as technological, organizational, and environmental factors but not by beliefs about inter-firm trust. Under this assumption, trust would direct the motivation towards reaching adoption decision as it provides information about the advisability of engaging in particular joint-action behavior (i.e. B2B EC adoption). In such case, trust between trading partners will breed a sense of psychological reassurance that the expected results in the relationship will be obtained (Andaleeb, 1995; Li *et al.*, 2012).

Several studies have provided theoretical arguments that simulate the above claim but unexamined in empirical research. For instance, Venkatesh and Bala (2012) argue a firm will be willing to make investments in B2B EC to automate business processes with a trading partner only if there is a high degree of trust in the relationship. Similarly, Ke and Wei (2007) emphasize that information sharing between trading partners using IS tools depend on the willingness of firms to share

117

information and knowledge. They stressed that low level of trust towards the trading partner make the focal firm worried about information sharing with the partner. Such concerns lead the focal firm to concentrate more about the risks that result from exchanging information with the partner.

In sum, presence of trust may not facilitate, but its absence would seriously inhibit e-commerce efforts. Prior research examines the casual relationship between trust and B2B EC adoption but only a few examines the contingency effect that trust may hold on other determinants.

2.9 Summary of Chapter

The adoption of e-commerce has been the focus of considerable research over the past decade. The interest in this topic has been driven largely by an assumption that e-commerce offers new opportunities for adopters to achieve competitive advantages such as market reach, reduced marketing time, and increased efficiency and productivity. A large number of studies have been conducted due to an increasing appreciation of the importance of adopting e-commerce.

The predominant research thread throughout much of this topic is the examining of variables and determinants that either act as barriers or act as incentives to adopt e-commerce technology. Most of these variables can be classified into one of the four categories including technological, organizational, environmental, and relational category.

Recent research have provided evidence that e-commerce literature exhibits a gap in identifying and understanding factors that affect the adoption process (Hameed & Counsell, 2012; Reimers *et al.*, 2010b). Despite the availability of extensive literature that explores different determinants affecting e-commerce adoption process, several factors that either hinder or facilitate the adoption of e-commerce have not yet been identified. Furthermore, the variations in the results of different factors in prior studies make application of these results practically inappropriate. Inconsistencies in the results of previous research make it nearly impossible to draw widely-applicable conclusions about the effects of the various factors that influence the adoption of e-commerce.

Researchers confirm that instability in B2B EC diffusion studies and their conclusions is due to the large number of determinants that relate to IT innovation as well as to the significant interaction among these determinants. This theme has led scholars to explore factors that cause this inconsistency. In this effort, several moderating variables have been examined, but limited studies have been conducted to explore the moderating role of trust and dependency. The role of those factors has so far been ignored in the literature. This is because the widely used innovation theories such as TOE and DOI have been disregard those factors.

TOE and DOI emphasize on how technological, organizational, environmental factors motivate the diffusion of innovation. Besides, researchers who focus on trust and dependency also considered them also as motivational factors. Researchers stressed that relationship related factors (trust and dependency) may be conceived of as factors that facilitate or direct the role of other factors instead of considering them

119

as motivational factors (Abu-Elsamen *et al.*, 2010; Lyytinen & Damsgaard, 2011; Reimers *et al.*, 2010b; Rodón & Sesé, 2010). Therefore, new framework still needs to be developed for a deeper and richer understanding of the phenomenon of B2B EC adoption. This study therefore proposed an interactive view of B2B EC adoption by explicitly considering trust and dependency as moderating variables in TOE framework. Next chapter explains in details the casualty in which trust and dependency will direct the role of other factors. In addition, it explains the research plan to attain the intended result.

CHAPTER THREE: THEORETICAL FRAMEWORK AND RESEARCH METHODOLOGY

3.1 Introduction

The research framework, research methodology, and data collection are discussed in this chapter. The chapter is divided into eight sections. Sections 3.2 and 3.3 cover the research framework that explains the causality between the research variables and firms' intent to adopt B2B EC. Research design and procedures that were implemented by researcher to examine the relationships between the research variables are specified in section 3.4. Section 3.5 presents the data collection procedures. Meanwhile, the descriptive analyses of the collected data are demonstrated in section 3.6. The treatment of data entry errors, missing data, normality, and non-response bias are presented in section 3.7. Finally, selection of data analysis strategy is presented in section 3.8. Figure 3.1 demonstrates the flow of chapter three.

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Figure 3. 1
Flow of Chapter three.

3.2 Research Framework

The objective of this study is to analyze the determinants of behavioral intention to adopt B2B EC from marketing and purchasing perspectives. Several theories are available to explain why and how innovations are adopted. In order to develop the research framework, this study relied on widely used theories and models in adoption research, namely; DOI, RDT and TOE framework. Both TOE framework and DOI emphasize the role of technological, organizational, and environmental motivated factors on innovation adoption (Chan & Chong, 2012b; Hsu *et al.*, 2006; Picoto, Bélanger, & Palma-dos-Reis, 2014; Zhu & Kraemer, 2005; Zhu *et al.*, 2006b). Meanwhile, RDT brings forward the role of relationship context as an important factor affecting the adoption of a new technology (Hart & Saunders, 1997; Iskandar *et al.*, 2001a; Son *et al.*, 2008; Son *et al.*, 2005). Using those theoretical lenses suggests a wide range of factors affecting the adoption behavior. Thus, to determine the relevant antecedents, this study focused only on factors that are well established in the adoption literature and are applicable to Jordanian context.

According to DOI, adoption behavior rests on evaluation of innovation attributes (Rogers, 2003). It assumes that potential adopters act in rational way; they evaluate the innovation attributes to produce a cognitive-based attitude towards innovation adoption (Alsaad *et al.*, 2014; Ansari & Zajac, 2010; Khalifa & Davison, 2006; Rogers, 2003). In this sense, potential adopters will adopt an innovation that its attributes are perceived to be consistent with potential adopter's needs and features. Indeed, there are several attributes affecting the behavior of potential adopter (Ansari & Zajac, 2010; Khalifa & Davison, 2006; Rogers, 2003). These include, innovation

123

attributes, such Complexity, Security, Compatibility, Cost, and Relative Advantages, which have been recognized as having influence on innovation adoption. Based on several meta-analyses, Complexity, Compatibility and Relative Advantages are the most influential attributes and they accounted for a high magnitude of variance in adoption behavior (Hameed & Counsell, 2014; Tornatzky & Klenin, 1982). Moreover, Al-Qirim (2010) has explored the most important technological variables that affect e-commerce in Jordan. He suggests that Relative advantages, Complexity, and Compatibility are more likely to influence the direction of e-commerce adoption in Jordan. Thus, it would be reasonable to include such attributes under the technological context of TOE framework in the proposed model.

Another important context affecting innovation adoption is the Organization context which reflects features of an organization. And one of the most important organizational features that help firms to adopt new innovation successfully is Internal capability (Alsaad *et al.*, 2014; Chwelos *et al.*, 2001; Fathian *et al.*, 2008; Guo & Wu, 2010; Mcelheran, 2013). A well-established contribution in the literature stresses the necessity for alignment between the nature of the technological change and the internal capabilities of potential adopter (Chwelos *et al.*, 2001; Mcelheran, 2013; Picoto *et al.*, 2014; Zhu & Kraemer, 2005; Zhu *et al.*, 2006b). Capabilities misalignment is attributed for the observed failure in acquiring and maintaining a new technology. In fact, such capabilities are labeled in adoption literature as Organization Readiness (Chwelos *et al.*, 2001; Fathian *et al.*, 2008; Guo & Wu, 2010; Iacovou *et al.*, 1995). Organizational Readiness represents both the technological capabilities and financial capabilities of a potential adopter (Chwelos *et al.*, 2001; Iacovou *et al.*, 1995; Rai *et al.*, 2009). Since adoption of B2B EC entails

124

considerable changes in organization and requires intensive resources to be acquired and maintained (Alsaad *et al.*, 2014; Rai *et al.*, 2009; Reimers, Johnston, & Klein, 2013), inclusion of Organizational Readiness as predictor of adoption behavior would be critical, and thus it is included in the proposed framework.

While Organizational Readiness highlights the importance of firm's capabilities and resources, Top Management Support is another organizational attribute that represents the political resources (Liang & Saraf, 2007; Picoto *et al.*, 2014; Zheng *et al.*, 2013). Top Management Support is a powerful forces enabling the efforts towards adoption of new technology by allocating managerial, financial, and technological resources that are necessary for innovation adoption (Liang & Saraf, 2007; Picoto *et al.*, 2014; Zheng *et al.*, 2013). Furthermore, Top Management Support has been reported to be one of the most important determinants of adoption behavior in a recent meta-analysis (Jeyaraj *et al.*, 2006). Consistent with this stream of research, Top Management Support as a variable is incorporated in the proposed framework.

However, another context presented by TOE is the environmental context (Tornatzky *et al.*, 1990). In fact, environmental context involves several variables. Previous research consistently highlights the impact of Competition Pressures, Institutional Pressures (coercive, normative, and mimetic pressures), and Government Supports (Jeyaraj *et al.*, 2006). Such variables are not relevant to all environments. For instance, the Jordanian government did not provide any technical or financial support to motivate B2B EC adoption. Instead, its role was merely an indirect one by creating an appropriate environment to conduct online transactions (Al-qirim, 2010a;

Al-qirim, 2010b; MOICT, 2012). In a similar vein, institutional pressures are assumed to play a significant role only in the later stages of innovation diffusion (Beatty *et al.*, 2001; Jeyaraj *et al.*, 2008; Shih, 2012). Since the diffusion of B2B technology in Jordan is still in its early stage, this study excluded environmental factors such as government support and institutional pressures from the proposed model, because they are perceived to be less relevant to Jordanian environment. In contrast, this study incorporated the Competition Pressure into the proposed framework as it is proved to be an important factor in most environments (Jeyaraj *et al.*, 2006).

TOE framework and DOI do not take into account relationships-related factors (Dependency and Trust) (Chan & Chong, 2012a; Chan *et al.*, 2012b; Hsu *et al.*, 2006). An additional insight brought forward by RDT is the role of relationship context, including dependency and trust. However, despite the importance of such variables, there is little consensus on how to model the influence of trust and dependency in B2B EC adoption models (Alsaad *et al.*, 2014). Although prior research has identified trust and dependency to be directly affecting the decision to adopt B2B EC, scholars reported that, these factors might play facilitating role by enabling the role of other motivational factors (Abu-Elsamen *et al.*, 2010; Lyytinen & Damsgaard, 2011; Reimers *et al.*, 2010b; Rodón & Sesé, 2010). In response to this, this study has incorporated the role of trust and dependency as moderators in the proposed framework, as it is expected that, the moderating role of both will enhance the predictive and explanatory power of TOE adoption models and produce results that will be useful to academicians and practitioners. Figure 3.2 depicts the proposed

126

framework, for further details see section 2.7 and 2.7. The rest of this section describes the causality between research variables.
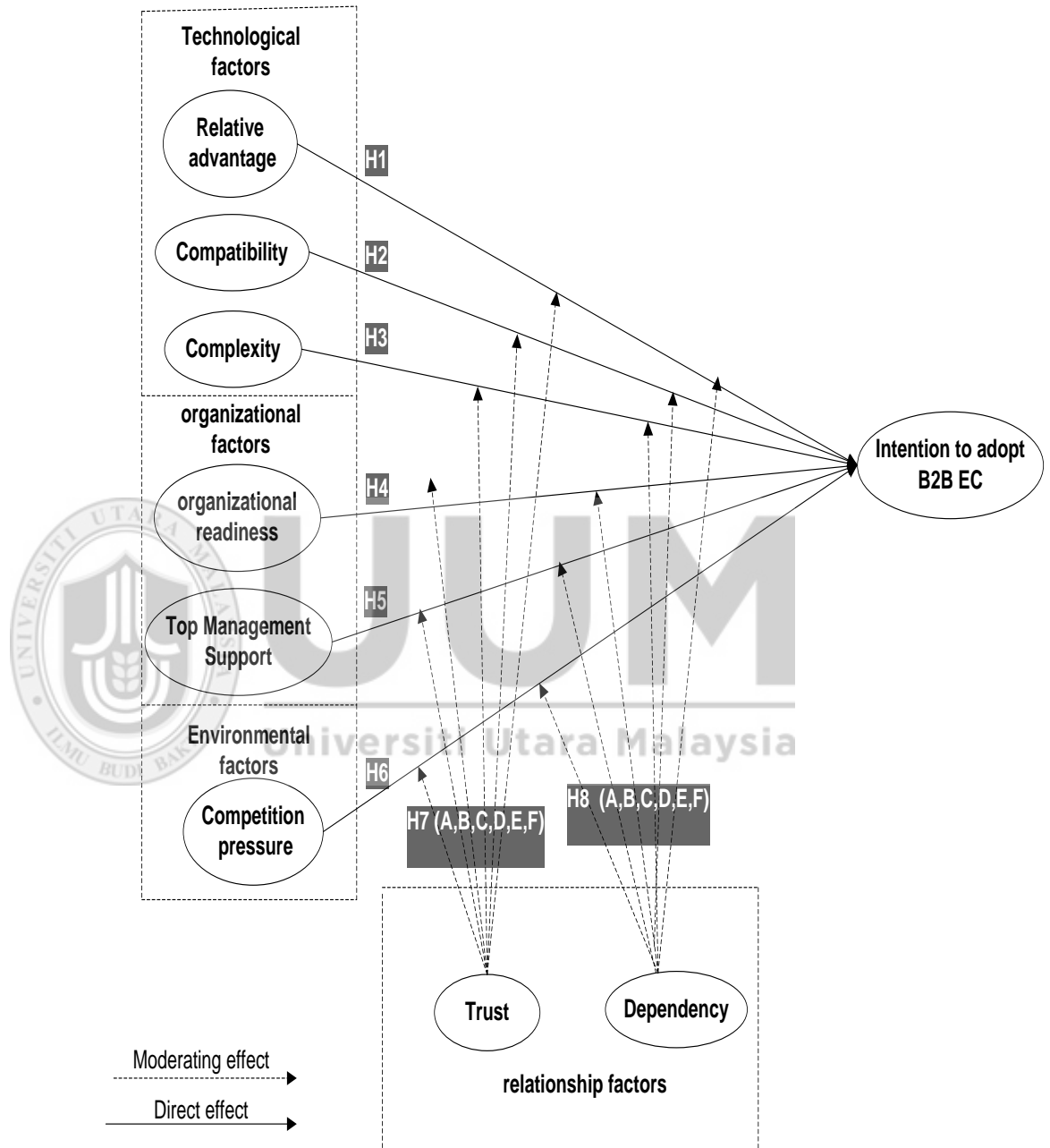
Figure 3. 2
The proposed research model

3.3. Hypotheses Development

3.3.1. Relative Advantage

Relative Advantage refers to the expected advantages that B2B EC can provide the organization. These include cost reduction, faster decision-making, reduced marketing time, increased efficiency and productivity, as well as others (Dong *et al.*, 2009; Elia *et al.*, 2007; Ranganathan *et al.*, 2011; Sanders, 2008; Yao & Zhu, 2012). Theorists argue that the benefits obtained from adopting innovation are the key factor in order to adopt innovation (Liu *et al.*, 2008; Lyytinen & Damsgaard, 2011). According to the Diffusion Innovation Theory, potential adopters will implicitly or explicitly carry out cost-benefit analyses. They will adopt innovations that produce greater returns than the method used previously (Rogers, 2003; Tarofder *et al.*, 2013; Venkatesh & Bala, 2012; Yoon & George, 2013; Zhu *et al.*, 2006b).

Several studies have found Relative Advantage to be a significant predictor in making the B2B EC adoption decision (Chwelos *et al.*, 2001; Khalifa & Davison, 2006; Lin, 2013a; Venkatesh & Bala, 2012; Zhu *et al.*, 2006b). This study anticipates that if firms' managers view B2B EC as likely to produce greater benefit, they are more likely to adopt it. This leads to the following hypothesis:

Hypothesis1: Higher perceived Relative Advantage leads to greater intention to adopt B2B EC.

3.3.2. Compatibility

Compatibility refers to the extent to which B2B EC is compatible with the firm's values, needs and past experiences (Rogers, 2003). Prior research suggests that Compatibility is a significant factor to be considered before a firm will adopt B2B EC (Rajaguru & Matanda, 2012; Venkatesh & Bala, 2012). This is because adopting B2B EC requires significant changes to be incorporated into a firm's structure, work practices, routine, and/or processes. A higher degree of Compatibility will enable the adoption of B2B EC with minimum changes to the current status (Hollenstein & Woerter, 2008; Thong, 1999). Also, a higher level of Compatibility increases the perception of benefits (Gao *et al.*, 2012; Grover, 1993; Karahanna *et al.*, 2006; van Rijnsoever *et al.*, 2009). Thus, it is predicted that:

Hypothesis 2: Higher perceived Compatibility leads to a greater intention to adopt B2B EC.

3.3.3. Complexity

Complexity refers to the degree of difficulty encountered in order to understand and apply B2B EC (Rogers, 2003). Almoawi and Mahmood (2011) argue that the decision to adopt depends on the time that a firm takes to understand the intricacies of the technological mechanism, the application and the benefits of e-commerce. A higher level of Complexity involves an elevated level of uncertainty about successful completion of B2B EC. This, in turn, increases the level of risk perceived in the adoption (Premkumar & Roberts, 1999; Ramdani *et al.*, 2009). Firms express hesitation to adopt B2B EC if the technology is difficult to understand, install, learn

129

and use. Therefore, the easier to understand the technology, the faster and more immediately the adoption will take place and vice versa. This leads to the following hypothesis:

Hypothesis 3: *Higher perceived Complexity leads to lower intention to adopt B2B EC.*

3.3.4. Top Management Support

Top Management Support refers to the degree to which the firm's leadership appreciates the importance of B2B EC as well as the degree to which they are committed to the adoption (Jitpaiboon *et al.*, 2010). Top Management Support involves two constructs: Management's belief and management's participation. The former refers to a subjective psychological state regarding the potentials of B2B EC. The latter refers to the steps taken in order to enable B2B EC (Liang & Saraf, 2007).

Strong management support ensures sufficient allocation of financial and technological resources which are required to adopt an IT innovation (Damanpour & Schneider, 2006; Liang & Saraf, 2007; Quinn, 1985; Zheng *et al.*, 2013). Top management is a powerful force that may work with or against the adoption process. When top management works positively for the adoption of an innovation, they can create the corporate cultural values that support it, thereby reducing the organizational resistance (Damanpour & Schneider, 2008; Elenkov *et al.*, 2005; Hameed & Counsell, 2012; Quinn, 1985). Conversely, if management support is at a low level or non-existent, the adoption process will be accorded a lower priority. Therefore, Top Management Support as a composite construct of management

130

beliefs and management participations is a key fundamental factor relating to adoption of B2B EC. This leads to the following hypothesis:

Hypothesis 4: Higher Top Management Support leads to greater intention to adopt B2B EC.

3.3.5. Organizational Readiness

Organizational Readiness refers to the ability of a firm to successfully adopt, use and benefit from information technologies (Fathian *et al.*, 2008). Adoption of B2B EC technology requires adjustment in the organization, workforce, process and structure (Lin *et al.*, 2007; Rafferty *et al.*, 2012). In order to adopt B2B EC in an appropriate manner, it is essential for the firm to ensure that there is an alignment between the nature of the technological change and the firm's capability (Abernathy & Clark, 1985; Elia *et al.*, 2007; Guo & Wu, 2010; Mcelheran, 2013; Tarofder *et al.*, 2013).

Iacovou et al. (1995) and Khalifa and Davison (2006) focus on two concepts in the process by which Organizational Readiness affects the decision to adopt B2B EC. These are the level of IT sophistication and firm's access to financial resources. IT sophistication refers to the technology infrastructure and IT human resources people (Chwelos *et al.*, 2001; Iacovou *et al.*, 1995). Technology infrastructure offers a platform on which B2B EC technology can be constructed. IT human resources offer the required knowledge and skills to develop and manage B2B EC applications (Zhu & Kraemer, 2005; Zhu *et al.*, 2006b). Additionally, implementation of e-commerce technology involves investment in software, hardware, and employee re-training and process re-engineering (Ramdani, 2009; Lin *et al.*, 2007; Rafferty *et al.*, 2012; Zhu,

Kraemer, & Xu, 2006). Ensuring that these resources are available in a timely and sufficient fashion involves availability of adequate financial resources.

In this manner, firms that have a greater degree of technological preparedness are better positioned to adopt B2B EC technologies. Therefore, Organizational Readiness as a construct composed of financial resources and IT sophistication is a key fundamental factor that represents the potential resources required to adopt B2B EC. This leads to the following hypothesis:

Hypothesis 5*: Higher Organizational Readiness leads to greater intention to adopt B2B EC.*

3.3.6. Pressure of Competition

Pressure from competition refers to the stress created by the threat of losing competitive advantage. This stress urges firms to adopt B2B EC (Lin, 2013a). Adoption of new technology can affect business environment, alter the rules of competition, and leverage new ways to outdo rivals. It can also change the competitive landscape (Porter & Millar., 1985; Zhu *et al.*, 2006b; Zhu *et al.*, 2004; Zhu *et al.*, 2003). Competition Pressure forces firms to offer faster responses to customer demands, shorter lead times, and a greater degree of customization (Huo, Zhao, & Zhou, 2013; Lin, 2013a; Zhu & Kraemer, 2005). Toward this end, firms should adopt, integrate, and reconfigure internal and external processes to match the requirements of the rapidly changing environment. Adopting B2B EC technologies allows firms to establish tighter connection and integrate its processes with its downstream and upstream partners (Sila, 2010; Sila, 2013; Teo *et al.*, 2003). In other

132

words, B2B EC is viewed by many firms as a formal business process innovation which enables them to achieve competitive advantage over rivals (Yao, Palmer, & Dresner, 2007; Yao & Zhu, 2012).

As long as businesses operating in a competitive environment, they will seek to invest in new technology in order to gain competitive advantage over their rivals (Chan *et al.*, 2012b). It has been suggested that the diffusion rate of B2B EC is high in a highly competitive environment (Lin, 2013a; Soares-Aguiar & Antonio, 2008; Teo *et al.*, 2003). Therefore, this work formulates the following hypothesis:

Hypothesis 6*: Higher Competition Pressure leads to greater intention to adopt B2B EC.*

3.3.7. The Moderating Role of Trust

Trust refers to the willingness of one firm to have confidence in and rely on a trading partners. It exists when one party strongly believes in reliability and integrity of the trading partners. Researchers stress that inter-organizational interaction relies heavily on a high level of trust (Kumar *et al.*, 1996; Sridharan & Simatupang, 2013). They also argued that building a good buyer-supplier relationship is more important than building sophisticated technologies alone (Beth *et al.*, 2003; Chae *et al.*, 2005). Researchers also confirm that B2B EC may not succeed without trust (Ali & Kurnia, 2010; Chang & Wong, 2010; Pavlou, 2002; Soliman & Janz, 2004; Son & Benbasat, 2006).

133

A vast body of literature have pointed trust as a variable that directly affects adoption of B2B EC (Al-Hakim *et al.*, 2012; Chong & Bai, 2014; Chong *et al.*, 2013; Hart & Saunders, 1998). For many of the adoption studies, the evidence for the predictions of a direct effect is not robust: recent studies confirm that trust plays insignificant direct role in adoption decision (Al-Hakim *et al.*, 2012; Chong & Bai, 2014; Saunders & Clark, 1992). Abu-Elsamen *et al*. (2010), Lyytinen and Damsgaard (2011), and Rodón and Sesé (2010) suggest that trust may also play a moderating role in B2B EC adoption. The moderating role of trust has been relatively unexamined in empirical research but it has attracted considerable theoretical attention in conceptual works.

For instance, Ke and Wei (2007) stated that information sharing between trading partners who are both using IS tools depends on their willingness to share the information and knowledge. They stressed that paucity of trust between the partners causes the focal firm to be concerned about sharing its information with the partners. This lack of trust causes the focal firm to focus on the risks that result from exchanging information with a partner who might not be trustworthy. Ke and Wei (2007) reported the following quote from an informant to demonstrate the importance of trust between trading partners ''...If we think that the partner is not trustworthy, we will not choose to disclose our proprietary information to this company... It is simply not wise to endanger our business for the ''so-called'' potential benefits of knowledge sharing''.

Furthermore, Venkatesh and Bala (2012) also argued that implementation of B2B EC is a resource-intensive process that involves considerable investment in terms of

resources, changes to the organization's processes and its routines. A potential adopter will have the motivation to invest in B2B EC only if there is substantial degree of trust with a trading partner.

These researchers' choice of words indicates that trust influences adoption behavior by enabling the effects of other variables on this adoption behavior. Therefore, instead of considering trust as a variable motivates adoption, it might be more productive to consider it as a variable that influences the manner in which the potential adopter directs its motivation to adopt B2B EC.

Dirks and Ferrin (2001), and Shaw and Staples (2004) argue that when trust has a moderating effect on behavior, it guides the potential adopter to selectively perceive and interpret factors that have a direct bearing on behavior. This study would thus expect that trust direct the motivation towards reaching adoption decision by providing information about the advisability of engaging in particular joint-action behavior like B2B EC adoption. Trust between trading partners breeds a sense of psychological reassurance that the relationship will produce the expected results (Andaleeb, 1995; Li *et al.*, 2012).

Furthermore, the existence of trust between trading partners allows a potential adopter to invest all necessary resources into the adoption process. This is because the potential partner does not have to cater for a possible let-down for exploitative situation (Chong *et al.*, 2013; Chong *et al.*, 2009b; Corsten & Kumar, 2005; Hart & Saunders, 1997; Kwon & Suh, 2005; Shih *et al.*, 2013; Son *et al.*, 2005). This leads to the formulation of the following three hypotheses:

135

Hypothesis 7:

Technological, organizational, and environmental factors will have a stronger relationship with the intention to adopt B2B EC under high level of trust.

This hypothesis includes the following sub hypotheses:

- *7A: Relative Advantages will have a stronger relationship with the intention to adopt B2B EC under high level of trust.*

- *7B: Compatibility will have a stronger relationship with the intention to adopt B2B EC under high level of trust.*

- *7C: Complexity will have a weaker relationship with the intention to adopt B2B EC under high level of trust.*

- *7D: Top Management Support will have a stronger relationship with the intention to adopt B2B EC under high level of trust.*

- *7E: Organization readiness will have a stronger relationship with the intention to adopt B2B EC under high level of trust.*

- *7F: Competition Pressure will have a stronger relationship with the intention to adopt B2B EC under high level of trust.*

3.3.8. The Moderating Role of Dependency

Hillman *et al.* (2009) and Rhee and Yang (2013) stress that RDT shares a number of fundamental assumptions with Contingency Theory. The role of dependency in adoption of B2B EC is controversial (Casciaro & Piskorski, 2005; Huang *et al.*,

136

2008; Reimers *et al.*, 2010b). Therefore, the contingent effect of dependency can be interpreted in two competing hypotheses.

In the first view, researchers stress that dependency in terms of critical resources entails uncertainty about allocation of these resources. Dependent firm is uncertain about what the actions will be of those who control these resources (Chatterjee, 2013; Iskandar *et al.*, 2001a; Reimers *et al.*, 2010b). Unmitigated resource dependency will negatively affect the dependent firm's autonomy (freedom to make decisions without outside interference) and leads to a situation in which continued success and survival are uncertain. Therefore, firms seek to mitigate the uncertainty about these resources by adopting inter-organizational arrangements (Drees & Heugens, 2013; Hillman *et al.*, 2009; Nienhüser, 2008).

IS researchers confirm that B2B EC adoption is a mechanism to manage the dependency's consequences and to secure the source of constrained resources. On one hand, it will facilitate the procurement of the needed resources by creating electronic linkage with the trading partners. It also automates the procurement process and facilitates the capturing and transmission of such data (Chatterjee, 2013; Iskandar *et al.*, 2001a). On the other hand, since such a customized digital linkage (B2B EC) requires a high investment in IT infrastructures which entails high switching cost, it will ensure that the key resources belonging to the trading partners are secured and available to the dependent party (Amit & Zott, 2001; Amit & Zott, 2012; Chatterjee, 2013; Rai, 2014).

In line with this reasoning, this work expects factors (TOE factors) that promote a firm's intention to adopt B2B EC would play a more significant role in a high level of dependency. As defined earlier, TOE factors represent firm' evaluation whether or not B2B EC is appropriate choice, which in turn prompt its intention to adopt. TOE factors coupled with the serious need to mitigate uncertainty surrounding vital resources encourage the dependent firm to adopt B2B EC. Therefore, high level of dependency would amplify the natural effects of TOE factors on intention to adopt B2B EC.

Alternatively, a contrary argument suggests that trading partners (buyer and supplier) often have different perception and interest toward adoption of B2B EC. This, in turn, makes the adoption of this technology more complex and difficult to achieve (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Chaparro-Peláez et al., 2014; Kim et al., 2010; Zhao, Xia, & Shaw, 2011). In order to overcome these difficulties, a firm should have two important attributes to do so successfully. These include (i) interests to adopt and (ii) power (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Kim et al., 2010; Turker, 2014). Specifically, firm interests is usually defined by appropriateness-related factors, and thus encourages the firm to adopt while power is defined by dependency level and thus enables the firm to induce its trading partners to participate in B2B EC initiative (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Hart & Saunders, 1997; Kim et al., 2010; Turker, 2014).

DiMaggio and Powell (1983) suggested that a firm's ability to exercise coercive pressure on a dependent party is contingent on the firm's position in a relationship. In the reasoning of RDT, a highly dependent firm has low level of power, because

138

whoever controls the vital resources has power over others who depend on them (Casciaro & Piskorski, 2005; Drees & Heugens, 2013; Hillman *et al.*, 2009; Nienhüser, 2008). Therefore, the highly-dependent firm is in a worse position to adopt B2B EC successfully, as it is unlikely to overcome the difficulties inherent in B2B EC adoption (Boonstra & de Vries, 2005; Boonstra & de Vries, 2008; Hart & Saunders, 1997; Kim *et al.*, 2010; Turker, 2014). In other words, it might be rather difficult for a firm with a great deal of interests but with a lack of power to adopt the B2B EC successfully. Hence, this study also would expect factors (TOE factors) that promote a firm's intention to adopt B2B EC to be less effective under a high level of dependency.

Based on the competing arguments and scant empirical results regarding the role of dependency as a moderator, the current study examines the moderating role between TOE related factors and intention to adopt B2B EC but does not predict the direction of the association. As Sekaran (2003) suggested, under such circumstance the hypotheses should be non-directional. The above discussion results in formulating the following hypotheses:

Hypothesis 8:
Dependency moderates the relationship between the technological, organizational, and environmental factors and the firm intention to adopt B2B EC.

This hypothesis includes the following sub hypotheses:

- *8A: Dependency moderates the relationship between the Relative Advantages and the intention to adopt B2B EC*

139

- *8B: Dependency moderates the relationship between the Compatibility and the intention to adopt B2B EC*

- *8C: Dependency moderates the relationship between the Complexity and the intention to adopt B2B EC*

- *8D: Dependency moderates the relationship between the Top Management Support and the intention to adopt B2B EC*

- *8E: Dependency moderates the relationship between the Organization Readiness and the intention to adopt B2B EC*

- *8F: Dependency moderates the relationship between the Competition Pressure and the intention to adopt B2B EC.*

3.4. Research Design

This section discusses the proposed plan to examine the research framework. In particular, this section sheds light on research nature and approach, research instrument, unit of analysis, sampling procedures, measurements, questionnaires translation and validation, and pilot study. Figure 3.3 depicts the components of this section.
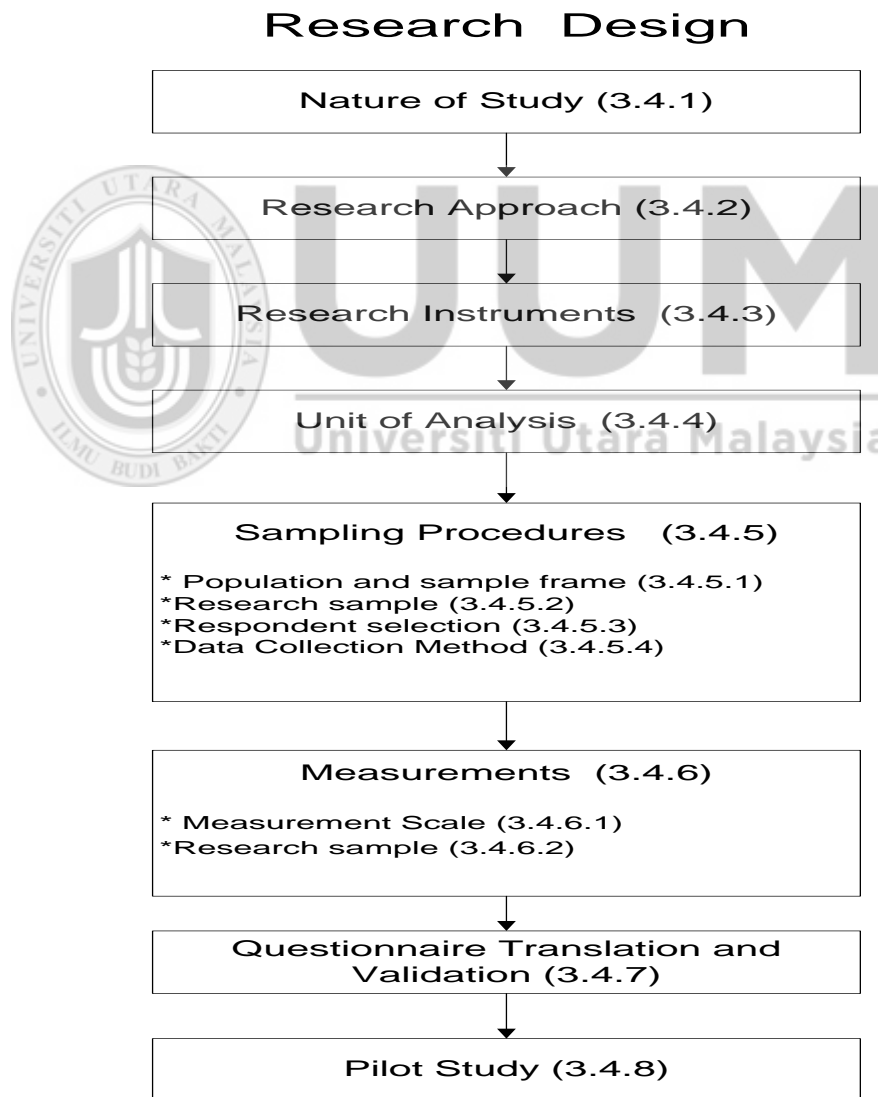
Figure 3. 3
The Components of Research Design Section

3.4.1. Nature of Study

Research can be an exploratory, descriptive or hypotheses-testing. An exploratory research is undertaken to explore a new area of research, while descriptive research attempts to describe certain characteristics of a phenomenon. By contrast, hypotheses-testing studies focus on examining the variation in the dependent variables (Sekaran & Bougie, 2010). The type of study carried out depends on the objective of the research. As study focuses on predicting the factors that significantly account for variance in an organization's intent to adopt B2B EC thus, it can be classed as a hypothesis testing study.

3.4.2. Research Approach

Selection of appropriate approach and method assumes critical importance when conducting a research (Galliers, 1992). A review of prior studies in prior IS adoption research helps to identify the most appropriate approach to carry out the research.

Mohamad and Ismail (2009) review approaches that used to carry out the IS adoption research. They find that quantitative approach is the one most currently adopted to carry out research in the adoption of e-commerce. More recently, Chen and Holsapple (2013) reviewed 618 journal articles to identify the research methods employed in e-commerce adoption. They found that more than 80% of the adoption research was quantitative.

With regards to the type of research methodology, Mohamad and Ismail (2009) found that cross-section survey is the most commonly used in adoption research. The next most popular methods are the case study, and interviews. This view is confirmed by Chen and Holsapple (2013). They found that 74.3% of the adoption research was based on the survey method while case study and interviews accounted for 4.7% and 4.4% respectively. Mohamad and Ismail (2009) argue that because survey method enables researchers to generalize their findings, it is more popular among them.

It can be seen from the above analysis that survey approach dominates IT adoption research methodologies. It provides snapshots of specific practices or behavior in specific time from which inferences may be made (Lin *et al.*, 2007). It is realistic and helps make proper generalizations (Mohamad & Ismail, 2009). Additionally, it enables the researcher to focus on a specific problem, to pursue a rigorous method, and to generate valid conclusions (Sekaran, 2003). Pinsonneault and Kraemer (1993) emphasize that the survey approach is most appropriate when the dependent and independent variables are well-defined and a conceivable model of the expected relationships exists. This study has a well-defined dependent variable (intention to adopt) and there is clear causality between research variables and are supported by theoretical basis. This study also interested in generalizing the research result to Jordanian firms at large. Due to these characteristics, this study will adopt the survey approach to investigate and examine research framework.

3.4.3. Research Instrument

A structured questionnaire has been selected as the main research instrument for this study. Questionnaire possesses several advantages over other types of instruments. It enables the researcher to accumulate vast quantities of data from respondents, it is generally inexpensive to administer, requires little effort for its development and lends itself to quick and easy analysis (Wilkinson & Birmingham, 2003). Furthermore, it helps to obtain standardized answers from respondents (Hair, Money, Page, & Samouel, 2007; Sekaran & Bougie, 2010).

Given the respondents of this study comprises of the firm's marketing and purchasing managers who are located at a wide geographic area and their time is very limited, using structured questionnaire is preferred method to collect data, due to its several advantages such as wide area coverage, low cost, and the respondents can answer the questionnaire at their leisure (Dillman, Smyth, & Christian, 2014; Sekaran & Bougie, 2010).

3.4.4. Unit of Analysis

Given the fact that B2B is by definition used by both sides of a buyer - supplier relationship, some studies have investigated this topic from either buyer perspectives (Chwelos *et al.*, 2001; Grover & Saeed, 2007; Son & Benbasat, 2007; Son *et al.*, 2008), supplier perspectives (Hart & Saunders, 1998; Iskandar *et al.*, 2001a; Iskandar *et al.*, 2001b) or without differentiation and taken the firm perspective by asking IS managers (Huang *et al.*, 2008; Ke *et al.*, 2009; Liu *et al.*, 2008). Other streams of

144

research have emphasized that investigating B2B systems should be based on two sample frames including marketing departments and purchasing departments (Archer, Wang, & Kang, 2008; Chun, 2004; Chwelos *et al.*, 2001; Huang *et al.*, 2008; Nakayama, 2003; Premkumar, 1995; Premkumar, Ramamurthy, & Nilakanta, 1994; Shih *et al.*, 2013; Walton, 1994; Williams, 1994).

While the purchasing perspective receives much attention, previous studies in marketing channel research have shown a discrepancy in the perspectives between buyers and suppliers with regard to inter-organization behavior (Kim *et al.*, 2010; Nyaga *et al.*, 2010). While buyer prefers working with fewer suppliers and suppliers seek longer-term relationships with business customers (Kim *et al.*, 2010; Nyaga *et al.*, 2010), the motivation for adopting B2B EC may differ. Consequently, this study attempts to understand the firm intention to adopt B2B EC with its key customer and supplier to determine whether their perspectives differ. Toward this end, this study analyses each perspective separately. However, as a unit of analysis is the unit to which data are assigned for statistical analysis and hypothesis testing (Rousseau, 1985), each perspective is considered as a separate unit.

3.4.5. Sampling Procedures

Sampling is the process of selecting a sufficient number of elements from the population (Sekaran & Bougie, 2010). In this section, population, sampling frame, the sampling procedure and sample size are discussed.

145

3.4.5.1.Population and Sample Frame

This study focuses on firms' intention to adopt, thus eligible firms are those that are currently non B2B EC adopters. The qualifying firms for studying B2B EC require massive transactions and high experience in supply chain and channel management (Saeed, Malhotra, & Grover, 2011; Wu & Chuang, 2009). Watts (1980), Akintoye, Mcintosh, and Fitzgerald (2000), and USAID (2007) point out that firms with large number of employees, high registered capital, and high sale turnover would be more likely to have these attributes. Two directories are available in Jordan to develop the sample list. The first directory provides list of firms according to employee numbers which is issued by Social Security Corporation while the second directory provides list of firms according to their registered capital as issued by Companies Control Department (CCD). The information from the first directory needs a formal application procedure that requires around two months to be obtained while the second directory provides firms' information online using search engine available to everyone. The directory of CCD is up to date and has complete list of Jordanian firm. It also provides contacts information for each listed firms. Since all required information is available in the directory of CCD and due to the time constraint, the researcher used the information available online from the second directory (CCD).

Therefore, the sample frame was fetched from the CCD in Jordan using search engine in their website. Since the directory is more detailed and explains each company's capital rather than its number of employees, the sampling frame is operationally defined based on the registered capital. In fact, registered capital could predict the volume of businesses transactions and the transaction volume is typically

146

as large as the registered capital (USAID, 2007). Since the B2B EC is typically used in larger volume transaction contexts, this study searched firms with large capital size.

The directory of CCD contains large number of firms; about 176,030 firms. To generate reasonable sample frame and to ensure massive supply chain activities in the prospective firms, the researcher searched for firms with registered capital that are equal to or exceed JD 5,000,000. There are two reasons behind the selection of this cut off amount. Firstly, B2B EC technologies are complex systems and the adoption of such systems require substantial technical and financial resources (Lin *et al.*, 2007; Venkatesh & Bala, 2012). Secondly, B2B EC adoption is correlated with high volume of transactions (Grover & Saeed, 2007; Liu *et al.*, 2008; Son & Benbasat, 2007). These parameters exist mainly in larger firms with adequate resources and there is a greater likelihood that such companies have large registered capital.

Using the CCD website, the search engine shows only the first 500 records in the result page. Since the search result exceeds 500 records, the researcher has adopted two stages to search for firms with capital of more than JD 5,000,000. In the first stage, the researcher searched for the firms that have capital size between JD 5,000,000 and JD 10,000,000. In the second stage, the researcher searched for firms that have capital size of more than JD 10,000,000. Accordingly, the directory was containing 684 firms. This directory also contained duplicate records and records relating to non-active firms. The researcher has filtered the list to include only working firms and removed the duplicate records. This process reduced the sample

frame to 546. In this directory list, the population was concentrated on firms located in the capital of Jordan i.e. "Amman". Around 93% (507 firms) of the population are located in Amman, while the rest are distributed in three cities including Irbid, Al-Zarka, and Al-Aqaba.

3.4.5.2.Research Sample

Since most firms are located in Amman and due to the cost and time considerations the researcher limited the research population to those firms (507) located in Amman. Several techniques are available for selecting the samples. Sekaran and Bougie (2010) specify three possible techniques for the purpose of results generalization. These include (i) simple random sampling, (ii) systematic sampling, and (iii) cluster sampling. According to Sekaran (2003), the sample size for the given population size is 227. Since the population is restricted to non B2B EC adopters and there is no single source to previously determine which firms are currently non B2B EC adopters, this study surveyed all firms in the population. Facing such characteristics, Al-Zu'bi (2012) and Al-Eqab (2009) used similar approach to study adoption of G2B e-commerce and Accounting Information System (AIS) respectively.

3.4.5.3 Respondent

One of the main objectives of this study is to examine firms' intention to adopt B2B EC in their supply chain of activities, including marketing and purchasing activities. Thus, this study sought to select respondents who are expected to have the best knowledge about the supply chain's operation and management. In view of this,

148

based on B2B literature and recommendations from practitioners (Chwelos *et al.*, 2001; Kim *et al.*, 2010; Premkumar, 1995; Premkumar *et al.*, 1994; Whipple *et al.*, 2015), managers who are at higher managerial levels have been chosen as the principal respondents for the current study (Alsaad *et al.*, 2014; Basu, Hartono, Lederer, & Sethi, 2002). A firm's management is assumed to have extensive IS knowledge about the firm and to have access to the organization's data and have the means to complete the questionnaire (Alsaad *et al.*, 2014; Basu *et al.*, 2002). Specifically, this study probed the marketing and purchasing managers, regarding their firm's intent to adopt B2B EC in their departments, because the firm's intention to adopt B2B EC with its business customer could be different from its intention to adopt B2B EC with its supplier (Chwelos *et al.*, 2001; Kim *et al.*, 2010). Those types of managers were considered as the most appropriate respondents in B2B adoption literature (Chwelos *et al.*, 2001; Kim *et al.*, 2010; Premkumar, 1995; Premkumar *et al.*, 1994; Whipple *et al.*, 2015). This is due to their ability to effectively respond to questions that involve multiple partner relationships and IT issues. Moreover, the respective respondents involved in firm's decision-makings, thus they were knowledgeable and responsible about their firms' B2B related operations and decisions (Zhu, 2008).

3.4.5.4 Data Collection Method

There are several data collection methods such as mail survey, internet survey, phone survey, and self-administrated survey (Dillman *et al.*, 2014; Sekaran & Bougie, 2010). Self-administrated method is more popular in Jordanian context and it achieves high response rate in such context (Al-Eqab, 2009; Al-Zu'bi, 2012). Since

149

the research population located in Amman city and most of Jordanian firms are concentrated in certain areas, the researcher employed self-administrated technique for data collection. This technique is also culturally accepted among business in Jordan.

3.4.6. Measurement

This study has nine variables, which include those relating to technology, namely: Relative Advantage, Complexity and Compatibility. Apart from that, there are organizational constructs which comprised Top Management Support and Organizational Readiness. There is also, environmental construct which is, Pressure from competition. Meanwhile, dependency and partner trust relate to relationships. The ninth variable is the dependent variable which is the intention to adopt B2B EC. Measures used for the constructs and their sources are shown in Table 3.1 As suggested by Rai *et al*. (2009), and Mcknight and Chervany (2002), the construct of Trust can be decomposed into three sub-constructs. These include Benevolence, Integrity and Competence. For Organizational Readiness, this study employed two sub-constructs, namely: IT sophistication and financial readiness. This is in line with the recommendations of Rai *et al*. (2009) and Chwelos *et al*. (2001).

Table 3. 1

Constructs Measurements and Measurement Sources

Contexts	Constructs	Sub construct	Source	Items
	Relative Advantage		Premkumar and Roberts (1999) and Venkatesh and Bala (2012)	5
Technological factors	Complexity		Premkumar and Roberts (1999), Oliveira *et al.* (2014)	4
	Compatibility		Teo & Pian (2003), Oliveira *et al.* (2014)	5
	Organizational Readiness	IT sophistication	Chwelos et al., (2001) and Rai *et al.* (2009)	6
Organizational factors		Financial readiness	Zheng *et al*.(2013)	3
	Top Management Support		Liang and Saraf (2007)	6
Environmental factors	Competitive pressure		Thong (1999)	3
	Dependency		Hoejmose *et al*. (2013) and Gulati and Sytch (2007)	4
Relationship factors		Benevolence		3
	Trust	Integrity	Rai, Brown, and Tang (2009) and Mcknight and Chervany (2002)	3
		Competence		3
Dependent variables	Intent to adopt B2B EC		Son and Benbasat (2007)	3
			Total :	48

151

3.4.6.1 Measurements Scale

A review of the selected constructs reveals that the optimum scale that can be used with them is interval. Interval scales enable respondents to indicate their level of agreement or disagreement about particular statement. These scales have been used extensively to measure business concepts such as attitudes, feelings, perceptions, values and opinions (Hair *et al.*, 2007). Accordingly, this study adopts an interval scale. This is in line with Rai et al. (2009) and Son and Benbasat (2007). In fact, there has been much debate with regard to the optimal number of scale points. Dillman *et al.* (2014) and Fink (2012) suggest that five or seven point of scale should be used. Foddy and Foddy (1994), however, conclude that a minimum of seven point scale is required to ensure scale reliability and validity. A Seven point scale is better than others, as it offers much wider range of options and increases the variance in the underlining measures (Dillman *et al.*, 2014; Foddy & Foddy, 1994). Therefore, research constructs in this study were measured using multiple items on seven-point Likert scales, labelled with "Strongly Disagree" to "Strongly Agree".

3.4.6.2 Questionnaire Design

Since researchers use questionnaires as the tool for collection of data, it is imperative that high quality questionnaires be designed in order to improve their ability to collect dependable data. Dillman (2007) suggests four guidelines for structuring and designing good questionnaire which include:

1.   Start with more important and useful questions.

2.   Group similar questions together in the same area.

3.   Create a kind of rapport among the groups of questions.

4.   Place the questions that are most likely to be unpleasant to respondents after the less unpleasant one.

Following these guidelines, the questionnaires used in this study is divided into four main sections.

- The first section contains questions that elicit firm's background information including years in operation, ownership status, estimated annual revenue, and nature of operation.

- The second section collects data about factors affecting firm's intention to adopt B2B EC. In this section the questions have been built so as to proceed logically with one question linking to the next. Questions were categorized into four dimensions that include technology, organization, environment, and relationships-related factors.

- The third part is concerned with assessment of firms' intention to adopt B2B EC.

- The last part is designed to collect demographic information relating to the respondents such as their age, gender, qualification, and position.

As stated earlier, research respondents are classified into two separate groups namely purchasing managers and marketing managers. Therefore, two set of mirror image

questionnaires have been developed, one for each of the groups. Appendix (A) represents the complete questionnaire.

3.4.7. Questionnaire Validation and Translation

Arabic language is a main language in Jordan. Using Arabic as a language of research questionnaire gives the researcher the advantage of communicating with companies in Jordan. This also enables the researcher to get more insightful information by using the native language of the target population in the data collection process. There is, however, little literature available in Arabic language that investigate similar research framework. Hence, extensive validation and translation procedures have been conducted before the data collection.

The researcher first established English written questionnaire, where English is the language of the original instrument. To pre-test the original instrument, expert review is an inexpensive and relatively quick method for evaluating questionnaires (Olson, 2010; Presser & Blair, 1994). The reviewers' number could be small, ranging from three to over 20 experts (Olson, 2010; Presser & Blair, 1994; Rothgeb & Willis, 2007; Willis, Schechter, & Whitaker, 1999). In view of this, the researcher engaged in validation process in line with seven academic experts in the behavioral information system area to ensure the accuracy and reliability of the survey instrument. Items were evaluated for construction faults, ambiguity, flow, and sequencing. The questionnaire was then revised where appropriate. Secondly, due to cultural and language differences the researcher

154

engaged in translation process to ensure that the translation of the survey questionnaire from English to Arabic is accurate and free from bias.

In the translation process, the researcher followed the translation procedures of forward-backward-translations suggested by Brislin (1986) which is considered as the most popular approach for survey translation (Forsyth, Kudela, Levin, Lawrence, & Willis, 2007). The result of this process produced translated version of the questionnaire that equally performed in the same way as the original one. The main focus in this process is on conceptual and cross-cultural equivalence rather than on literal/linguistic equivalence (Brislin, 1986; Forsyth *et al.*, 2007; Zavala-Rojas, 2014). The overall idea of this approach is that, bilingual translators who are both familiar with terminologies of the underlining area and whose mother tongue is the language of the target population translated the questionnaire into the language of the target population. Priority was given to emphasis on conceptual, rather than literal translations. Moreover, there was a need to use acceptable and natural language for the broadest audience (Brislin, 1986; Forsyth *et al.*, 2007; Zavala-Rojas, 2014). Bilingual translators aim to identify and resolve the poor concepts/expressions of the translation. They also determine any discrepancies between the forward translation and the original version of the questionnaire (Brislin, 1986; Forsyth *et al.*, 2007; Zavala-Rojas, 2014). The result of this process produced a complete translated version of the questionnaire. Then, following the same approach as that defined in the first step, the questionnaire will be translated back to English by another translators who have no previous knowledge about the questionnaire. As in the forward translation, the back-translation should focus on cultural and conceptual equivalence and

not literal equivalence. Discrepancies will be discussed and adjusted accordingly until a satisfactory version is reached (Brislin, 1986; Forsyth *et al.*, 2007; Zavala-Rojas, 2014).

Following these procedures, the English version of questionnaire was translated into Arabic language by the researcher and two bilingual academic experts specialized in e-commerce in Jordan. Telephone and face to face discussions were also used to identify and to clarify conflicts of interpretation. The results from those experts were considered by the researcher and the revised Arabic version of the questionnaire was created. Afterwards, the back-translation process, the revised Arabic version of questionnaire was given to another two bilingual academic experts in e-commerce, who were different from the first group. Then, the results from the back translation, Arabic to English, were then compared with the original English version to validate the accuracy of the content.

To further refine the survey instrument, the researcher conducted preliminary interviews with two managers and sent the questionnaire for two academic professors. The purpose of this was to analyze the translated questionnaire from the perspectives of understandability and practical relevance of the topic under investigation. Some questionnaire items were modified and explained further, which improved the questionnaire.

3.4.8. Pilot Study

It is essential to test the research instrument on the target population before the actual data collection. The pilot test is considered a pre-testing of the research instrument

(Zikmund, Babin, Carr, & Griffin, 2012). Therefore, performing pilot study for the translated instrument before the actual data collection has many significant advantages to the success of study, and this will provide the opportunity to remove ambiguity and increase clarity of some questionnaire items (Sekaran & Bougie, 2010; Zikmund *et al.*, 2012). In doing so, the researcher was able to polish and refine the questionnaire in order to obtain the data successfully and confirm that respondents have no problem with answering the questions.

The major objective of the pilot test is to assess the goodness of the measurement in terms of validity and reliability. Therefore, in this study, the pilot test was conducted to achieve the following objectives:

1. To ensure all questionnaire questions are clearly understood by the respondent,

2. To ensure all questions can be completed within a time span and, the respondents do not get tired or have less motivation with the questionnaire, and

3. To improve the questionnaire so that respondent will have no difficulties in completing the questionnaire.

To employ the pilot study in a successful way, it should include individuals represented for those who will receive the questionnaire. For this study, purchasing and sale managers who are directly responsible for a firm's supply chain activities are the most applicable informant in the context of this study (Chwelos *et al.*, 2001; Kim, Umanath, & Kim, 2006a; Rai *et al.*, 2009). Sample should be used to test the translated instruments (Dillman *et al.*, 2014). According to Hill (1998), sample

between 10 to 30 questionnaires is an appropriate size for pilot study. Accordingly, the researcher distributed 100 questionnaires to the prospective respondents who are selected randomly from the sample frame. Out of them, 26 were collected of which two were not valid and thus, not considered for analysis.

It is important, however, to assess the consistency of an instrument or its reliability. In order to test the reliability of research instrument, various tests are usually available. Internal consistency reliability test is considered a common method used by researchers (Hair, Black, Babin, & Anderson, 2010; Hair *et al.*, 2007; Sekaran & Bougie, 2010; Zikmund *et al.*, 2012). It examines three important things including the extent to which construct items hang together as a set. This also includes the extent to which construct items are independently measuring the same construct and the extent to which the construct items are inter-correlated with one another.

Sekaran and Bougie (2010), however, suggest that Cronbach's Alpha coefficient is the most popular test of inter-item consistency reliability. Thus, Cronbach alpha analysis was conducted to examine internal consistency of the instrument. By using SPSS, all of the dependent and independent variables were tested. The closer the Cronbach's alpha coefficient gets near to 1.0 are better. If the Cronbach's Alpha is less than 0.6, it is considered as poor and thus, the items are less reliable. Those in the range of 0.7 are acceptable and those over 0.8 as good (Sekaran, 2010). Hair *et al.* (2007) observe that researchers generally consider that an alpha value of 0.70 as a minimum, however, lower coefficients may be acceptable.

By application of Cronbach's alpha formula, the instrument yielded satisfactory internal

consistency for eight out of ten of the underlining constructs including Relative

Advantage, Complexity, Compatibility, IT Sophistication, Financial Resources, Top

Management Support, Trust, and Intent to adopt B2B EC. Table 3.2 shows the summary

of the reliability results. It could be seen from the table that the Cronbach's alpha values

for those constructs are above 0.70. Accordingly, given the Cronbach's alpha values of

those constructs, they are consistent with established benchmark of 0.70 meaning that all

of them are reliable and thus, there was no need for further action.

Table 3. 2
Constructs' Cronbach's Alpha Values

Constructs	Sub construct	Items	Cronbach's alpha
Relative Advantage		5	0. 882
Complexity		5	0.851
Compatibility		4	0.732
Organizational Readiness	IT sophistication	6	0.908
	Financial readiness	3	0.826
Top Management Support		6	0.778
Competitive pressure		3	0.697
Dependency		4	0.668
Trust		9	0.919
Intent to adopt B2B EC		3	0.860
Total		48	

Two constructs including Competitive pressure, and Dependency were less than the

established benchmark of 0.70. The Cronbach's alpha values of those constructs are

0.697 and 0.668 accordingly. Hair *et al.* (2007) observe that researchers generally

consider that an alpha value of 0.70 as a minimum but lower coefficient may be

159

acceptable. Since the Cronbach's alpha value of those constructs is in range of 0.7, the relatively low value of Cronbach's Alpha could be accepted for those constructs (Hair *et al.*, 2007), particularly in pilot stage.

3.5. Data Collection

In this study a questionnaire was adopted for collecting quantitative data. Since the respective respondents of this study were the managers of marketing and purchasing departments, two near-mirror-image versions of a survey were developed and pre-tested. The purchasing version was sent to focal firm represented by a purchasing manager. On the other hand, the marketing version was sent to focal firm represented by a marketing manager. The definition and description of B2B EC were included in the survey instrument to improve the validity of the responses.

The researcher delivered a survey package to the respective respondents personally. This method is more popular in Jordanian context and usually facilitates higher response rate high response rate (Al-Eqab, 2009; Al-Zu'bi, 2012). Moreover, it is very effective since the research population is only limited to firms located in one city namely; Amman. Furthermore, in Amman city, most of firms concentrated in specific areas such as industrial estates which makes the self-administrated technique as an efficient method for data collection.

The survey package included a copy of the questionnaire and an invitation letter printed on the university's official letterhead. This letter asked the participants for their

cooperation and provided information that explains the objectives of the study, definition of key concepts, and an estimated time (between 10 -15 minutes) for completing the questionnaire. The letter also assured anonymity and confidentiality of their responses. It was concluded by thanking the respondents for their effort and time to take part in the survey. Overall, the responses were requested within one week from all respondents.

However, self-administered data collection modes usually obtains lower responses rate. Therefore, follow-up procedures became very important (Dillman *et al.*, 2014). Dillman *et al.* (2014) suggests that response rates will usually be lower than those normally attained without follow-up of respective respondents. Therefore, after a period of one to two weeks, firms that did not respond were reminded through either telephone calls or self-visits (Dillman *et al.*, 2014; Sekaran & Bougie, 2010).

Out of 507 firms located in Amman, 45 firms were unreachable due to incorrect address. For the rest of the firms (462), the researcher distributed almost two questionnaires for each firm; one for marketing manager and one for purchasing manager. When the prospective respondent has dual functions of marketing and purchasing, the researcher asked the respondent to respond either from marketing or purchasing perspective, based on which function is the most important to the firm. Accordingly, 798 questionnaires have been delivered to the prospective respondents. After two and half months, the researcher collected 296 responses from both marketing and purchasing sides. Out of them, 15 were incomplete and thus were omitted. Since only non-adopter responses are subjected to analysis, the researcher excluded 42 responses from respondents who

161

reported that they are currently B2B EC adopters which, in turn, left 239 responses that are valid for further analysis. However, as the researcher received two responses from most of the respective firms, the 239 responses were belonging to 146 unique firms. Out of them, 93 firms responded to both questionnaires (marketing and purchasing), meanwhile 53 firms responded to either marketing or purchasing questionnaire. Out of 239 valid responses, 125 were from purchasing side and 114 were from marketing side. Table 3.3 summarizes the data collection details.

Table 3. 3

Summary of Data Collection and Response Rate

Description	Details
Research population (various state)	All firms with more than 5 Million JD Employed capital 547 firms
Firms located in Amman	507
Unreachable companies	45
Revised number of samples	462
Actual number of distributed questionnaires	798[*] (in most cases, two questionnaires were distributed per firm)
Responses collected	296 total responses
	15 Incomplete questionnaires
	42 currently B2B EC adopters
	239 Non B2B EC adopters
Eligible responses	239 responses
	125 From purchasing managers
	114 From marketing mangers
Response rate	30%

* Not all firms received two questionnaires. Some firms have managers with dual functions (marketing and purchasing), therefore, the research asked those respondents to fill only one questionnaires either from marketing or purchasing perspective.

To calculate the response rate, the researcher used the number of eligible responses divided by the number of eligible samples (Zikmund *et al.*, 2012). The number of eligible responses was 239 whereas; the number of eligible samples was 798. Accordingly, the response rate was approximately 30%. This response rate is comparable to those reported in similar studies (see Table 3.5). In spite of several

attempts have been considered by the researcher to increase the response rate, the study's response rate is relatively lower as compared to those studies conducted in Jordanian context, (see Table 3.4). This low response rate with respect to Jordanian context may be attributed to nature of the respondent. That is, the marketing and purchasing managers' functions are very dynamic, whereby limited time is available for them to answer the questionnaires. Next section describes the characteristics of respondents and the data collected.

Table 3. 4

Response Rate for Selected Studies in Jordanian Context

Authors	Study context	Sector	Response rate
Al-Zu'bi (2012)	G2B E-government	Amman Listed Companies	43.3 %
AL-Bakri (2010)	B2B E-commerce	SMEs	73.6 %
Sheikh Salem and Awwad (2005)	E-business	SMEs	70 %
Abu-Shanab and Al-Tarawneh (2013)	Production Information Systems Adoption	Companies in Al-Hasan Industrial Zone	74 %
Al-dmour and Al-surkhi (2012)	B2B E-commerce Adoption	Bank	80 %
Al-weshah and Al-zubi (2012)	E-Business Enablers and Barriers	SMEs Communication Sector	86 %
Alrubaiee, Alshaibi, and Al-bayati (2012)	E-marketplace usage	Companies listed in Amman Chamber of commerce and industry	63 %.
Al-Odat (2013)	Adoption of Data Mining Technology within Accounting Information Systems	Amman Listed Companies	72 %

163

Table 3. 5

Response Rate in Selected Studies in B2B EC Literature

Study	Subject of study	Country	Response rate
Cao, Gan, *et al.* (2013)	Intent to adopt E-supply chain	North America	20.7%.
Chan and Chong (2012)	Decision to adopt Rosettanet	Malaysia	10.6%
Chong, Ooi, *et al.* (2009)	Decision to adopt Collaborative e-commerce	Malaysia	27.25%
Rajaguru and Matanda (2012)	IOIS Integration	Australia	15.1%
Ramdani *et al* .(2009)	Adoption of a set of enterprise systems	Northwest of England	40 %
Ifinedo (2011)	E-business adoption	Canada	11.8%

3.6.Descriptive Analysis

This section reports information about the empirical data that have been collected for this study. Such information is important since it enables the researcher to make informed judgments about the soundness of the choices made and conclusions reached. It also provides the researcher and readers with necessary information about the research settings and thus enables them to make comparisons with other research results in the same area (Gefen, Rigdon, & Straub, 2011b). Therefore, to understand the characteristics of the sample in this study, this section shows some of the demographic information about firms that participated in the survey. The section starts with describing the background of the responding firms and followed by profiles of the respondents themselves. Finally, in the last part, the descriptive statistics about the research variables are provided.
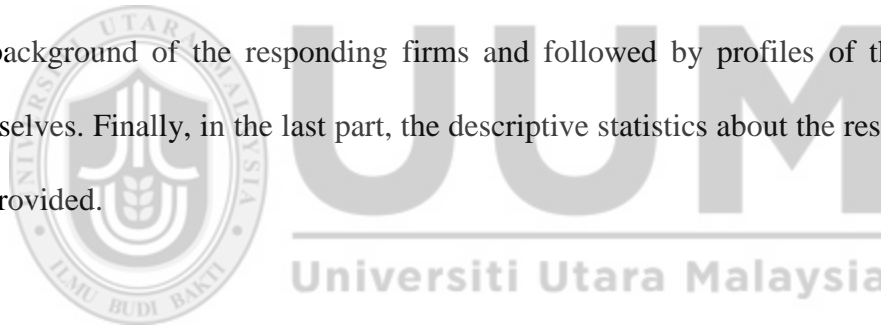
3.6.1. Profile of the Responding Firms

The firms that participated in the survey were the firms that have large registered capital. Since there was no way to identify those that are already interested in buying activities or selling activities or both by *a* priori, both marketing and purchasing questionnaires were sent to all firms in the sample frame resulting in two independent samples; purchasing department and marketing department.

All responses from the two independent respondent groups were obtained from 146 firms. Ninety-three of them responded to both sets of the questionnaire (marketing and

purchasing department), whereas, 53 of them responded to either purchasing questionnaire or marketing questionnaire. In summary, this study incorporated 125 responses from purchasing and 114 responses from marketing departments. However, since 93 of the firms responded to both sides, the firms' demographic characteristics are consistent among them. To examine this issue, the demographic characteristics of the 93 matched the responses when compared using descriptive analysis. Accordingly, the result shows no differences regarding the firms' demographic characteristics. Hence, the researcher can safely report the demographic characteristics of the 93 firms based on any side (marketing or purchasing side). This section, however, explores selected profiles of responding firms, specifically the firms' industry, ownership type, operational age, employee size, and sale turnover of the 146 firms. The descriptive analysis are presented and discussed below.

3.6.1.1.Firms' Industry

The majority of responding firms, as presented in Table 3.6, operated in services sectors, accounting for 56.2% of responding firms. Other responding firms operated in industry sector, accounting for 43.8 % of the responding firms. In fact, Jordan economy is a service-oriented one, where the services sector contributes 67.6% of the total GDP. Manufacturing contributes 19.2% of the GDP, meanwhile 13.2% is distributed on other sectors (Jordan Investment Bord, 2014). Therefore, the result of this study is consistent with characteristics of Jordanian market.

166

Table 3. 6

Distribution of Responding Firms across Sectors.

Firm Sector	Frequency	Percent
Industry Sector	64	43.8
Services Sector	82	56.2
Total	146*	100.0

*All responses of both sides (marketing and purchasing) came from 146 unique firms

3.6.1.2.Types of Firm's Ownership

Firm's ownership type was also requested by the survey; Table 3.7 classifies the responding firms according to their ownership type, in terms of citizen owned, foreign owned or joint ownership. The table shows that almost 52% of the responding firms are locally owned, while the remaining firms in the sample are either foreign owned (24%), or under joint ownership (23%) between foreigners and local citizens.

Table 3. 7

Distribution of Responding Firms Based on Ownership Type.

Ownership type	Frequency	Percent
Citizen owned	76	52%
Foreign owned	35	24%
Joint foreign/citizen owned	34	23%
Missing	1	1%
Total	146*	100.0

*All responses of both sides came from 146 unique firms

3.6.1.3.Firms' Employees Number

Organization size is characterized by either the number of employees, sale turnover, or both (USAID, 2007). Table 3.8 classifies the responding firms according to the number of full time employees. It shows that approximately 51% of the responding firms had more than 250 employees. While about 17% of the responses came from firms with full time employees between 100 and 250. Limited responses were from small firms where 16 % of the responding firms had either up to 50 employees or with employees between 50 and 99.

Table 3. 8
Distribution of Responding Firms According to Full Time Employee Number.

Employee size	Frequency	Percent
Up to 50 employees	23	16%
50-99 employees	23	16%
100 – 250 employees	25	17%
More than 250 employees	75	51%
Total	146*	100.0

*All responses of both sides came from 146 unique firms

3.6.1.4 Firms' Sales Turnover

Sales' turnover is also an important measure which determines both organization size and transaction volume (Son & Benbasat, 2007). Table 3.9 also illustrates the distribution of the surveyed firms by annual sales turnover. Almost 63% of the respondents had turnover greater than JD 15 million, whereas 17 % of firms had annual sales turnovers up to JD 5 million. Nearly 7 % of the respondent firms had annual sale

168

turnover within the range of JD 11 million and JD 15 million. The annual sale turnover of 12 % of the respondent firms range between JD 5 million and JD 10 million. This result shows that most of responding firms have high sale turnover which is consistent with the expectation of this study, since all surveyed firms were obtained from sample frame that has high capital size. Nevertheless, some the responding firms report low sale turnover. This may be due to the fact that some industry requires high employed of capital whereas other is not (USAID, 2007).

Table 3. 9
Distribution of Respondent Firms According of Annual Sale Turnover.

Sales turnover	Frequency	Percent
Below 5 million JD	25	17%
5-10 JD million	17	12%
11-15 JD million	10	7%
More than 15 JD million	92	63%
Missing	2	1%
Total	146*	100.0

*All responses of both sides came from 146 unique firms

3.6.1.5 Years in operation

Firm's age is also an important factor that potentially influences B2B EC. As Table 3.10 illustrates, more than 52 % of the surveyed firms have been operating for more than 15 years, while the other responding firms are relatively equal across age categories. Approximately, 14% were founded less than five years ago, whereas only 20 % have been operating between 5 and 10 years. However, matured firms (with more than 10 years of operation) somewhat dominate the sample.

Table 3. 10
Distribution of Responding Firms Based on Years in Operation.

Operation age	Frequency	Percent
Less than 5 years	21	14%
5-10 years	29	20%
11-15 years	20	14%
More than 15	76	52%
Total	146	100.0

3.6.2. Respondents Demographic Data

The questionnaires of this study targeted purchasing managers as respondents for purchasing survey, while marketing managers were the main respondents for marketing survey. Those managers represent their department as a whole up to the upper level management and also have the knowledge and experience to participate in this survey. This section discusses the demographic profile of key informants who completed the survey questionnaires on behalf of their firms. The survey was designed to collect the respondents' gender, age, and experience in the current position, educational level, and position's title in both samples (marketing and purchasing sample). The results are presented and discussed below.

Table 3.11 shows that majority of the respondents, in both samples, hold managerial position with either manager (purchasing = 32.8%, marketing percent=34.2%) or senior manager (purchasing = 28%, marketing = 25.4%). A quite high percent of responses came from senior staffs and others (purchasing = 28%, marketing = 21.9%). These percentages are quite high, although the target respondents of this study were from

170

managerial level. Targeting same type of respondents in the context of B2B EC, Hassan (2013) and Wu & Chuang (2010; 2009) reported that high percent of their responses (between 22% and 31%) came from senior staffs and others. One possible explanation for this issue is that respondents at managerial level are too busy to respond to the questionnaires (Baruch, 1999), and thus individuals who are knowledgably and in charge would often respond to the questionnaires. To trace the effect of senior staffs and others group on the research results, this study performed additional analyses as discussed in section 4.3.2.3.

However, approximately 52.8% of the respondents in the purchasing survey and 38.6% percent of the respondents in the marketing survey had five or more years of experience in their current position. On average, more than 53.5% of the marketing informants hold Bachelor degree and around 38.6 % hold Master degree. Meanwhile, around 49.6 % and 44% of the purchasing informants had Bachelor and Master Degrees respectively. This suggests that respondents had sufficient knowledge and experience to participate in the survey and to supply reliable data for this study.

Table 3. 11
Participants demographics information

		Purchasing Group		Marketing Group	
		Frequency	Percent	Frequency	Percent
Position	Owner/Proprietor	3	2.4	5	4.4
	Managing Director/Chief Executive Officer	11	8.8	16	14.1
	Senior Manager	35	28.0	29	25.4
	Manager	41	32.8	39	34.2
	Senior Staffs and Others	35	28.0	25	21.9
Total		125	100.0	114	100.0
Experience in current position	Below 5 years	66	52.8	44	38.6
	5-10 years	37	29.6	30	26.3
	11-15 years	6	4.8	21	18.4
	More than 15 years	16	12.8	19	16.7
Total		125	100.0	114	100.0
Education	Diploma or below	4	3.2	4	3.5
	Bachelor degree	62	49.6	61	53.5
	Master degree	56	44.8	44	38.6
	PhD	3	2.4	5	4.4
Total		125	100.0	114	100.0
Gender	Male	110	88.0	107	93.9
	Female	15	12.0	7	6.1
Total		125	100.0	114	100.0
Age	Under 30 years	25	20.0	13	11.4
	30-39 years	54	43.2	66	57.9
	40-49 years	30	24.0	25	21.9
	50 and above years	16	12.8	10	8.8
Total		125	100.0	114	100.0

Respondents' age and gender were also obtained from the survey. Majority of the respondents are male and accounted for 88% and 93.9% in the purchasing and marketing surveys respectively. This is consistent with the Jordanian culture of which masculinity dominates in most aspects of life. Finally, in both groups, majority of respondents were

172

in the age group of 30-50 years old. More precisely, the age category between 30 and 39 years old accounted for 57.9% and 43.2% of total respondents in the marketing and purchasing survey, respectively. To view the respondents' feedback with regard to the research variables and related questions, next section reports this information in details.

3.6.3. Descriptive Analysis of Research Variables

Descriptive statistics provide an indication to the representation of the sample. Descriptive statistics of the research dimensions through mean value give the researcher and the readers a detailed view of how the informants in the study responded to the survey questions (Sekaran and Bougie 2010). Accordingly, descriptive statistics were computed and conducted to summarize and describe the main characteristics of a data set from both marketing and purchasing groups. Respondents' perspective on every dimension of the variables, namely: Relative Advantage, Compatibility, Complexity, Top Management Support, Firm' Financial Resources and IT Sophistication, Competition Pressure, Trust, Dependency, and Intention to Adopt are provided with general descriptive statistics on each survey item as follows.

3.6.3.1. Perceived Relative Advantages

Table 3.12 presents the perception of Relative Advantages of adopting B2B EC in view of marketing and purchasing sides. The overall mean score across purchasing side and marketing side were 5.5 and 5.4 respectively, indicating positive perception of Relative Advantages among all participants. From the answers, it can be observed that the

173

majority agreed with the statements that adoption of B2B EC will provide several benefits to them. Even though, both groups perceived that the adoption of B2B EC is better than using its precursor, the mean scores indicate that, purchasing side have very marginal more positive perception on the advantages of B2B EC adoption than the marketing side.

Table 3. 12
Descriptive Statistics for Perception of Relative Advantage in Marketing and purchasing Samples.

Relative Advantages dimensions	Mean	
	Purchasing group	Marketing group
Adoption of B2B EC will manage business operations in an efficient way	5.5	5.4
Adoption of B2B EC will perform specific tasks more quickly	5.5	5.2
Adoption of B2B EC will improve the quality of operations.	5.6	5.3
Adoption of B2B EC will offer new opportunities.	5.4	5.4
Adoption of B2B EC will increase business productivity.	5.7	5.6
Overall Mean	5.5	5.4

3.6.3.2.Perceived Compatibility

Table 3.13 shows the degree to which the respondents perceive B2B EC is compatible with existing business operational environment in both sides, marketing and purchasing. The respondents agree that B2B is somehow compatible with their business operational environment. Overall, slight differences between the marketing group (mean=4.9) and purchasing group (mean=4.8).

174

Table 3. 13

Descriptive Statistics for Perception of Compatibility in Marketing and purchasing Samples.

Compatibility dimensions	Mean	
	Purchasing group	Marketing group
Adoption of B2B EC fits the work style of the firm	4.9	4.9
Adoption of B2B EC is fully compatible with current business operations.	4.7	4.9
Adoption of B2B EC is compatible with our firm's corporate culture and value system	4.8	5.0
Adoption of B2B EC is compatible with existing hardware and software in the firm.	4.6	4.7
Adoption of B2B EC is consistent with our business strategy	5.1	5.2
Overall Mean	4.8	4.9

3.6.3.3. Perceived Complexity

Table 3.14 demonstrates the degree of B2B EC's Complexity from the perspective of marketing and purchasing sides. Purchasing respondents view B2B EC adoption as not being complex (mean=3.0), whereas marketing respondents perceive the adoption of B2B EC as being neither complex nor easy to use (mean=4.0).

Table 3. 14

Descriptive Statistics for Perception of Complexity in Marketing and purchasing Samples.

Complexity dimensions	Mean	
	Purchasing group	Marketing Group
Adoption of B2B EC requires a lot of mental effort.	3.8	4.8
Adoption of B2B EC is frustrating.	2.9	3.6
Adoption of B2B EC is too difficult to be incorporated in our business operations	2.7	3.8
Adoption of B2B EC is too difficult for our employees	2.6	3.9
Overall Mean	3.0	4.0

3.6.3.4.IT Sophistication

This section presents the level of technological expertise and the contribution of IT to achieve their organization goals across the respondent groups (marketing and purchasing). The level of IT sophistication in both groups was high. According to the results presented in Table 3.15, majority agreed with the statements identifying the contribution of IT to achieve their organization goals, with an overall mean score of both side is 5.7.

Table 3. 15
Descriptive Statistics for Perception of IT Sophistication in Marketing and purchasing Samples.

IT sophistication dimensions	Mean	
	Purchasing group	Marketing group
Operational cost reduction.	5.4	5.6
Productivity improvements.	5.9	5.6
Improving quality of decision making	5.6	5.6
Improving access to information.	5.8	5.8
Improving competitiveness.	5.6	5.8
Improving service to customers.	6.0	6.0
Overall Mean	5.7	5.7

3.6.3.5.Financial Resources

Table 3.16 shows the level of capital availability to invest in B2B EC across the responding groups. In general, both groups somewhat agreed that they have enough financial resources to invest in B2B EC with overall mean scores (mean=4.7) and (mean=4.9) for marketing and purchasing group respectively.

176

Table 3. 16
Descriptive Statistics for Perception of Availability of Financial Resources in Marketing and purchasing Samples.

	Mean	
Financial Resources dimensions	Purchasing group	Marketing group
We have financial resources to adopt B2B EC	5.0	4.6
We have enough financial allocations to adopt B2B EC	4.9	4.7
There is an intention to increase these allocations.	4.8	4.8
Overall Mean	4.9	4.7

3.6.3.6.Top Management Support

Table 3.17 shows that both top management believe in the importance of B2B EC and the extent to which they could adopt B2B EC. Based on the results presented in Table 3.17, majority of the respondents demonstrate that their top management believes that B2B EC is somewhat important to their business. However, there are slight differences in management beliefs regarding the adoption of B2B EC across marketing and purchasing side (marketing mean=4.7, purchasing mean=5.0). In addition, the extent to which the Top management has adopted B2B EC related activities is also presented in this Table 3.17. The result suggests that majority of respondents in both sides believe that their top management moderately involved in B2B EC adoption activities with mean score of both sides indicating 4.6.

177

Table 3. 17

Descriptive Statistics for Perception of Top Management Support in Marketing and purchasing Samples.

Top Management Support	Mean	
	Purchasing group	Marketing group
Top management beliefs		
B2B EC has the potential to provide significant business benefits to the firm.	5.1	5.1
B2B EC will create a significant competitive arena for firm.	5.0	5.2
B2B EC is necessary to conduct business activities	4.9	3.9
Overall Mean	5.0	4.7
Top management participation		
Articulates a vision for B2B EC adoption.	4.7	4.6
Formulates a strategy for B2B EC adoption.	4.6	4.7
Establishes goals and standards to monitor B2B EC adoption.	4.7	4.7
Overall Mean	4.6	4.6

3.6.3.7. Competition Pressure

Table 3.18 tabulates the mean scores of perceived Competition Pressure across the two groups. It shows that the overall mean scores of marketing and purchasing group are (mean=4.5) and (mean=4.4) respectively, indicating that both sides perceived moderate level of pressure from competition to consider B2B EC.

Table 3. 18

Descriptive Statistics for Perception of Competition Pressure in Marketing and purchasing Samples.

Competition Pressure dimensions	Mean	
	Purchasing group	Purchasing group
B2B EC has an influence on competition	4.6	4.8
Our firm is under pressure from competitors to adopt B2B EC	4.0	4.2
Some of our competitors have already started using B2B EC	4.7	4.5
Overall Mean	4.4	4.5

3.6.3.8. Dependency

Table 3.19 presents the perception of the extent to which firms are dependent on their key trading partners in the view of both marketing and purchasing side. The result highlights that purchasing group generally views their key partner as less crucial to their future performance and therefore, less important to maintain a specific channel relationship (purchasing mean=3.8). On the other hand, marketing group expresses that they are at par with their key trading partners.

Table 3. 19
Descriptive Statistics for Perception of Dependency on Trading Partner in Marketing and purchasing Samples.

	Mean	
Dependency dimensions	Purchasing group	Marketing group
This partner is important to our future performance.	4.4	4.8
It would be difficult for us to replace this partner.	3.8	4.2
We do not have a good alternative to this partner.	3.4	3.9
We depend on this partner.	3.8	4.3
Overall Mean	3.8	4.3

3.6.3.9. Trust

There are three sub-constructs of Trusting beliefs, that have been identified, namely; Benevolence, Competence, and Integrity. As a set, these sub-constructs explain a major portion of the trusting beliefs held by one party about another. Table 3.20 presents the mean scores for each dimension of trust in both marketing and purchasing groups. The respondents slightly agree that their key trading partner has Benevolence as the results indicate (marketing mean=4.8, purchasing mean=4.7), while, Integrity shows (marketing

179

mean=4.6, purchasing mean=4.6), and Competence indicating (marketing mean=4.6, purchasing mean=4.8).

Table 3. 20

Descriptive Statistics for Perception of Trust in Marketing and purchasing Samples.

Trust dimensions	mean	
	purchasing sample	marketing sample
Benevolence		
They would act in the best of our interest	4.7	4.8
If we required help, they would do their best to help.	4.9	5.0
They are interested in our well-being, not just their own well-being	4.6	4.6
Overall mean	4.7	4.8
Integrity		
We are comfortable in relying on them to fulfill our obligations	4.5	4.6
We always feel confident that we can rely on them to do their part when we interact with it.	4.6	4.6
We feel comfortable in doing business on the internet with them	4.7	4.6
Overall mean	4.6	4.6
Competences		
They are competent at serving us.	4.7	4.6
They do a good job at meeting our needs.	4.8	4.7
They are good at what we want.	4.8	4.6
Overall mean	4.8	4.6

3.6.3.10.   Adoption Intention

Finally, mean scores on behavioral intention to adopt B2B EC indicate that marketing sample has positive intention to adopt B2B EC with overall mean score (mean=4.7). The purchasing sample mean scores for behavioral intention was approximately similar to the marketing sample (mean = 4.5), indicating insignificant differences between both groups.

Table 3. 21

Descriptive Statistics for Perception of Adoption Intention in Marketing and purchasing Samples.

Adoption Intention dimensions	Mean	
	Purchasing group	Marketing group
Our firm intends to adopt a B2B EC in near future.	4.4	4.4
It is likely that our firm will take some steps to adopt B2B EC in near future.	4.5	4.7
we believe it is worthwhile for our firm to adopt B2B EC in near future.	4.6	5.0
Overall Mean	4.5	4.7

In summary, this section provides important information to understand the characteristics of the samples. The demographic information about firms and informants across marketing and purchasing surveys have been presented. Then, the descriptive statistics have been provided for all research variables and its items across marketing and purchasing sample. Next section, explains data screening procedures to ensure readiness of the data for further analysis.
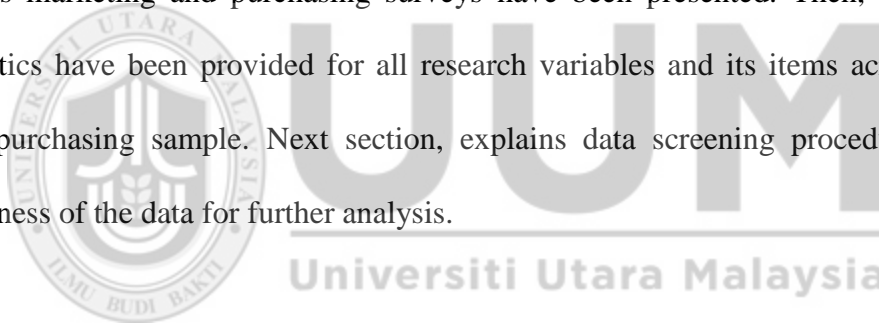
3.7.Data Screening

The data screening is a process of examining appropriateness of the collected data for further analysis. This process is essential before incorporating the data in sophisticated regression analysis (Hair *et al.*, 2010; Sekaran & Bougie, 2010; Zikmund *et al.*, 2012). It includes treatment of data entry errors, missing data, examination of data normality, and examination of non-response bias (Hair *et al.*, 2010). The following section provides details about each process.

3.7.1. Missing Data and Data Entry Error Treatment

Data screening was carried out to assess the data before conducting further statistical analyses. To identify any human errors during data entry process, extreme values have been examined by descriptive analysis of the data. It was observed that there is no item that had any extreme value outside the 7-point scale. For each item, the values were varied between 1 and 7. Furthermore, some items which were negatively formulated in the questionnaire were reversely coded at this stage.

Missing data, however, is another important issue in survey process that could cause serious problems during data analysis (Hair *et al.*, 2010; Hair, Hult, Ringle, & Sarstedt, 2014a; Zikmund *et al.*, 2012) particularly in PLS-SEM. It takes place when information is not provided for particular questions in the survey. Missing data could be as a result of several reasons, such as, human mistakes during data entry, misunderstanding of the

questions by respondents, and/or the respondents are either not willing to answer the question or did not know the right answer (Hair *et al.*, 2010).

To identify and handle the missing data correctly, Hair *et al.* (2010) recommends four ways to evaluate the extent to which there are missing data. Firstly, missing data can be classified as ignored, if a respondent did not provide answers for equal or less than 10% of all the questions that are included in the survey, and thus it can be replaced by mean or median. Secondly, if a respondent fail to provide more than 50%, his/her responses will be part of those of candidates for deletion. Thirdly, if the respondent is unable to answer 20-30%, this can can be remedied by replacing the missing value by the mean or median of the corresponding item.

Following those guidelines, fifteen cases of respondent's answers were excluded, because the respondents did not answer more than 50% of the included questions. Thereafter, it appears no one item suffered from extensive missing data. More precisely, through data screening, six observations have missing values and the number of missing values per observation does not exceed 2 %, therefore, because the missing values are very small, mean value replacement instead of casewise deletion was used in treating such case as recommended in PLS (Hair *et al.*, 2014a). Thus, this study performs mean replacement for those values. Consequently, with the treatment of the missing values, the purchasing department has 125 valid responses, while the marketing department has 114; which were used for the further analysis.

3.7.2. Outliers Identifications

An outlier is an observation with unique characteristics that distant from other values in a random sample from a population (Hair *et al.*, 2010). It can be an extreme value to a particular question, or extreme values to all questions. In general, statistical inferential tests can be relatively sensitive to outliers, often because, the calculations rely on squared deviations from the mean (Hair *et al.*, 2010). Although, PLS-SEM is not affected by outliers (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014b; Hair, Ringle, & Sarstedt, 2011a; Henseler, Ringle, & Sinkovics, 2009; Henseler & Sarstedt, 2013), several researchers do also recommended examination and elimination of observed outliers before starting the hypotheses testing (Hair *et al.*, 2014a).

Practically, researchers usually identify outlier observations by examining the extent to which a particular response is departed from the normal distribution of the sample (Hair *et al.*, 2010). In this process, researchers most often convert the data values into standard scores which have mean and standard deviation of zero and one accordingly. According to the rule of thumb, the threshold value of standard scores is up to 4 (Hair *et al.*, 2010). Once the outlier values are identified, the researcher must decide whether to retain or delete them.

This study used boxplots which is graphically depicting the degree to which scores values of particulate item is far from its mean. Boxplots usually recommend some observations (called influential observations) that could be outliers. The result indicates that the purchasing survey has very little number of influential observations in some

184

items namely: Relative5, Sof2, Sof4, Sof6, Trust4, and Trust5 items. In marketing sample, the boxplots test also identifies very limited influential observations which are corresponding to Relative2, Relative5, Sof1, Sof2, Sof3, Sof4, Sof5, and Sof6 items. To examine whether these observations are outliers, this study calculated their standardized values or Z scores (see Appendixes (B and C)). And based on a cutoff value of 4 (Hair *et al.*, 2010), none of the observations in purchasing survey and marketing survey were identified as an outlier. Therefore, outliers are not an issue for this research.

3.7.3. Normality

An estimation of the normality of data is a prerequisite for many statistical tests. It is important to confirm that the data are not too far from normal distribution. An extremely non-normal data is problematic in the evaluation of the parameters' significances and distorts the results of multivariate analysis (Hair *et al.*, 2010). Hair *et al.* (2014) suggest that even though PLS has soft constraint regarding normality assumption, it is essential to verify that the data are not extremely non-normal, as extremely non-normal data increases standard errors obtained from bootstrapping procedure. Therefore, researcher should still examine normality before performing PLS analysis.

In view of that, Hair *et al.* (2014) recommend that two measures of distributions should be examined, including skewness and kurtosis. Skewness measures the degree to which a variable's distribution stretches towards the right or left tail of the normal distribution curve. On the other hand, Kurtosis is an assessment of whether the distribution of data is too peaked or very narrow to the central. Theoretically, the pattern of particular values is

185

considered normal distribution when skewness and kurtosis are close to zero (Hair *et al.*, 2010; Hair *et al.*, 2014a), which is a situation that is very unlikely to happen (Davcik, 2014; Hair *et al.*, 2011a). Practically, the level of skewness and kurtosis is acceptable when their absolute values are not greater than the absolute value of one (Hair *et al.*, 2010; Hair *et al.*, 2014a). However, if the values are not in that range, transformation of variables is suggested to resolve normality problem (Hair *et al.*, 2010). Another consideration is the number of items for each construct, when only values of one or two items are non-normal, the researcher has to look at the normality of the construct as a unit (Hair *et al.*, 2014a).

Accordingly, using descriptive analysis incorporated in SPSS 19, skewness and kurtosis test have been executed for all items in each survey (marketing and purchasing) separately. With exception of items of Relative Advantage and IT sophistication, the skewness and kurtosis values of survey items in marketing and purchasing survey ranged between -1 and +1, which are well below the level suggested for transformation (Hair *et al.*, 2010). The IT sophistication items deviated from normal distribution in both marketing and purchasing samples, whereas items of Relative Advantage were not normal in marketing sample only.

In fact, there are array of transformations that can be applied to correct non-normal data such as square or logarithm of the underlining variables (Hair *et al.*, 2010). In this study, the researcher has applied both square and logarithm one by one but neither square nor logarithm has improved the normality of the data. However, recently Templeton (2011) has suggested two steps approach for IS researchers to achieve normality, that is,

186

transforming the variable into a percentile rank in the first step and then apply the inverse-normal transformation to the results of the first step to form a variable consisting of normally distributed z-scores. By doing so, skewness and kurtosis values of non-normal items have been corrected and fallen within the range of -1 and +1, and thus it is normally distributed.

3.7.4. Non-response Bias Assessment

Non-response bias is another important methodological issue in survey research and can compromise the study results. It typically focuses on comparing responses of late-stage with responses of early-stage (Armstrong & Overton, 1977). In general, delayed responses are interpreted as a lack of interest or commitment particularly on the part of respondents and thus, differences in responses can be due to substantial delay in responding to a survey (Armstrong & Overton, 1977).

To evaluate whether there is response bias, this study followed the method suggested by (Armstrong & Overton, 1977). That is, comparing the responses of early and late respondents with respect to all survey items. In view of this, the independent sample test of the survey items were conducted to compare the responses from the early 25% and the late 25% across the marketing and purchasing samples. The demographic characteristics of the two groups, such as industry type, years in operation, annual revenue, employees' number, age, gender, experience, and position were compared in both marketing and purchasing survey. The outcome (see Appendixes (D and E) demonstrated no systematic non-response bias and, in turn, concluded that the samples

187

obtained from research population are able to represent the total population of the study

(Armstrong & Overton, 1977).

3.8.Data Analysis

This section provides information that helped the researcher to select a proper data analysis. The SEM technique and the corresponding SEM approaches are discussed in this section.

3.8.1. Selection of Analysis Technique

There are two generations of analytical techniques employed to forecast and predict the dependent variable. Earlier generation regression models such as LOGIT, MANOVA ANOVA, and linear regression, enable researchers to perform analyses for only one layer of linkages between research variables at a time. By contrast, second generation of data analysis techniques, such as Structural Equation Modelling (SEM), enable high quality statistical analysis. It allows researchers to answer interrelated research questions in a single and comprehensive analysis by modelling the relationships among research constructs simultaneously (Bagozzi & Yi, 2012; Gefen, 2000; Kline, 2010).

Unlike early generation regression modelling, SEM evaluates both the assumed causation among a set of research constructs and the loadings of observed items (measurements) on their expected latent variables (constructs), in one analysis. In other

188

words, SEM tests both, factor analysis and hypotheses, in a single analysis (Bagozzi & Yi, 2012; Gefen, 2000; Kline, 2010). By doing so, a proposed research model will be tested more rigorously by using better methodological assessment tools. SEM also delivers information about the extent to which the research model is supported by the collected data (Bagozzi & Yi, 2012; Gefen, Rigdon, & Straub, 2011a). In order to obtain reliable findings, this study will resort to SEM techniques of analysis for predicting the dependent variable.

In many respects, however, the model evaluation in SEM is heavily influenced by different approaches of SEM specifically in terms of the evaluation of measurement model. In general, there are two approaches to estimate the parameters of SEM, namely, the Covariance-Based SEM (CB-SEM) approach and the Variance-based SEM (VB-SEM, also called PLS-SEM) approach. Those approaches are very different in their model development procedure, estimation objectives, underlining philosophy, distributional assumptions, theoretical background, estimation and interpretation (cf. Hair et al. 2010). Thus, both approaches have different features that make them appropriate for different research purposes. Next section provides more details on this issue.

3.8.2   Selection of SEM Approach

SEM has taken up a prominent role within the academic literature of many fields, specifically in MIS research, to test whether or not theoretical assumptions are supported with empirical data. Although, choosing the correct approach has triggered significant

debate across a variety of disciplines in recent decades (Diamantopoulos, Riefler, & Roth, 2008; Goodhue, Lewis, & Thompson, 2012; Sarstedt, Ringle, & Hair, 2014a), however, several considerations are important when deciding which approach should be applied. The choice of whether CB-SEM or PLS-SEM depends on research settings and objectives. Hair *et al*. (2011), recommended rules of thumb in selecting the correct approach for analysis. Table 3.22 shows rules of thumb that should be applied at the time of deciding whether to use PLS-SEM or CB-SEM in accordance with Hair *et al*. (2014). In view of this, five types of decision considerations are listed in the table comprising research goals, measurement model specification, structural model complexity, and data characteristics. The next part discusses those considerations in details.

3.8.2.1 Research Goals

The choice of SEM approach is determined by the research objective. CB-SEM is more appropriate statistical methodology when the underlining research model is grounded on strong theory and further confirmation and testing are the goals (Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). In contrast, in a situation where theory is not well developed, the path relationships between the latent constructs are the primary concern in model testing, and researchers are generally less concerned with predictive accuracy of the model, PLS-SEM approach is the methodological choice (Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). PLS-SEM is more oriented towards predicting path relationships between the latent construct rather than the predictive accuracy of the model. It is the most preferred approach when the

research objective is theory development and prediction (Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). Nevertheless, Hair *et al.* (2011b) confirm that PLS-SEM's capabilities also support its usage for theory testing (conformation).

Table 3. 22
Rules of Thumb to Select SEM Approach

Decision considerations	Decision
Research Goals	• If the goal is predicting key target constructs or identifying key "driver" constructs, select PLS-SEM. • If the goal is theory testing, theory confirmation, or comparison of alternative theories, select CB-SEM. • If the research is exploratory or an extension of an existing structural theory, select PLS-SEM.
Measurement Model Specification	• If formative constructs are part of the structural model, select PLS-SEM. • If the structural model is complex (many constructs and many indicators), select PLS-SEM.
Structural Model	• If the model is nonrecursive, select CB-SEM. Data • If your data meet the CB-SEM assumptions exactly, for example, with respect to the minimum sample size and the distributional assumptions, select CB-SEM; otherwise, PLS-SEM is a good approximation of CB-SEM results. • Sample size considerations: – If the sample size is relatively low, select PLS-SEM. With large data sets, CB-SEM and PLS-SEM results are similar, provided that a large number of indicator variables are used to measure the latent constructs (consistency at large). – PLS-SEM minimum sample size should be equal to the larger of the following: (1) ten times the largest number of formative indicators used to measure one construct or (2) ten times the largest number of structural paths directed at a particular latent construct in the structural model.
Data Characteristics and Algorithm	• If the data are to some extent nonnormal, use PLS-SEM; otherwise, under normal data conditions, CB-SEM and PLS-SEM results are highly similar, with CB-SEM providing slightly more precise model estimates. • If CB-SEM requirements cannot be met (e.g., model specification, identification, non-convergence, data distributional assumptions), use PLS-SEM as a good approximation of CB-SEM results. • CB-SEM and PLS-SEM results should be similar. If not, check the model specification to ensure that CB-SEM was appropriately applied. If not, PLS-SEM results are a good approximation of CB-SEM results.

Source: *adapted from Hair et al. (2011)*

3.8.2.2 Model Complexity

Unlike CB-SEM, PLS-SEM works efficiently for modeling higher-order constructs (second order constructs or higher order) (Becker, Klein, & Wetzels, 2012; Wetzels, Odekerken-schröder, & Oppen, 2009). Moreover, it estimates path models that comprise many constructs, several structural path relationships and/or many indicators per construct. Furthermore, PLS-SEM enables for a flexible treatment of more advance model elements, such as moderator variables (Becker *et al.*, 2012; Fassott, 2010; Hair *et al.*, 2014a; Hair *et al.*, 2014b; Wilson, 2010). Additionally, PLS-SEM has less restrictive assumptions about the normal distribution of data and number of required observation as those in CB-SEM. Thus, PLS enables researchers to estimate very complex models without imposing distributional assumptions on the data using only few observations (Hair *et al.*, 2014a; Hair *et al.*, 2014b; Henseler *et al.*, 2009).

3.8.2.3 Data Characteristics

CB-SEM rests on the assumptions of a multivariate distribution and independence of observations. In contrast, PLS-SEM approach avoids many of the restrictive assumptions imposed by CB-SEM. PLS-SEM approach allows for soft distributional assumption and evaluation of PLS models using nonparametric methods (Chin, 2010; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). Additionally, PLS-SEM approach avoids small sample size problems and can be used in some situations when the equivalent approach "CB-SEM" cannot (Chin, 2010; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). Some authors provide empirical evidence that CB-SEM

approach requires several hundred or even thousands of observations when the structure model is very complex (Boomsma & Hoogland, 2001). On the contrary, in PLS-SEM approach, there can be more indicators than observations (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005). Using a Monte Carlo simulation, Chin and Newsted (1999) present a study on PLS-SEM approach with small samples. They found that the underlining model can provide information about the appropriateness of indicators at sample size as low as 20. They, however, suggest a range of 30 to 100 cases as the minimum number of observations that should be used for PLS-SEM analysis.

3.8.2.4 Measurement Model

PLS-SEM, in contrast to CB-SEM, enables researchers to be more flexible in specifying the measurement model. Specifically, the relationships between indicators and constructs can be modeled as reflective or formative in PLS-SEM approach (Chin, 2010; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). However, CB-SEM have been criticized by its careless modeling of formative measurement, therefore, PLS-SEM is normally considered the ''natural choice'' to formative measurement since it avoids identification problems that usually happen when CB-SEM is being used (Chin, 2010; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009).

Equipped by these rules of thumb, this study employed the PLS-SEM approach in preference to CB-SEM approach. The decision to apply this approach is because: (1) the nature of this study is to explore and predict the relationships among independent variables and dependent variable, that is, to explain the variance of intention to adopt

193

B2B EC rather than to confirm or to reject specific theoretical rationale. (2) PLS-SEM also has capabilities for examining and confirming theories. (3) The research model of this study comprises both reflective and formative constructs, has second order construct, and includes an interaction effect. Since specification of the measurement model and the structure model under the PLS-SEM approach enable flexibility in modeling such research settings, therefore, it was more appropriate for analysis. (4) PLS-SEM approach has been designed to relax the hard assumptions set by CB-SEM with regard to normality and number of observations which is hard to achieve in business research. Next chapter discusses and employs the PLS-SEM technique in analyzing the proposed framework.

CHAPTER FOUR: DATA ANALYSIS

4.1 Introduction

This chapter is designed to empirically achieve research objectives specified in Chapter One and to test the suggested research hypotheses presented in Chapter Three. This chapter introduces the necessary steps conducted by researcher to ensure that the results from applying PLS-SEM are valid and reliable. The researcher, in section 4.2 started by specifying the path model including structure and measurement models. Section 4.3 focuses on path model assessment. Both measurement and structure models are evaluated in this section. Finally, summary of study's results is presented in the last section 4.4. Figure 4.1 depicts the flow of the data analysis procedures.
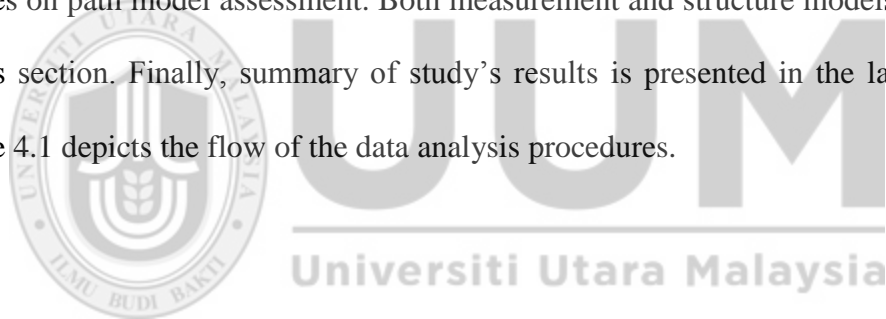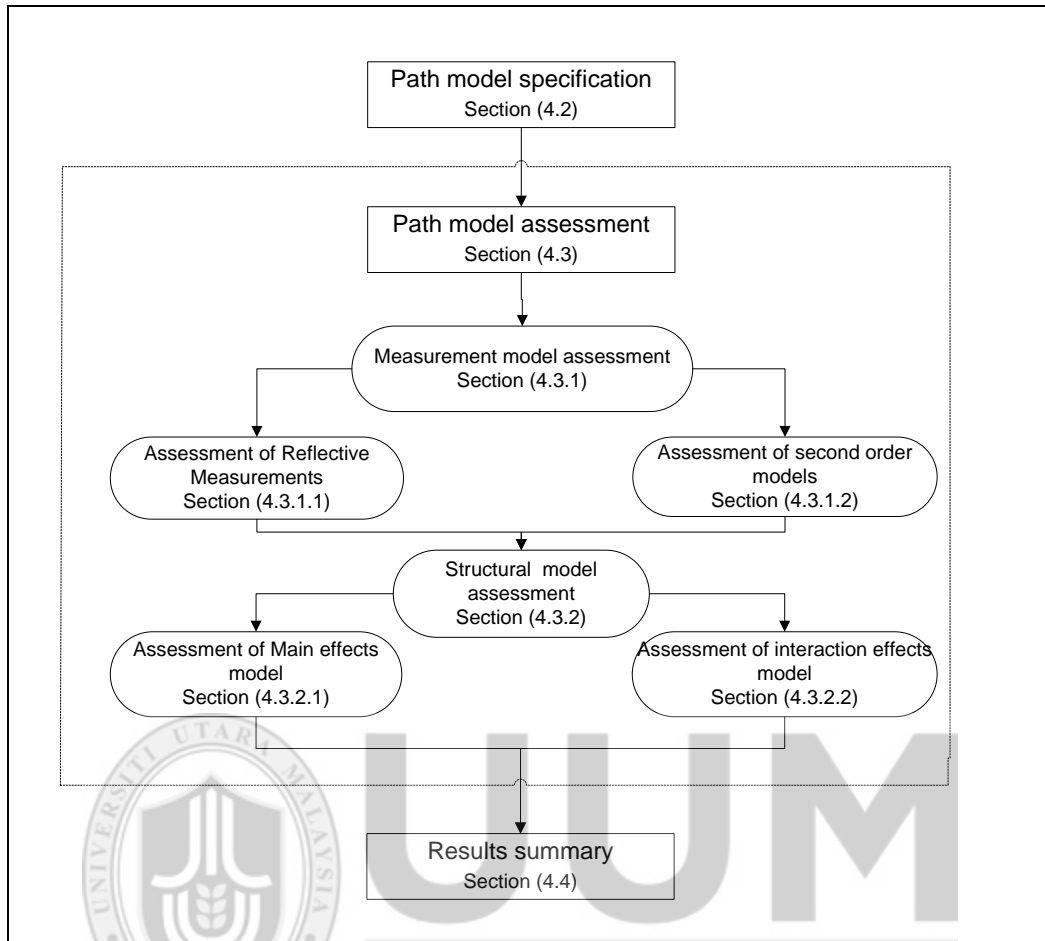
Figure 4. 1
The Flow of Analysis Using PLS-SEM

4.2 Path Model Specification

Application of PLS-SEM in a research project for hypothesis testing requires initial preparing of a diagram that displays the relationships between research variables and demonstrates the research hypotheses that will be examined. Such diagram is usually called a path model (Hair *et al.*, 2014a; Hair *et al.*, 2011a; Sarstedt, Ringle, Smith, Reams, & Hair, 2014b). Connections between variables should be drawn based on logic and theory to visually display the hypotheses that will be tested (Davcik, 2014; Gefen *et*

al., 2011a; Hair *et al.*, 2014a). However, path models are composed of two modules, the structural model (also referred as inner model) and the measurement model (also referred as outer model). Structural model usually portray the relationships between the variables where the arrow head pointed from exogenous construct (independent variable) to endogenous construct (dependent variables). On the other hand, measurement models describe the relationships between constructs and their measures (also called indicators or manifest variables) (Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2014b; Sarstedt *et al.*, 2014a; Sarstedt *et al.*, 2014b).

In order to build the path model in an appropriate way, attention should be given into the level of constructs' abstraction and types of measurement models (Becker *et al.*, 2012; Polites, Roberts, & Thatcher, 2012; Ringle, 2012; Wetzels *et al.*, 2009; Wright, Campbell, Thatcher, & Roberts, 2012). Once the researchers have clear relationships between underlining variables (constructs), determined the abstraction level of constructs, and determined the type of measurements for each construct they will be able to specify the path model in correct way (Polites *et al.*, 2012; Wetzels *et al.*, 2009; Wright *et al.*, 2012).

Accordingly, to convert the proposed framework of this study into a path model, the researcher has identified relationships between nine main constructs based on TOE, DOI, and RDT theories as depicted in Figure 4.2. Adoption Intention construct is an endogenous construct affected directly by six exogenous constructs including Relative Advantage, Compatibility, Complexity, Organizational Readiness, Top Management

197

Support, and Competition Pressure. Trust and Dependency were specified as moderators on all of the specified relationships.

In line with Rai *et al*. (2009), this study has identified Trust and Organization Readiness as second-order constructs. Trust is defined as a set of beliefs including benevolence, integrity and competencies. Although these beliefs mutually support and reinforce each other, yet they are also distinct (Li *et al.*, 2012; Rai *et al.*, 2009; Son & Benbasat, 2006). Following this, trust's construct represents the common factor of benevolence, integrity, and competences. Therefore, in line with Mcknight and Chervany (2002); Polites *et al.* (2012); and Rai *et al.*(2009), trust is specified as a formative second-order construct based on three first-order constructs. On the other hand, organization readiness consists of interrelated dimensions including financial resources and IT sophistication (Chwelos *et al.*, 2001; Polites *et al.*, 2012; Rai *et al.*, 2009). All of the variance associated with IT sophistication and financial resources are of interest to the researcher, thus dropping a dimension may drastically change the meaning of the Organizational Readiness construct (Chwelos *et al.*, 2001; Polites *et al.*, 2012; Rai *et al.*, 2009). Following this, Organizational Readiness is conceptualized as a formative construct with two first-order constructs including IT sophistication and financial resources (Chwelos *et al.*, 2001; Polites *et al.*, 2012; Rai *et al.*, 2009).
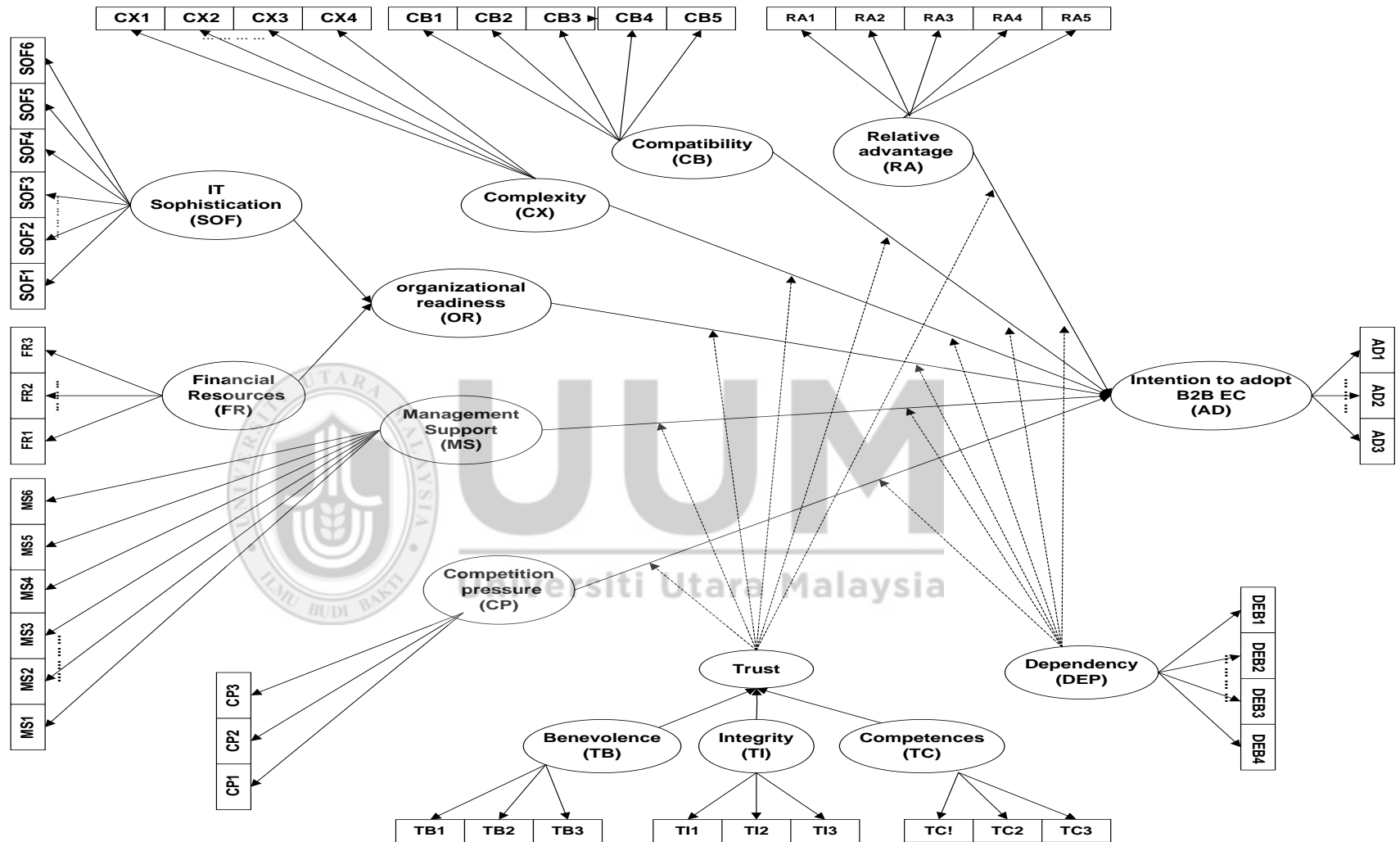
Figure 4. 2
The Proposed Path Model

199

4.3 Path Model Assessment

In general, PLS-SEM uses a principal component analysis, path analysis, and regression simultaneously to evaluate the underlining theoretical framework. It starts first by evaluating each construct as an approximation of its corresponding block of manifest indicators. In other words, PLS in this stage evaluates the measurement model of the path model (Hair *et al.*, 2014b; Hair *et al.*, 2011a; Sarstedt *et al.*, 2014a). Once, the measurement model evaluation provides satisfactory results, PLS in the next stage run non-iterative series of Ordinary Least Square regression to determine whether or not the specified relationships are meaningful and significant. In other word, PLS in this stage evaluates the structural model to accept or reject hypotheses suggested in the path model (Hair *et al.*, 2014b; Hair *et al.*, 2011a; Sarstedt *et al.*, 2014a).

To do so, Sarstedt, Ringle, Smith, *et al.* (2014b) suggest general framework as depicted in Figure 4.3, for assessment of measurement and structure models which has been adopted in this study. Figure 4.3 shows that researchers should start in evaluating the measurement model by looking first into reflective measurement models. Collection of assessment should be applied. Then, if the path model involves formative measurement model, different assessment should be conducted. Once the measurement models are valid and reliable, the researcher can proceed to structure model assessment by performing several tests. This figure also portrayed the outline of this section.
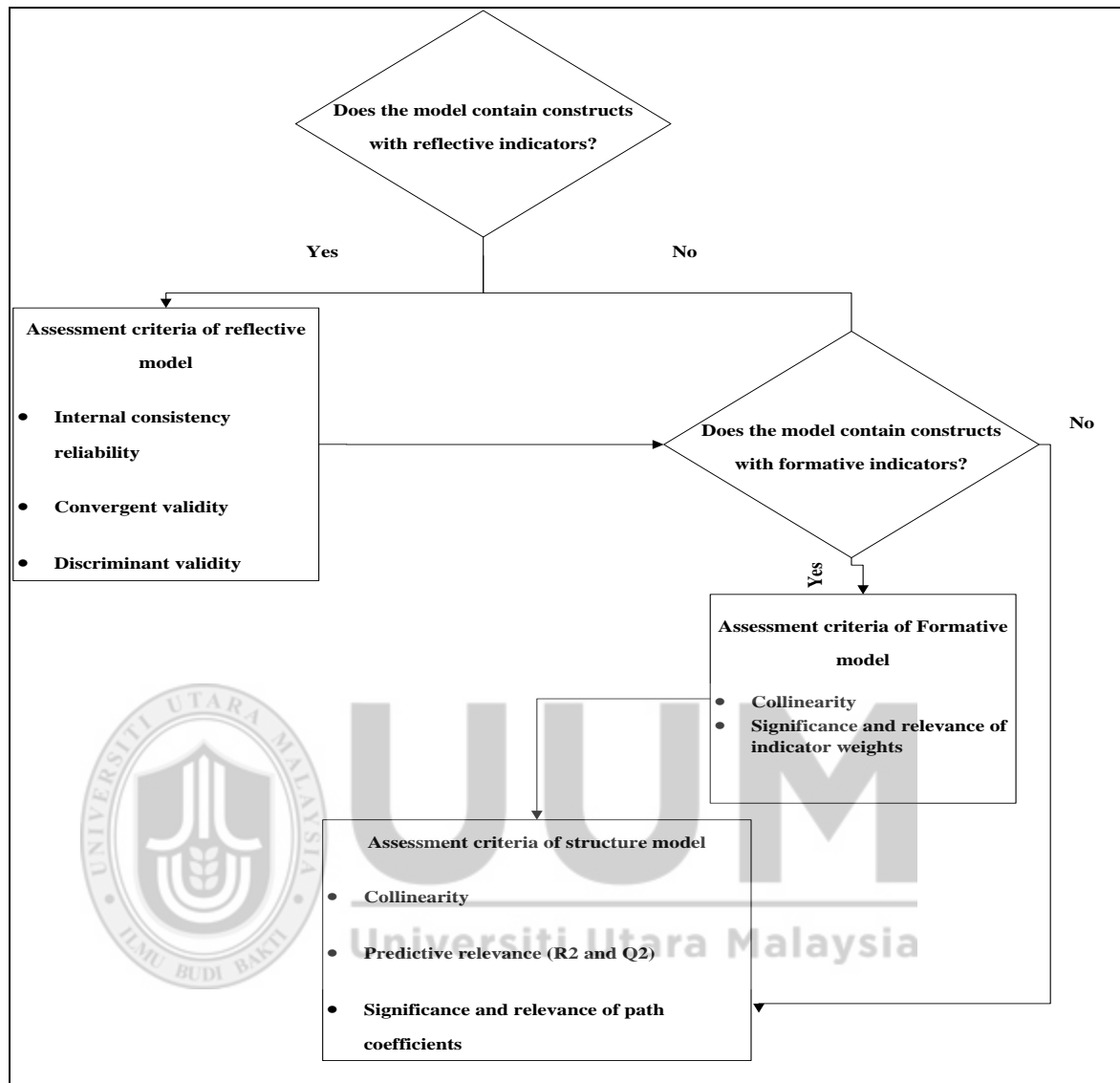
Figure 4. 3
Path Model Assessments Guidelines
Source : Adapted from Sarstedt, Ringle, Smith, *et al.* (2014)

4.3.1 Measurement Model Evaluation

Measurement model evaluation is the first and the prerequisite step for generating results

in PLS. It is about testing of measurements' reliability and validity. The assessment of

the measurement model in PLS-SEM varies depending on the nature of measurement

model itself, whether the model includes formative measures or reflective measures (Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014a).

In general, reflective measurement model assumes that indicators are caused by the construct where all indicators measure the same underlying phenomenon. All indicators are expected to be interchangeable and have a common theme where omission of an indicator will not alter the meaning of the construct (Davcik, 2014; Hair *et al.*, 2014a; Henseler *et al.*, 2009; Jarvis, MacKenzie, & Podsakoff, 2003; Polites *et al.*, 2012; Wright *et al.*, 2012). On the other hand, formative measurement model assumes that indicators cause the latent construct. In this sense, the phenomenon of interest (latent construct) is formed by the presence of underlying measures (Davcik, 2014; Diamantopoulos *et al.*, 2008; Hair *et al.*, 2014a; Henseler *et al.*, 2009; Jarvis *et al.*, 2003; Polites *et al.*, 2012; Wright *et al.*, 2012). In other words, the indicators as a group jointly determine the empirical meaning of the construct and each indicator describes a different aspect of the construct. Thus, formative indicators are not expected to be interchangeable and dropping an indicator will influence the essence of the latent variable (Davcik, 2014; Diamantopoulos *et al.*, 2008; Hair *et al.*, 2014a; Henseler *et al.*, 2009; Jarvis *et al.*, 2003; Polites *et al.*, 2012; Wright *et al.*, 2012).

Due to these differences, each type of measurement model has totally different set of criteria compared to each other. If the case is reflective measurement model, indicators reliability, internal consistency reliability, convergent validity and discriminant validity are the key concerns. In contrast, in formative measurement model, the researchers'

interests are to examine, co-linearity, significance and relevance of indicator weights (Davcik, 2014; Diamantopoulos *et al.*, 2008; Hair *et al.*, 2014a; Henseler *et al.*, 2009; Jarvis *et al.*, 2003; Polites *et al.*, 2012; Sarstedt *et al.*, 2014b; Wright *et al.*, 2012). Next section discusses the result of reflective assessment model.

4.3.1.1 Reflective Measurement Model Assessment

To assess the properties of the measures, this study initially specified a model for all first-order constructs. This is in accordance with Carter, Wright, Thatcher, and Klein (2014) and Wetzels *et al.*(2009) guidelines. Then, the indicators and composite reliability, convergent validity, and discriminate validity have been examined.

4.3.1.1.1   Indicators and Composite Reliability

Since they represent the same underlying theoretical concept, reflective indicators are required to be highly correlated (Davcik, 2014; Hair *et al.*, 2014a; Jarvis *et al.*, 2003; Wetzels *et al.*, 2009). Cronbach's alpha is one of the most popular tests for indicators reliability. It postulates that all indicators are equally reliable and each indicator should be typically more than 0.7 (Davcik, 2014; Diamantopoulos *et al.*, 2008; Hair *et al.*, 2010; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009; Jarvis *et al.*, 2003). On the other hand, internal consistency reliability examines the extent to which construct indicators are inter-correlated assuming that all indicators are not equally reliable. Internal consistency reliability is usually represented by composite reliability and it can

203

be interpreted in the same way as Cronbach's alpha (Hair *et al.*, 2014a; Hair *et al.*, 2011a; Sarstedt *et al.*, 2014b).

Table 4.1 presents key statistics of Cronbach's Alpha for all items in both marketing and purchasing surveys. With regard to marketing survey, the initial analysis shows that all the items were loading appropriately between 0.782 and 0.941 on their postulated constructs with exception of two items namely: CX1 belongs to Complexity construct and BF3 belongs to Top Management Support construct. With exception of those two items, the result is in accordance with the rule of thumb where loadings of each item should be to be greater than 0.7 (Hair et al., 2014a; Hair et al., 2011a; Sarstedt et al., 2014b). However, CX1 and BF3 exhibit very low loadings; the loading was 0.296 and -0.102 respectively. In such case, Hair, Hult, *et al.* (2014) and Hair *et al.* (2011) suggest that all items that have loading of lower than 0.4 should always be eliminated from reflective scales. Thus, both items have been deleted from this marketing survey.

On the other hand, Cronbach's alpha for each item in purchasing survey was between 0.710 and 0.952 with exception of four items. Except the fourth item, the loadings of purchasing survey's items show high level of reliability as they are above the threshold value of 0.7. However, consistent with marketing survey, CX1 and BF3 exhibit also very low loadings of 0.486 and -0.122 respectively. Hence, those items have been also deleted from purchasing survey. Furthermore, the Cronbach's alpha of SOF3 and PR2 in purchasing survey loaded 0.671 and 0.658 respectively, which are slightly lower than the threshold value of 0.7. Since those values are very close to the cutoff value of 0.7, they can be retained as they contribute to content validity of their respective construct

(Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2011b). Thus, this study kept those items in the purchasing survey. However, the relative high loadings of Cronbach's alpha provide evidence of indicators' reliability.

Table 4. 1
Indicators Reliability Using Cronbach's Alpha.

Construct name	Items	Cronbach's alpha	
		Marketing Sample	Purchasing sample
Intention to adopt	Adopt1	0.902	0.93
	Adopt2	0.941	0.952
	Adopt3	0.891	0.926
Relative Advantage	RA1	0.88	0.899
	RA2	0.892	0.826
	RA3	0.919	0.878
	RA4	0.728	0.71
	RA5	0.889	0.868
Compatibility	CM1	0.832	0.789
	CM2	0.825	0.855
	CM3	0.83	0.747
	CM4	0.765	0.768
	CM5	0.802	0.829
Complexity	CX1	**0.296**	**0.486**
	CX2	0.756 (0.775)*	0.744 (NC)
	CX3	0.845 (0.859)*	0.889(NC)
	CX4	0.794 (0809)*	0.87(NC)
Top Management Support	BF1	0.838 (NC)*	0.887(NC)*
	BF2	0.839(NC)*	0.860 (NC)*
	BF3	**-0.102**	**0.122**
	MP1	0.863(NC)*	0.874(NC)*
	MP2	0.900(NC)*	0.857(NC)*
	MP3	0.831(NC)*	0.805(NC)*
Financial resources	Fin1	0.772	0.914
	Fin2	0.875	0.916
	Fin3	0.874	0.861
IT Sophistications	SOF1	0.841	0.796
	SOF2	0.822	0.829
	SOF3	0.887	**0.671**
	SOF4	0.892	0.899

Table 4. 1 *(continued)*
Indicators Reliability Using Cronbach's Alpha.

Construct name	Items	Cronbach's alpha	
		Marketing Sample	Purchasing sample
	SOF5	0.862	0.839
	NSOF6	0.863	0.765
Competition Pressure	PR1	0.792	0.906
	PR2	0.839	**0.658**
	PR3	0.874	0.732
Dependency	Depend4	0.831	0.811
	Depend5	0.866	0.896
	Depend6	0.814	0.838
	Depend7	0.849	0.828
Trust-Benevolence	TB1	0.935	0.899
	TB2	0.918	0.853
	TB3	0.913	0.882
Trust-Integrity	TI1	0.904	0.832
	TI2	0.903	0.846
	TI3	0.938	0.884
Trust-Competences	TC1	0.931	0.901
	TC2	0.933	0.921
	TC3	0.914	0.91

*values inside parentheses indicate all Values after deletion
NC: No Change after items deletion.

However, since Cronbach's Alpha postulates that all indicators are equally reliable, scholars believe that it should not be given much credence to estimate the construct reliability. Instead, composite reliability assumes that all indicators are not equally reliable and thus there are greater deal that composite reliability is a better sign of the internal consistency than the Cronbach's alpha (Chin, 1998; Davcik, 2014).

In this study, the result of composite reliability analysis is presented in Table 4.2. The table shows that composite reliability of all constructs were high in both samples

206

(marketing and purchasing) ranging between 0.813 and 0.953. These figures are above the conventional reliability threshold of 0.7 providing an evidence of internal consistency for all constructs. Therefore, it can be concluded that the all constructs are appropriate for further analysis (Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2011b).

Table 4. 2
Composite Reliability of the Underlining Constructs

Construct name	Composite reliability	
	Marketing sample	**Purchasing sample**
Relative Advantage	0.936	0.922
Compatibility	0.906	0.898
Complexity	0.855	0.875
Financial resources	0.879	0.925
IT Sophistications	0.945	0.915
Top Management Support	0.931	0.933
Competition Pressure	0.874	0.813
Dependency	0.906	0.908
Trust-benevolence	0.944	0.910
Trust-integrity	0.948	0.936
Trust-Competences	0.939	0.890
Intention to adopt	0.936	0.955

4.3.1.1.2 Convergent Validity

Convergent validity shows that whether or not a set of indicators represents one and the same underlying construct (Fornell & Larcker, 1981; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014b). To examine that, Fornell & Larcker (1981) proposed the Average Variance Extracted (AVE) as a criterion for testing convergent validity. AVE signifies to the amount of variance the indicators share with their respective construct. Theoretically, it is essential that indicators share more variance with their respective construct than with other constructs in the model (Fornell & Larcker, 1981; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014b).

The results in Table 4.3 demonstrate the AVE of each construct in both samples. It shows that AVEs were ranging between 0.596 and 0.876. Based on rule of thumb, an AVE value of more than 0.5 ensures sufficient convergent validity. It is argued that if a construct has AVE's value of more than 0.5, researchers can claim that this construct is able to explain more than half of its indicators' variance (Fornell & Larcker, 1981; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014b). Hence, the results of AVE analysis demonstrate sufficient and satisfied convergent validity in both samples.

Table 4. 3

Average Variance Extracted (AVE) of Underlining Constructs

Construct name	Average Variance Extracted (AVE)	
	Marketing sample	**Purchasing sample**
Relative Advantage	0.747	0.704
Compatibility	0.658	0.637
Complexity	0.664	0.701
Financial resources	0.698	0.806
IT Sophistications	0.742	0.644
Top Management Support	0.730	0.735
Competition Pressure	0.874	0.596
Dependency	0.706	0.712
Trust-Benevolence	0.850	0.772
Trust-Integrity	0.837	0.729
Trust-Competences	0.858	0.829
Intention to adopt	0.831	0.876

4.3.1.1.3   Discriminant Validity

Discriminant validity demonstrates the degree to which a construct is empirically distinct from other constructs in the structure model. This is reflected in how much indicators of a particular construct are different from indicators of other constructs (Fornell & Larcker, 1981; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014b). Two methods are available to determine the discriminant validity namely; Fornell and Larcker method and cross-loadings method (Fornell & Larcker, 1981; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Sarstedt *et al.*, 2014a; Sarstedt *et al.*, 2014b). In the first method, Fornell and Larcker, (1981) suggest that discriminant validity is established when the AVE of an individual construct is greater than the squared multiple correlation of that

construct with other constructs. On the other hand, the second method focus on the indicators' cross loadings where an indicator should load more on its postulated construct more than the other constructs (Hair *et al.*, 2014a; Hair *et al.*, 2011a; Sarstedt *et al.*, 2014a; Sarstedt *et al.*, 2014b).

This study used the both methods to determine the discriminant validity of underlining constructs across marketing and purchasing samples. In Table 4.4 and Table 4.5 respectively, the AVE square root of all constructs across marketing and purchasing samples are presented. It indicates that the square root of the AVE for each construct in both samples was greater than its correlation with the other constructs suggesting strong properties of discriminant validity.

On the other hand, the results of cross-loading method are presented in Table 4.6 and Table 4.7 for both marketing and purchasing samples respectively. Table 4.6 and Table 4.7 show that, all indicators load higher on their respective construct than any other constructs in the path model. This would suggest that all indicators loaded distinctly on the specified construct they measured, thus signifying discriminant validity of all the constructs in both marketing and purchasing samples. Therefore, both analyses obviously point out that all constructs in the path model exhibits discriminant validity.

Table 4. 4

AVE Square Root in Marketing Sample

	Adopt	CB	CX	DEP	FIN	PR	RA	SOF	TB	TC	TI	TMS
Intention to Adopt (Adopt)	0.911											
Compatibility (CB)	0.35	0.811										
Complexity (CX)	-0.149	-0.143	0.815									
Dependency(DEP)	0.318	0.22	0.072	0.84								
Financial resources (Fin)	0.426	0.514	-0.017	0.145	0.841							
Competition pressure (PR)	0.64	0.384	0.041	0.365	0.458	0.835						
Relative Advantage (RA)	0.528	0.525	-0.136	0.084	0.567	0.438	0.864					
IT Sophistication (SOF)	0.391	0.468	-0.068	0.191	0.518	0.392	0.666	0.861				
Trust-Benevolence (TB)	0.397	0.364	-0.072	0.175	0.474	0.533	0.481	0.449	0.922			
Trust-Competences (TC)	0.332	0.418	0.038	0.371	0.398	0.394	0.418	0.414	0.712	0.926		
Trust-Integrity (TI)	0.278	0.431	-0.029	0.317	0.396	0.396	0.414	0.39	0.781	0.848	0.915	
Top Management Support (TMS)	0.617	0.459	-0.053	0.334	0.606	0.566	0.514	0.554	0.408	0.486	0.392	0.855

Table 4. 5

AVE Square Root in Purchasing Sample

	Adopt	CB	CX	DEP	FIN	PR	RA	SOF	TB	TC	TI	TMS
Intention to Adopt (Adopt)	0.936											
Compatibility (CB)	0.266	0.798										
Complexity (CX)	-0.226	-0.188	0.837									
Dependency(DEP)	0.115	0.261	0.219	0.844								
Financial resources (Fin)	0.285	0.544	-0.081	0.274	0.898							
Competition pressure (PR)	0.186	0.455	-0.112	0.24	0.459	0.772						
Relative Advantage (RA)	0.195	0.512	-0.145	0.113	0.434	0.41	0.839					
IT Sophistication (SOF)	0.183	0.468	-0.167	0.119	0.356	0.432	0.573	0.803				
Trust-Benevolence (TB)	0.212	0.392	-0.031	0.272	0.445	0.374	0.343	0.352	0.879			
Trust-Competences (TC)	0.251	0.353	-0.027	0.383	0.325	0.291	0.291	0.346	0.699	0.911		
Trust-Integrity (TI)	0.245	0.462	-0.113	0.327	0.368	0.353	0.24	0.32	0.779	0.798	0.854	
Top Management Support (TMS)	0.336	0.663	-0.119	0.225	0.649	0.674	0.495	0.583	0.451	0.431	0.485	0.857

Table 4. 6

Cross Loadings for All Indicators in Marketing Sample

	Adopt	CB	CX	DEP	Fin	PR	RA	SOF	TB	TI	TC	TMS
Adopt1	**0.903**	0.289	-0.115	0.39	0.361	0.566	0.405	0.271	0.296	0.199	0.291	0.575
Adopt2	**0.94**	0.303	-0.127	0.246	0.402	0.603	0.472	0.322	0.367	0.231	0.274	0.552
Adopt3	**0.89**	0.366	-0.165	0.234	0.402	0.582	0.565	0.477	0.422	0.33	0.344	0.56
Compat1	0.343	**0.831**	-0.206	0.116	0.382	0.34	0.47	0.428	0.241	0.229	0.234	0.328
Compat2	0.229	**0.825**	0.004	0.198	0.457	0.43	0.41	0.379	0.449	0.445	0.383	0.34
Compat3	0.292	**0.83**	-0.147	0.15	0.45	0.333	0.484	0.424	0.34	0.45	0.345	0.387
Compat4	0.263	**0.765**	0.032	0.331	0.386	0.195	0.344	0.285	0.233	0.373	0.407	0.383
Compat5	0.269	**0.802**	-0.214	0.125	0.423	0.264	0.403	0.363	0.249	0.293	0.365	0.431
Compx2	-0.107	-0.191	**0.775**	-0.079	-0.004	-0.048	-0.105	-0.155	-0.128	-0.004	-0.007	-0.015
Compx3	-0.132	-0.119	**0.859**	0.138	-0.044	0.066	-0.149	-0.022	-0.107	-0.175	-0.088	-0.07
Compx4	-0.122	-0.049	**0.807**	0.094	0.01	0.071	-0.075	-0.004	0.055	0.123	0.194	-0.039
Depend4	0.383	0.253	0.01	**0.831**	0.098	0.385	0.217	0.332	0.243	0.343	0.445	0.422
Depend5	0.189	0.151	0.083	**0.867**	0.115	0.218	-0.033	0.04	0.087	0.242	0.227	0.172
Depend6	0.204	0.139	0.068	**0.814**	0.148	0.3	-0.026	0.04	0.081	0.178	0.193	0.192
Depend7	0.157	0.118	0.146	**0.849**	0.151	0.227	-0.037	0.039	0.071	0.218	0.236	0.175
Fin1	0.228	0.33	0.084	0.137	**0.772**	0.306	0.401	0.407	0.321	0.24	0.201	0.434
Fin2	0.32	0.384	-0.046	0.135	**0.875**	0.376	0.513	0.461	0.445	0.377	0.377	0.505
Fin3	0.46	0.528	-0.042	0.108	**0.874**	0.44	0.501	0.443	0.415	0.357	0.38	0.563
Prusser1	0.488	0.314	0.062	0.356	0.354	**0.792**	0.31	0.424	0.472	0.391	0.411	0.523
Prusser2	0.46	0.274	0.093	0.29	0.392	**0.839**	0.255	0.164	0.371	0.263	0.253	0.39
Prusser3	0.63	0.362	-0.03	0.28	0.4	**0.874**	0.495	0.375	0.481	0.336	0.325	0.498
NRA1	0.508	0.503	-0.147	0.062	0.539	0.374	**0.88**	0.611	0.445	0.359	0.38	0.505
NRA2	0.445	0.475	-0.177	0.062	0.514	0.404	**0.892**	0.59	0.441	0.364	0.371	0.433
NRA3	0.487	0.475	-0.079	0.094	0.488	0.383	**0.919**	0.599	0.443	0.347	0.374	0.442
NRA4	0.322	0.372	-0.046	0.07	0.41	0.254	**0.728**	0.438	0.293	0.335	0.266	0.359
NRA5	0.486	0.433	-0.123	0.075	0.489	0.454	**0.889**	0.615	0.433	0.39	0.396	0.468
NSOF1	0.356	0.424	-0.044	0.129	0.441	0.366	0.523	**0.841**	0.45	0.399	0.421	0.507
NSOF2	0.372	0.448	0.023	0.221	0.434	0.379	0.585	**0.822**	0.378	0.312	0.41	0.567

Table 4. 6

Cross Loadings for All Indicators in Marketing Sample

NSOF3	0.287	0.331	-0.031	0.205	0.408	0.345	0.57	**0.887**	0.358	0.327	0.371	0.417
NSOF4	0.302	0.403	-0.118	0.096	0.445	0.286	0.592	**0.892**	0.4	0.344	0.355	0.434
NSOF5	0.37	0.395	-0.087	0.21	0.501	0.358	0.575	**0.862**	0.346	0.297	0.305	0.467
NSOF6	0.309	0.392	-0.105	0.109	0.43	0.269	0.593	**0.863**	0.379	0.332	0.261	0.437
Trust1	0.409	0.412	-0.071	0.16	0.51	0.552	0.504	0.427	**0.935**	0.721	0.623	0.435
Trust2	0.33	0.336	-0.07	0.125	0.389	0.458	0.423	0.42	**0.918**	0.697	0.653	0.35
Trust3	0.351	0.248	-0.057	0.198	0.397	0.453	0.395	0.394	**0.913**	0.744	0.701	0.333
Trust4	0.237	0.4	0.001	0.302	0.39	0.357	0.378	0.36	0.716	**0.904**	0.709	0.309
Trust5	0.233	0.369	0.053	0.307	0.349	0.354	0.368	0.399	0.716	**0.903**	0.843	0.444
Trust6	0.287	0.413	-0.114	0.267	0.351	0.375	0.391	0.321	0.715	**0.938**	0.779	0.332
Trust7	0.362	0.418	0.007	0.305	0.38	0.389	0.408	0.4	0.703	0.756	**0.931**	0.475
Trust8	0.282	0.396	0.093	0.336	0.371	0.362	0.387	0.391	0.63	0.784	**0.933**	0.46
Trust9	0.262	0.337	0.012	0.406	0.351	0.337	0.358	0.353	0.634	0.828	**0.914**	0.404
Belif1	0.54	0.44	-0.023	0.132	0.577	0.439	0.604	0.537	0.412	0.393	0.504	**0.838**
Belif2	0.551	0.483	-0.023	0.17	0.648	0.428	0.677	0.588	0.469	0.448	0.546	**0.839**
Practis1	0.499	0.355	-0.035	0.401	0.483	0.529	0.303	0.419	0.305	0.273	0.285	**0.863**
Practis2	0.514	0.366	-0.112	0.344	0.495	0.526	0.307	0.424	0.329	0.262	0.361	**0.9**
Practis3	0.527	0.307	-0.035	0.395	0.372	0.501	0.279	0.384	0.216	0.284	0.36	**0.831**

Table 4. 7

Cross Loadings for All Indicators in Purchasing Sample

	Adopt	CB	CX	DEP	Fin	PR	RA	SOF	TB	TI	TC	TMS
Adopt1	*0.930*	0.303	-0.205	0.146	0.293	0.218	0.174	0.14	0.143	0.25	0.262	0.364
Adopt2	*0.952*	0.235	-0.207	0.102	0.251	0.159	0.21	0.204	0.23	0.231	0.265	0.297
Adopt3	*0.926*	0.196	-0.224	0.065	0.251	0.135	0.164	0.173	0.235	0.202	0.167	0.271
Compat1	0.168	*0.789*	-0.15	0.259	0.411	0.383	0.554	0.428	0.343	0.378	0.356	0.534
Compat2	0.221	*0.855*	-0.158	0.238	0.467	0.431	0.366	0.365	0.281	0.32	0.234	0.541
Compat3	0.137	*0.747*	-0.132	0.218	0.365	0.261	0.368	0.381	0.415	0.455	0.265	0.488
Compat4	0.22	*0.768*	-0.123	0.173	0.389	0.363	0.288	0.304	0.284	0.368	0.24	0.477
Compat5	0.27	*0.829*	-0.179	0.184	0.503	0.358	0.483	0.41	0.301	0.371	0.325	0.593
Compx2	-0.148	-0.166	*0.746*	0.061	-0.058	-0.024	-0.024	-0.096	-0.08	-0.121	-0.133	-0.029
Compx3	-0.209	-0.198	*0.888*	0.18	-0.108	-0.106	-0.161	-0.181	-0.01	-0.14	-0.041	-0.143
Compx4	-0.203	-0.113	*0.87*	0.28	-0.035	-0.133	-0.155	-0.132	-0.004	-0.031	0.077	-0.11
Depend4	0.111	0.314	0.158	*0.811*	0.277	0.185	0.168	0.187	0.33	0.341	0.458	0.239
Depend5	0.113	0.207	0.178	*0.896*	0.216	0.253	0.084	0.114	0.22	0.31	0.304	0.191
Depend6	0.031	0.17	0.128	*0.838*	0.181	0.221	0.127	0.082	0.145	0.227	0.296	0.15
Depend7	0.081	0.133	0.254	*0.828*	0.213	0.153	-0.001	-0.03	0.14	0.161	0.18	0.137
Fin1	0.223	0.536	-0.105	0.246	*0.914*	0.427	0.445	0.401	0.47	0.403	0.385	0.579
Fin2	0.24	0.545	-0.095	0.239	*0.916*	0.421	0.368	0.349	0.395	0.38	0.326	0.592
Fin3	0.291	0.399	-0.029	0.25	*0.861*	0.389	0.362	0.23	0.344	0.231	0.188	0.571
Prusser1	0.196	0.464	-0.149	0.15	0.422	*0.906*	0.399	0.419	0.294	0.308	0.253	0.646
Prusser2	0.03	0.26	0.154	0.365	0.232	*0.658*	0.255	0.207	0.245	0.23	0.179	0.411
Prusser3	0.114	0.256	-0.058	0.238	0.344	*0.732*	0.256	0.289	0.35	0.278	0.236	0.44
NRA1	0.156	0.488	-0.125	0.12	0.462	0.365	*0.899*	0.511	0.327	0.233	0.261	0.467
NRA2	0.146	0.43	-0.221	0.122	0.351	0.358	*0.826*	0.408	0.33	0.253	0.258	0.368
NRA3	0.172	0.46	-0.18	0.045	0.338	0.304	*0.878*	0.511	0.233	0.158	0.24	0.408
NRA4	0.159	0.343	0.048	0.155	0.36	0.433	*0.71*	0.503	0.244	0.14	0.207	0.469
NRA5	0.181	0.424	-0.132	0.043	0.318	0.271	*0.868*	0.461	0.309	0.226	0.251	0.367

214

Table 4. 7

Cross Loadings for All Indicators in Purchasing Sample (continued)

NSOF1	0.119	0.394	-0.084	0.162	0.295	0.285	0.455	*0.796*	0.341	0.319	0.317	0.444
NSOF2	0.132	0.336	-0.163	0.051	0.274	0.292	0.502	*0.829*	0.299	0.178	0.268	0.456
NSOF3	0.015	0.351	-0.112	0.017	0.197	0.256	0.479	*0.671*	0.279	0.183	0.286	0.377
NSOF4	0.23	0.45	-0.181	0.099	0.316	0.419	0.518	*0.899*	0.361	0.365	0.366	0.55
NSOF5	0.109	0.364	-0.134	0.149	0.314	0.454	0.478	*0.839*	0.311	0.335	0.262	0.462
NSOF6	0.114	0.359	-0.093	0.053	0.286	0.324	0.392	*0.765*	0.089	0.065	0.15	0.475
Trust1	0.214	0.397	-0.033	0.24	0.475	0.4	0.33	0.318	*0.899*	0.637	0.567	0.47
Trust2	0.143	0.366	-0.103	0.179	0.383	0.239	0.362	0.336	*0.853*	0.717	0.627	0.345
Trust3	0.19	0.273	0.035	0.286	0.305	0.317	0.227	0.283	*0.882*	0.719	0.664	0.357
Trust4	0.189	0.391	-0.108	0.246	0.304	0.214	0.174	0.227	0.761	*0.832*	0.761	0.371
Trust5	0.12	0.302	0.003	0.348	0.272	0.241	0.213	0.265	0.68	*0.846*	0.728	0.342
Trust6	0.266	0.444	-0.134	0.276	0.345	0.394	0.225	0.314	0.598	*0.884*	0.612	0.483
Trust7	0.239	0.394	-0.066	0.313	0.385	0.336	0.298	0.352	0.688	0.82	*0.901*	0.443
Trust8	0.192	0.265	0.002	0.338	0.284	0.21	0.236	0.289	0.595	0.692	*0.921*	0.367
Trust9	0.246	0.296	-0.005	0.391	0.217	0.239	0.253	0.299	0.618	0.661	*0.91*	0.361
Belif1	0.313	0.582	-0.154	0.174	0.6	0.598	0.47	0.577	0.342	0.386	0.362	*0.887*
Belif2	0.374	0.566	-0.109	0.226	0.59	0.518	0.414	0.559	0.388	0.454	0.491	*0.86*
Practis1	0.222	0.597	-0.072	0.173	0.599	0.615	0.436	0.406	0.445	0.462	0.357	*0.874*
Practis2	0.219	0.589	-0.06	0.216	0.522	0.609	0.384	0.459	0.448	0.478	0.321	*0.857*
Practis3	0.249	0.513	-0.093	0.163	0.445	0.583	0.411	0.437	0.339	0.303	0.252	*0.805*

Taken as a whole, the results incorporated in this section provide clear support that all reflective measurement in the path model met the conventional standards of reliability and validity. Next sub-section presents an evaluation of higher-order constructs.

4.3.1.2 Higher-Order Construct Assessment

The path model of this study involves two relationships that will be examined at a higher level of abstraction (second-order constructs) namely; the role of Organizational Readiness and Trust. Each second-order construct should be estimated separately (Hu, Kettinger, & Poston, 2014; Wilson, 2010; Wright *et al.*, 2012). As mentioned earlier, this study assigned the first-order constructs of IT sophistication and financial resources as formative indicators to the second-order construct of Organizational Readiness. In similar vein, the first-order constructs of benevolences, integrity and competences have been modeled as formative indicators to the second-order construct of Trust.

Indeed, there are two approaches for modeling higher-order construct namely; the repeated indicator approach and the two-stage approach (Becker *et al.*, 2012; Hair *et al.*, 2014a; Henseler *et al.*, 2009; Polites *et al.*, 2012; Wetzels *et al.*, 2009). As the indicators of a second-order construct do not exist, the repeated indicator approach specifies all indicators of the underlying first-order latent constructs to the second-order construct (Becker *et al.*, 2012; Hair *et al.*, 2014a; Henseler *et al.*, 2009; Polites *et al.*, 2012; Wetzels *et al.*, 2009). On the other hand, the two stage approach involves calculating the latent construct scores for all first-order constructs in the first stage. Then, the calculated scores are assigned to the second-order construct as indicators

216

(Becker *et al.*, 2012; Hair *et al.*, 2014a; Henseler *et al.*, 2009; Polites *et al.*, 2012; Wetzels *et al.*, 2009; Wright *et al.*, 2012). Theoretically, the repeated indicator approach has several advantages over the two stage approach. In general, it is able to estimate all constructs (first and second order constructs) simultaneously rather than estimating first-order and second-order dimensions separately as in two stage approach (Becker *et al.*, 2012). Thus, in this study the repeated indicator approach has been adopted.

To validate the formative second-order models, the researchers should inspect whether the first-order constructs load sufficiently and significantly into their assumed second-order construct (Becker *et al.*, 2012; Wilson, 2010; Wright *et al.*, 2012). That is because first-order construct represent actionable drivers of the second-order construct. Accordingly, all path coefficients (loadings) between the first-order and second-order constructs were examined using PLS algorithm. Furthermore, the significance of path coefficients were assessed via bootstrapping technique with 5000 iterations (Hair *et al.*, 2014a; Hair *et al.*, 2011a).

For Organizational Readiness, the path coefficients estimate and its significant level of the first order-constructs are presented in Table 4.8. The results showed the two dimensions, IT sophistication and financial resources as the first-order constructs load sufficiently and significantly on the second-order construct of organization readiness. All path coefficients in both samples (marketing and purchasing) are above the cutoff point of 0.1 and significant (P-value < 0.00). With regard to Trust as a second-order construct, Table 4.8 shows that Benevolences, Integrity and Competences load sufficiently and significantly on Trust construct in both samples. That is, all path

coefficients are above the threshold of 0.1 and significant (P-value < 0.00). This result indicates that the conceptual properties of Organizational Readiness and Trust matched with reflective-formative type of second order hierarchical component models.

Table 4. 8
Hierarchical measurement model results

Second order construct name	Component name (First-order)	Marketing sample		Purchasing Sample	
		Path coefficients	P value	Path coefficients	P value
Organizational Readiness					
	IT sophistication	0.756	0.00	0.765	0.00
	Financial resources	0.373	0.00	0.424	0.00
Trust					
	benevolence	0.362	0.00	0.36	0.00
	Integrity	0.361	0.00	0.373	0.00
	Competences	0.359	0.00	0.353	0.00

Overall, several statistical analyses in this section confirm the measurement models in this study. Accordingly, it can be concluded that the proposed path model has satisfactory level of validity and reliability. Having such qualities, the research can safely move toward structural model analysis and testing the proposed hypotheses.

4.3.2 Structure Model Assessment

In fact, the nature of effects between exogenous and endogenous differs for models with and without moderation effect (Hair *et al.*, 2014a). Since one of the objectives of this study is to test the significance of the main effects between all exogenous and endogenous constructs, the PLS analysis should be initially executed without the

moderator, and then the interaction effects can be safely tested in another model (Hair *et al.*, 2014a). Therefore this study executes two models: the main effects model and the moderation effects model separately.

4.3.2.1 The Main Effect Model

Typically there are four criteria to assess the structure model including coefficient of determination (R²), Prediction relevance (Q^2), path coefficient (β), and effect size (f^2) (Hair *et al.*, 2011a; Henseler *et al.*, 2009; Sarstedt *et al.*, 2014b). However, Multicollinearity is an issue essential to be examined prior to the assessment of structural model. Thus, Multicollinearity assessment is presented in the next section.

4.3.2.1.1 Multicollinearity

Practically, Variance Inflation Factor (VIF) is a frequently used to inspect Multicollinearity (Petter, Straub, & Rai, 2007). According to the rule of thumb, a VIF value of 5 and higher indicates a potential problem of Collinearity (Hair *et al.*, 2014a; Hair *et al.*, 2011a). Using PLS algorithm, VIF values for all constructs are generated and presented in Table 4.9. The values vary between 1.059 and 4.757 which less than the cut-off value of 5. Therefore, it can be concluded that the proposed path model in both samples (marketing and purchasing) has no Multicollinearity issue.

Table 4. 9
Multicollinearity Assessments Using VIF

Construct name	Marketing sample			Purchasing Sample		
	Adopt	OR	Trust	Adopt	OR	Trust
Intention to Adopt (Adopt)	-	-	-			-
Compatibility (CB)	1.631	-	-	2.103		-
Complexity (CX)	1.059	-	-	1.14		-
Dependency(DEP)	1.242	-	-	1.34		-
Financial Resources (Fin)		1.359	-		1.149	-
Organizational Readiness(OR)	2.991	-	-	2.374		-
Competition pressure (PR)	1.849	-	-	1.899		-
Relative Advantage (RA)	2.232	-	-	1.561		-
IT Sophistication (SOF)	-	1.359	-	-	1.149	-
Trust- Benevolence (TB)	-	-	2.625	-	-	2.86
Trust-Competences (TC)	-	-	3.752	-	-	3.044
Trust-Integrity (TI)	-	-	4.757	-	-	4.323
Top Management Support (TMS)	2.21	-	-	3.377	-	-
Trust	1.625	-	-	1.472	-	-

4.3.2.1.2 Determination Coefficient (R^2)

The preliminary point for testing the structural model is the determination coefficient (R^2). Since the aim of the PLS-SEM is to explain the endogenous latent variables' variance, R^2 is the most important criteria to assess the structure model. The judgment of R^2 value is highly dependent on the specific research discipline (Davcik, 2014; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Sarstedt *et al.*, 2014a). While R^2 value of 0.75 is considered high in some disciplines, R^2 values of 0.20 would be perceived as high in other research area (Hair *et al.*, 2011a). Accordingly, some researchers such as Chin (2010) describes the general rule of thumb regarding R^2 as values of 0.67, 0.33, and 0.19 are considered as substantial, moderate, and weak, respectively. On

the other hand, Cohen's (1988) criterion describes that R² value of 0.26 or more is considered as substantial, 0.13 as moderate, and 0.02 as weak. However, since adoption B2B EC is very complex issue and it is very difficult to be predicted (Reimers, Johnston, & Klein, 2010a; Reimers *et al.*, 2010b), Cohen's (1988)' criterion is adopted to evaluate the determination coefficient. In adoption research, several studies use such criteria to evaluate the R^2. For example, Zhao *et al.* (2011) and Wang *et al.*(2013) considered the R^2 of 0.41 and 0.25 respectively as substantial amounts of variance explained by the proposed independent variables.

However, the result of PLS algorithm shows that an estimated model fits the survey data very well in marketing sample, with R^2 for firm's adoption intention equal to 0.517 indicating a substantial amounts of variance explained by the proposed independent variables. On the other hand, the estimated model of the purchasing sample moderately fits the survey data, with R^2 for firm's adoption intention equal to 0.165. Accordingly, those figures signify that the structure model explains acceptable variance level of Intention to Adopt B2B EC in both marketing and purchasing sample.

221

4.3.2.1.3 The Predictive Relevance of the Structure Model

Besides looking at the magnitude of the R^2 as a measure for predictive relevance, Chin (2010) suggests that the researcher should also apply the predictive sample reuse technique to examine the predictive relevance of the model. Predictive relevance (Q^2) of the structure model is measured by Cross-validated redundancy (Chin, 2010; Hair *et al.*, 2014b; Henseler *et al.*, 2009). The Q's value is generated based on the predictive sample reuse technique using blindfolding procedure. This technique excludes data for a given construct or a block of indicators and then predicts the excluded part based on the calculated parameters. According to the rule of thumb, Q^2 values of 0.02, 0.15, and 0.35 indicate a small, medium, or large predictive relevance respectively (Akter, D'Ambra, & Ray, 2011b; Henseler *et al.*, 2009).

For model of this study, the construct cross-validated redundancies (Q^2) have been obtained by blindfolding procedure using omission distance 7. According to Chin (1998), the omission distance should be between 5 and 10. The results of blindfolding procedures in SmartPLS3.0 show that the Cross-validated redundancy of the endogenous construct (Intention to Adopt) in purchasing model equals 0.115 which is moderately low. On the other hand, the Cross-validated redundancy of the endogenous construct (Intention to Adopt) in marketing model equals 0.431 which shows large predictive relevance. However, both models present an acceptable cross-validated redundancy values.

222

4.3.2.1.4 Path Coefficient and Significance Test

Usually, sign, path coefficient (β), and t value are used for hypotheses testing in PLS (Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). Path coefficient can be interpreted as standardized beta coefficients of ordinary least squares regressions. Values of Path coefficient are standardized on a range from - 1 to + 1. When coefficients are closer to + 1, it represents strong positive relationships. On the other hand, when coefficients are closer to -1, it indicates strong negative relationships (Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). Once the path coefficients are generated, the significance of each path coefficient can be assessed by means of a bootstrapping procedure that calculates t-values for each path coefficients. Paths coefficients are not significant when their sign are contrary to the hypothesized direction, whereas significant paths showing the hypothesized direction empirically support the proposed causal relationship (Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009).

To assess the significance of the various effects included in the model, the researcher fist run PLS algorithm which generates the path coefficient; and then the researcher should run the structural model using the bootstrap procedure by generating 5000 resamples (Hair *et al.*, 2014a; Hair *et al.*, 2011a; Sarstedt *et al.*, 2014b). All statistical tests were assessed at 5 % significance level using one-tailed t-tests because all the hypotheses were unidirectional in nature. The results of the structural model estimates of both marketing and purchasing sample are illustrated in Table 4.10.

Table 4. 10

Path Coefficients and Significant Level of Marketing and Purchasing Structure Models

Construct name	marketing model			purchasing model		
	β	T Statistics	P Values	β	T Statistics	P Values
Relative Advantage (RA)	0.261	2.74	0.00***	0.043	0.58	0.27
Compatibility (CB)	-0.053	0.83	0.20	0.075	0.88	0.18
Complexity (CX)	-0.113	1.76	0.03**	-0.177	2.14	0.01**
Organizational Readiness (OR)	-0.220	2.26	0.01	-0.113	1.17	0.12
Top Management Support (TMS)	0.386	3.86	0.00***	0.385	2.78	0.00***
Competition Pressure (PR)	0.406	3.84	0.00***	-0.07	1.01	0.15

Significant at * p < 0.1 ** p < 0.05 *** P < 0.01 (one-tailed test)

In the marketing model, the results depicted in Figure 4.5 show that the path from Relative Advantage to Intention to Adopt is positive and significant (β= 0.261; p < 0.00), indicating that as the Relative Advantage increases, so too does the extent of Adoption Intention, thereby providing support for H1. The relationship between Complexity and Intention to Adopt is negative and significant (β= -0.113; p < 0.05), indicating that as the Complexity of B2B EC increases, Intention to Adopt will decrease. With regard to influence of Organization Readiness on Intention to Adopt, the sign of bath coefficient is negative which is contrary to the hypothesized direction (β= - 0.220; p < 0.05). As such, the H4 should be rejected (Hair *et al.*, 2011a). In addition, the bath of Compatibility to Intention to Adopt is negative and insignificant (β= - 0.053; p > 0.05). Thus, the researcher rejects H2. However, the path from Top Management Support to Intention to Adopt is positive and significant (β= 0.386; p < 0.00), suggesting that as the extent of Top Management Support

increases, so too does Intention to Adopt. Consequently, H5 is supported. Lastly, the relationship between Competition Pressure and Intention to Adoption is also positive and significant ($\beta= 0.406$; $p < 0.00$), signifying that as the extent of competition increases, Intention to Adopt will increase accordingly. Thus, H6 is supported.
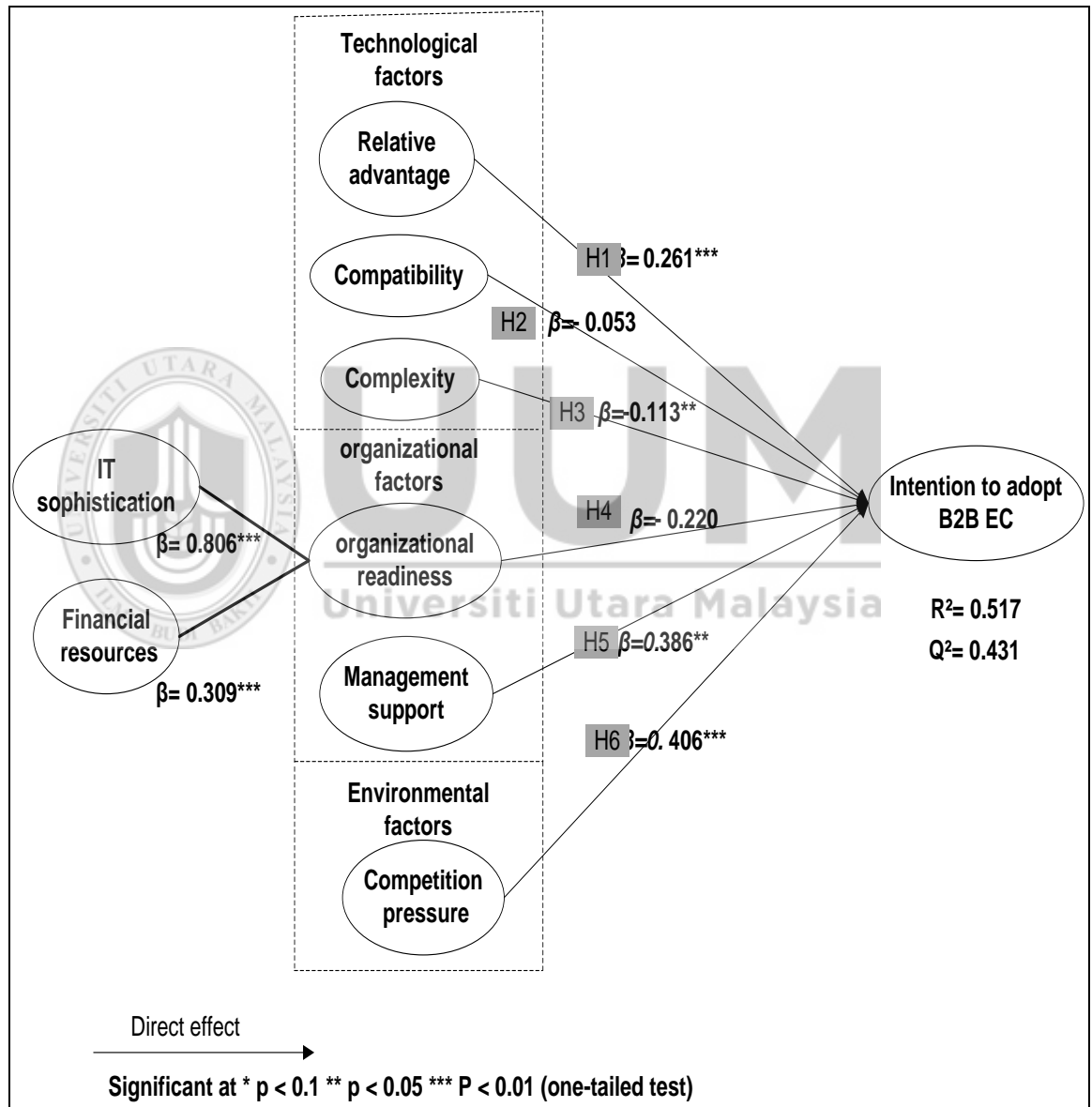

Figure 4. 4
Path Coefficients and Significant Level of Marketing Structure Model.

225

In the purchasing model as depicted in Figure 4.5, contrary to expectations, four hypotheses have been rejected. The crucial role of Relative Advantage and Competition Pressure in shaping firms' intentions to adopt B2B EC are not significant ($\beta= 0.043$; $p > 0.05$) and ($\beta= - 0.075$; $p > 0.05$), respectively. Thereby the researcher rejects H4 and H5. In line with marketing sample, neither Organization Readiness ($\beta= - 0.113$; $p > 0.05$) nor Compatibility ($\beta= 0.071$; $p > 0.05$) have significant influence on Intention to Adopt in marketing sample. Consequently, H5 and H4 have been rejected in both data sets. Only Complexity and Top Management Support have been found to have a significant influence on Intention to Adopt with ($\beta= - 0.177$; $p < 0.05$) and ($\beta= 0.385$; $p < 0.05$), accordingly.
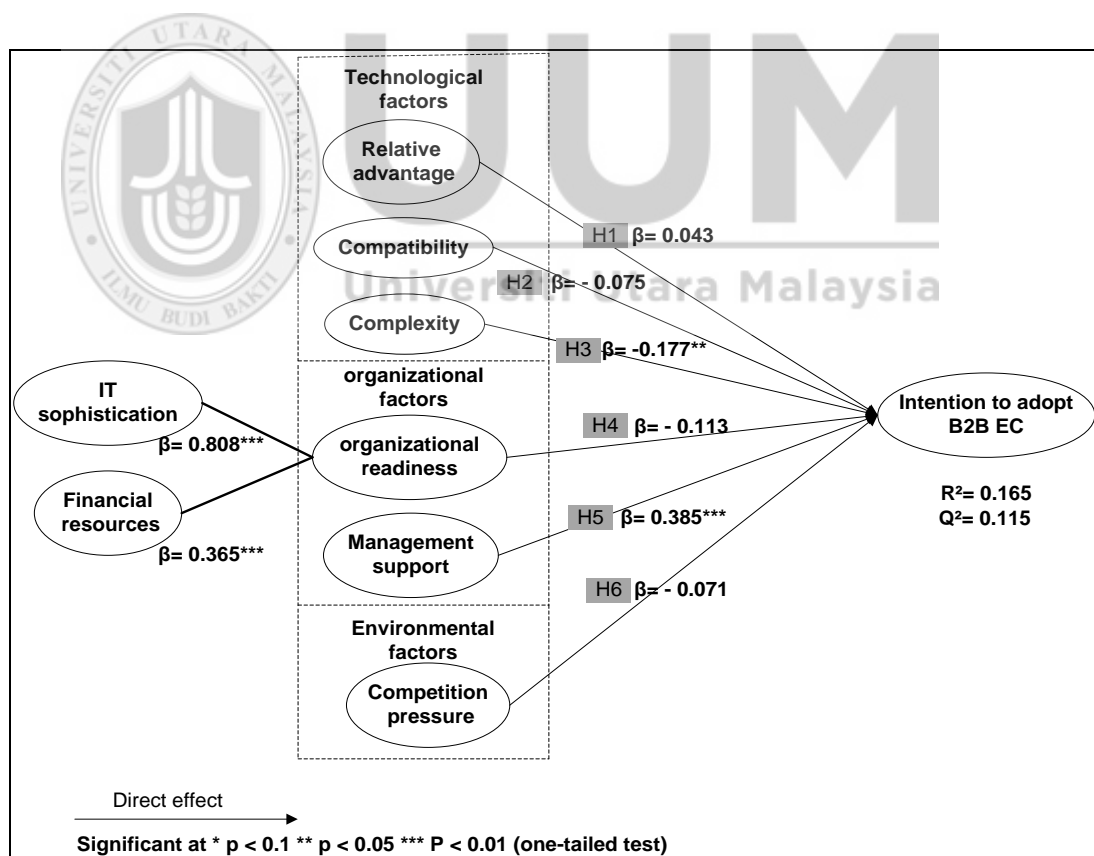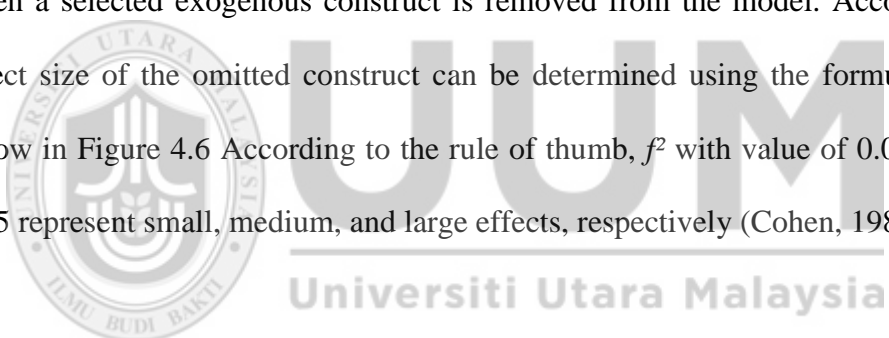

Figure 4. 5
Path Coefficients and Significant Level of Purchasing Structure Model.

4.3.2.1.5   Effect Size (f^2)

Another assessment to be considered in structural model evaluation involves the effect size (f^2) of each relationship in the structure model, which allows researchers to evaluate the exogenous latent variable's incremental explanation of an endogenous latent variable. The effect size can be determined by calculating Cohen's f^2 (Chin, 2010; Cohen, 1988; Hair *et al.*, 2014a; Hair *et al.*, 2011a; Henseler *et al.*, 2009). The f^2 is calculated by observing the change in R^2 when a specific latent construct is removed from the model. In view of that, the researchers need to estimate R^2 for two PLS path models: the first R^2 will be calculated for the original model as specified by the research framework, whereas the second R^2 will be calculated for the same model when a selected exogenous construct is removed from the model. Accordingly, the effect size of the omitted construct can be determined using the formula provided below in Figure 4.6 According to the rule of thumb, f^2 with value of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively (Cohen, 1988).

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

Figure 4. 6
Formula For Effect Size (F²) Calculation

The results given in Table 4.11 show only two exogenous in purchasing model have effect size (f^2) of more than the threshold value (0.02) including Complexity and Top Management Support. As they proved to have a significant path coefficient,

Complexity and Top Management Support have relatively small effect size on the intention to adopt B2B EC in purchasing model.

Table 4. 11
The Exogenous Effect Size (F²) On the Intention to Adopt B2B EC

Exogenous name	Model	
	Marketing	**Purchasing**
Relative Advantage (RA)	0.084*	0.001*
Compatibility (CB)	0.005*	0.001*
Complexity (CX)	0.034*	0.04*
Organizational Readiness (OR)	0.019*	0.003*
Top Management Support (TMS)	0.138*	0.053*
Competition Pressure (PR)	0.245**	0.005*

*small effect size, ** medium effect size, *** large effect size

On the other hand, with exception of Compatibility and Organization Readiness, the impact of all exogenous variables on the intention to adopt B2B EC has relatively small effect on marketing sample. Yet, it is at acceptable level. Competition Pressure was the most influencing on intention to adopt in marketing sample.

4.3.2.2 The Interaction Effects

Moderation takes place when the effect of a predictor on a criterion varies depending on the level of a third variable, called a moderator variable, which interacts with the independent variable in order to explain the dependent variable (Baron & Kenny, 1986; Edwards & Lambert, 2007). To incorporate interaction effect into path model, PLS requires the interaction term to be modeled as an additional latent variable called "interaction latent construct". Initiating such construct in PLS can be done by two approaches including product indicator approach and two-stage approach

228

(Goodhue, Lewis, & Thompson, 2007; Hair *et al.*, 2014a; Hair *et al.*, 2014b; Hair *et al.*, 2011a; Henseler & Chin, 2010). In product indicator approach, the interaction effect is modeled by creating a latent interaction construct in which its indicators are estimated by multiplying each predictor's indicator with each moderator's indicator (Chin & Dibbern, 2010; Goodhue *et al.*, 2007; Hair *et al.*, 2014a; Henseler & Chin, 2010). In the two-stage approach, the construct scores of predictor and moderator are calculated and saved. Then, in the second stage, the latent interaction construct are created in which its indicators are estimated by multiplying the saved scores of both the predictor and moderator (Goodhue *et al.*, 2007; Hair *et al.*, 2014a). Two-stage approach is suggested to be superior when the moderator is second order construct or the moderator has formative indicators, whereas the product indicator approach is suggested to be superior when the moderator is reflective construct (Henseler & Chin, 2010; Wilson, 2010).

In this study, the dependency and trust have been proposed as moderator on all hypothesized relationships specified in the path model. As trust is constructed as the second-order construct, this study follows the two stage approach for constructing the trust's interaction latent constructs. On the other hand, interaction latent constructs related to dependency have been constructed using product indicators approach. Thus, this study has to create twelve interaction latent constructs. Six interaction latent constructs represent the interaction term between dependency and the all specified relationships, whereas the interaction terms between trust and the all specified relationships have been represented by the another six interaction latent constructs.

229

With regard to the interaction effect of trust, the interaction latent constructs of Relative Advantage × Trust (RA×Trust), Compatibility × Trust (CB×Trust), Complexity × Trust (CX×Trust), Organization Readiness × Trust (OR×Trust), Top management support × Trust (TMS×Trust), and Competition Pressure × Trust (CP×Trust) have been examined using bootstrapping procedure with 5000 resample. All statistical tests were assessed at 5 % level of significance using one-tailed t-tests because trust related hypotheses were unidirectional in nature.

The result is presented in the Table 4.12. All of the trust related interaction constructs in both models (Marketing and Purchasing) have weak path coefficient which are also not significant (p value > 0.05). Therefore, the claim that trust has moderating effect has been rejected. Hence, H7a to H7f were not supported.

Table 4. 12
Interaction Path Coefficients and Significant Level At Marketing And Purchasing Models.

Interaction effect	marketing model			purchasing model		
	β	T Statistics	P Values	*β*	T Statistics	P Values
Trust × RA*	-0.089	0.901	0.18	-0.177	1.363	0.08
Trust × CB *	0.072	0.827	0.20	0.011	0.121	0.45
Trust × CX *	-0.073	0.932	0.17	0.094	1.226	0.11
Trust × OR *	-0.186	1.550	0.06	0.104	0.648	0.25
Trust × TMS*	0.153	1.091	0.13	-0.176	1.147	0.12
Trust × PR*	-0.008	0.083	0.46	0.128	1.402	0.08
Dep × RA**	0.084	0.843	0.39	0.041	0.38	0.69
Dep × CB **	-0.073	0.919	0.35	-0.043	0.442	0.67
Dep × CX**	0.184	1.951	0.05	-0.241	2.49	0.01
Dep × OR **	-0.034	0.324	0.74	0.194	1.88	0.06
Dep ×TMS**	0.014	0.163	0.87	0.044	0.43	0.66
Dep ×PR **	0.018	0.161	0.78	-0.381	2.99	0.00

** the hypothesis is tested at two-tailed, * the hypothesis is tested at one-tailed.

With regard to the interaction effect of Dependency, the interaction latent constructs of Relative Advantage × Dependency, Compatibility × Dependency, Complexity × Dependency, Organization Readiness × Dependency, Top management support × Dependency, and Competition Pressure × Dependency have been examined using bootstrapping procedure with 5000 resample. Since the hypotheses between Dependency and the specified relationships were non directional, this study has tested them at two tail hypothesis. Therefore, when the magnitude of the resulting empirical t-value is above 1.96, it can be suggested that the path coefficient is significantly different from zero at a significance level of 5%. The critical t values for significance levels of 1 % and 10% probability of error are 2.57 and 1.65, respectively.

As presented in Table 4.12, the interaction terms between Dependency and Relative Advantage as well as between Dependency and Compatibility are weak and insignificant in both models (Marketing and Purchasing) ($p > 0.05$), indicating Dependency does not have either positive or negative moderating effect on the role of Relative Advantage and Compatibility on firms' intention to adopt B2B EC. Thus, H8a and H8b have been rejected.

Consistent with H8d, the negative relationship between Organizational Readiness and firms' intention to Adopt B2B EC in purchasing model dampens when Dependency is high rather than low, where the interaction term was positive and significant (standardized β= 0.194, $p < 0.1$ two-tailed test) between Organization Readiness and Dependency. This suggests that Dependency has positive moderation

231

effect on the relationship between Organization Readiness and Intention to adopt B2B EC. Therefore, in line with the contingent consistency hypothesis, Organization Readiness was more predictive of Intention to Adopt B2B EC as Dependency became more positive.

Figure 4.7 shows the interaction pattern using Aiken & West's (1991) procedure of computing slopes one standard deviation above and below the mean of Dependency. This technique is designed for the interpretation of the interaction effect of two continuous predictor variables. However, the proposed interaction effect between Dependency and Organization Readiness is rejected in marketing model. The path coefficient is very weak and insignificant (standardized $\beta= -0.034$, p >0.5 two-tailed test).
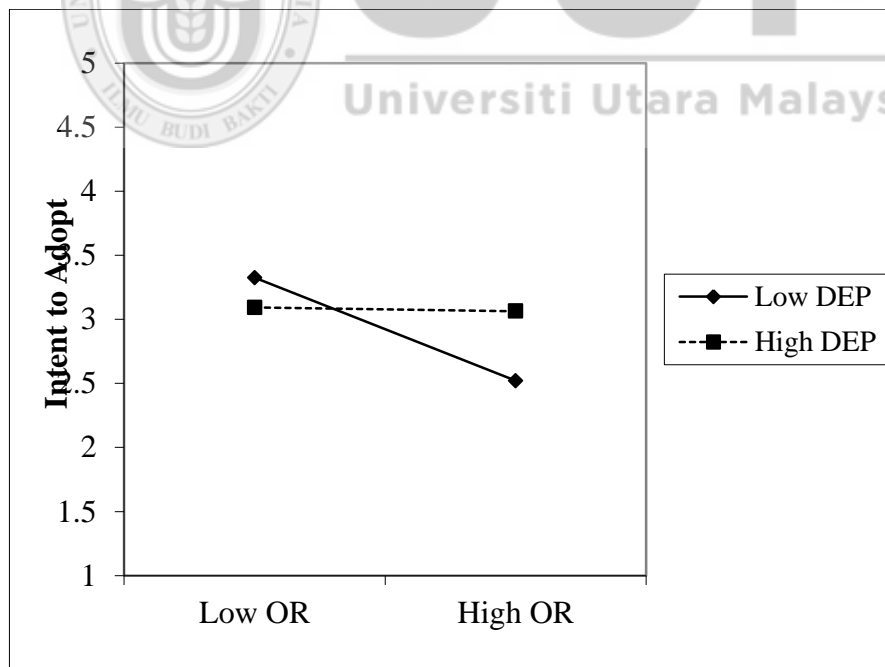

Figure 4. 7
The Interaction Effect Between Organization Readiness (OR) and Dependency (DEP) in Purchasing Model

Furthermore, the interaction term between Complexity and Dependency in purchasing model is negative and significant (standardized β= -0.241, p < 0.05), which supports H8c, indicating that high level of Dependency amplifies the negative relationship between Complexity and firms' intention to Adopt B2B EC. Therefore, Dependency has a negative moderating effect on the relationship between Complexity and firms' intention to Adopt B2B EC. This suggests that the negative interaction effect is more likely to be observed in firms confronting higher levels of Dependency. Again, this study plotted the interaction term by computing the slopes one standard deviation above and below the mean of Dependency. Figure 4.8 indicates that the interaction pattern is consistent with H8c; that is, Complexity is more effective on firms' intention to adopt B2B EC when Dependency is high rather than low. On the contrary, the interaction term between Complexity and Dependency in Marketing model is positive and significant (standardized β= 0.184, p < 0.1), which also supports H8c in marketing model, indicating that high level of Dependency diminishes the negative relationship between Complexity and firms' intention to Adopt B2B EC. Figure 4.9 indicates that the interaction pattern is consistent with H8c; that is, Complexity is less effective on firms' intention to adopt B2B EC when Dependency is high rather than low.
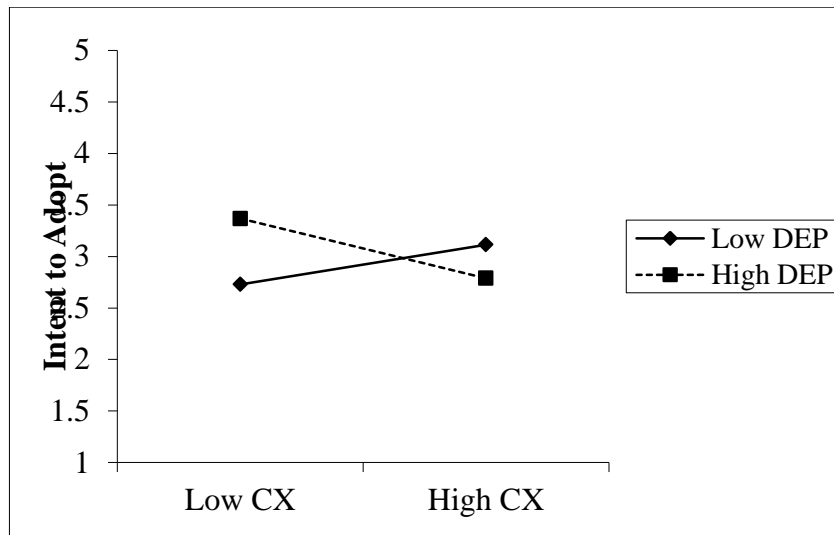
Figure 4. 8
The Interaction Effect Between Complexity (CX) and Dependency (DEP) In Purchasing Model
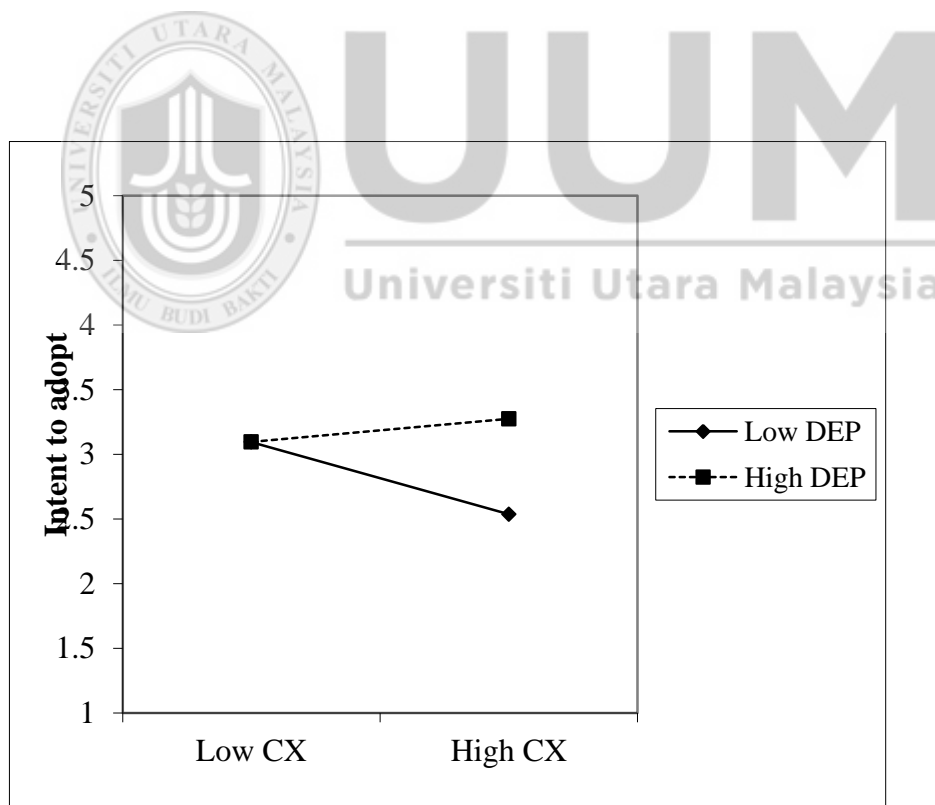

Figure 4. 9
The Interaction Effect Between Complexity (CX) and Dependency (DEP) In Marketing Model.

234

With regard to the interaction effect between Top Management Support and Dependency, the path coefficient is weak and insignificant (standardized $\beta= 0.014$, p > 0.1), suggesting that the impact of Top Management Support in motivating firms' intention to adopt B2B EC does not change in either high or low level of Dependency, and thus rejecting H8e in both model.

Lastly, in spite of direct association between Competition Pressure and intention to adopt was negative and insignificant in purchasing model, the interaction effect between Competition Pressure and Dependency is negative and significant (standardized $\beta= -0.381$, p < 0.00), which supports H8f, indicating Dependency has a negative moderating effect on the relationship between Competition Pressure and firms' intention to Adopt B2B EC. This means that in high level of Dependency, an increase in Competition Pressure is associated with a less intention to adopt B2B EC. This pattern is clearly represented in Figure 4.10. However, while dependency in purchasing model significantly moderates the role of Competition Pressure on intention adoption, it plays weak and insignificant moderating role in marketing model (standardized $\beta= 0.018$, p > 0.05). Therefore, the researcher rejects the H8f in marketing model.
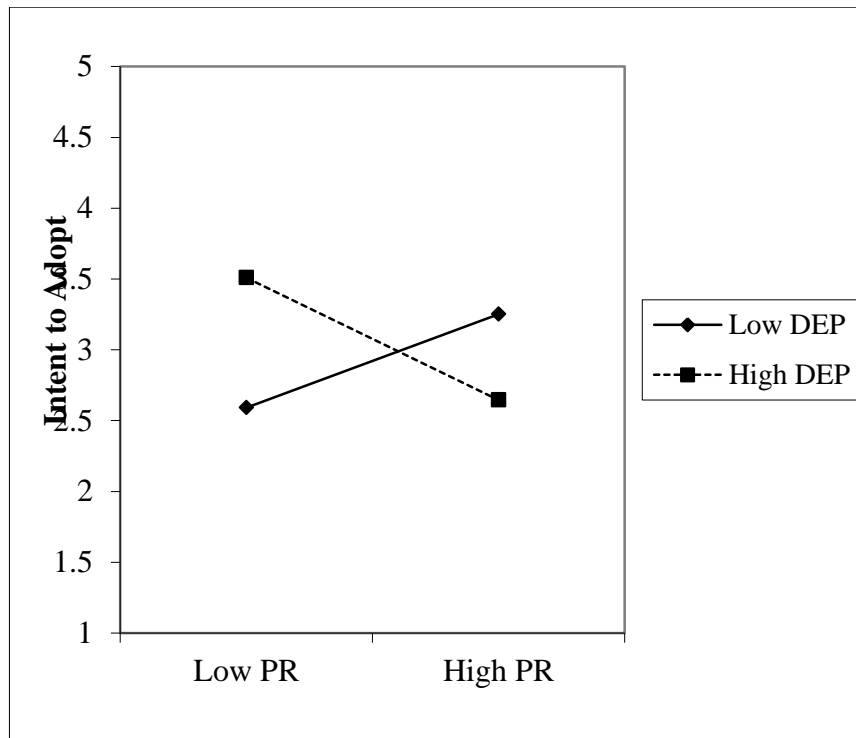
Figure 4. 10
The interaction effect between Competition Pressure (PR) and Dependency (DEP) in purchasing model.

4.3.2.2.1 The Effect Size of Interaction Effect

Testing interaction effects using PLS requires examination of the explanatory power of the model with and without moderators. To do so, Chin *et al*. (2010) suggest comparing the R² of interaction model with the R^2 of the main effects model. The change in R^2 is used to assess the overall effect size (f^2) for the interaction. According to the rule of thumb, f^2 value of 0.2, 0.15, and 0.35 have been suggested to be considered as small, moderate, and large effects, respectively (Cohen 1988).

The effect size test is presented in Table 4.13. For purchasing model, the interaction effect was found to have an effect size (f^2) of 0.49 which represents a large effect. On

236

the other hand, the interaction effect was found to have an effect size (f^2) of 0.22 in marketing model which represents a medium effect. Thus, it can be concluded that the model in which Dependency and Trust are proposed to moderate the links between TOE dimensions and intention to adopt B2B EC possesses a significantly higher explanatory power than the main model.

Table 4. 13
The Effect Size of Interaction Effect

	R^2 **Included**	R^2 **Excluded**	f^{2*} **Effect size**	**Effect size**
Purchasing model	0.441	0.165	0.49	large
Marketing model	0.606	0.517	0.22	Medium

*$f2$ = [R^2 (interaction effect model) − R^2 (main effect model)]/ [1 − R^2 (main effect model)].

4.3.2.3 Additional Analysis

A number of additional analyses were run to investigate an important issue in the data. The critical issue highlighted by the researcher is that a quite high percent of responses came from senior staffs and others (purchasing = 28%, marketing = 21.9%), although the target respondents of this study were from managerial level. To assess this issue, all the regressions were re-run by excluding all responses from senior staff and others. With regard to the main effect model, the results were, generally, very similar to those in Table 4.10. Full result of the analysis is presented in Appendix F. With regard to the interaction model, the results slightly changed from the regressions that include responses from senior staff and others. The main differences found were only among three interaction terms, particularly, in the purchasing model. These include the interaction terms between Dependency and each of Complexity, Competition Pressure, and Organization Readiness. Detail

237

results can be found in Appendix G. These interaction terms became no longer significant.

One of the possible reasons to explain differing results could be attributed to the sample size. When the researcher excludes senior staffs' and others' responses, the sample size became not large enough to effectively test many interactions at a time. Moderation interactions greatly increase the number of variables in the model. Therefore, when the sample size is an issue, the result would be more sensitive (Hair et al., 2014a).

To make sure that these modifications in results is not attributed to perception differences between the two groups and only due to sample size, the researcher first divided the responses into two groups; the first group incorporated all responses from senior staff and others, meanwhile, the second group combined all responses from managers. The researcher then executed independent sample t-test to compare the mean difference between the two groups of respondents on selected measurement items. The result showed insignificant differences between the two data set for almost in all measurement items (refers Appendices H and I for details).

4.3.2.4 Summary of Testing Hypotheses

Table 4.14 presents a summary of the results from the marketing and purchasing models. In the first step, the main effect has been tested separately without moderators. As indicated in the Table 4.14, the first hypothesis, that Relative Advantage would directly increase the extent of the intent to adopt B2B EC, was

238

supported for marketing sample but not for purchasing sample. The second hypothesis, that Compatibility would directly increase firms' intention to adopt B2B EC, was not supported in either the purchasing sample model or the marketing sample. The third hypothesis, that the extent of B2B EC Complexity directly decreases firms' intention to adopt B2B EC, was supported in both marketing and purchasing samples. The fourth hypothesis, that the extent of Organizational Readiness directly increases firms' intention to adopt B2B EC, was not supported at all in both samples. The fifth hypothesis, that the extent of Top Management Support directly increases firms' intention to adopt B2B EC, was supported by both samples. Lastly, the sixth hypothesis, that the extent of Competition pressure directly increases firms' intention to adopt B2B EC, was supported only by marketing samples.

With regard to the moderation effect of Trust and Dependency, the interaction model has been initiated. As shown in Table 4.15, the result has not confirmed the postulated hypotheses that Trust moderates the TOE dimensions. Consequently, all hypotheses with regard to the moderation effects of trust have been rejected. On the other hand, the moderation role of Dependency has also been examined. The result demonstrates that Dependency moderates the role of Complexity, Organizational Readiness, and Competition Pressure.

Table 4. 14

Summary of Hypotheses Testing (Main Effects Model)

		Marketing sample			Purchasing sample		
	Hypothesis statement (rephrased)	**Sign (+/-)**	**Sig**	**Decision**	**Sign (+/-)**	**Sig**	**Decision**
H1	Relative Advantage (RA) influences the Intention to adopt B2B EC positively	+	sig	Supported	+	ns	Not supported
H2	Compatibility (CB)) influences the Intention to adopt B2B EC positively	+	ns	Not supported	+	ns	Not supported
H3	Complexity (CX) influences the Intention to adopt B2B EC negatively	-	sig	Supported	-	sig	Supported
H4	Organizational Readiness (OR) influences the Intention to adopt B2B EC positively	-	ns	Not supported	-	ns	Not supported
H5	Top Management Support (TMS) influences the Intention to adopt B2B EC positively	+	sig	Supported	+	sig	Supported
H6	Competition Pressure (PR) influences the Intention to adopt B2B EC positively	+	sig	Supported	+	ns	Not supported

sig: significant, ns: not significant, (+) positive relationship, (-) negative relationship

Table 4. 15
Summary of hypotheses testing (interaction effects model)

		Marketing sample		Purchasing sample	
	Hypothesis statement (rephrased)	**Sig (+/-)**	**Decision**	**Sig (+/-)**	**Decision**
H7a	Trust moderates the relationship between Relative Advantage and Intention to adopt B2B EC positively	ns	Not supported	ns	Not supported
H7b	Trust moderates the relationship between Compatibility and Intention to adopt B2B EC positively	ns	Not supported	ns	Not supported
H7c	Trust moderates the relationship between Complexity and Intention to adopt B2B EC negatively	ns	Not supported	ns	Not supported
H7d	Trust moderates the relationship between Organizational Readiness and Intention to adopt B2B EC positively	ns	Not supported	ns	Not supported
H7e	Trust moderates the relationship between Top Management Support and Intention to adopt B2B EC positively	ns	Not supported	ns	Not supported
H7f	Trust moderates the relationship between Competition Pressure and Intention to adopt B2B EC positively	ns	Not supported	ns	Not supported
H8a	Dependency moderates the relationship between Relative Advantage and Intention to adopt B2B EC	ns	Not supported	ns	Not supported
H8b	Dependency moderates the relationship between Compatibility and Intention to adopt B2B EC	ns	Not supported	ns	Not supported
H8c	Dependency moderates the relationship between Complexity and Intention to adopt B2B EC	sig (+)	Supported	sig (-)	Supported
H8d	Dependency moderates the relationship between Organizational Readiness and Intention to adopt B2B EC	ns	Not supported	sig (+)	Supported
H8e	Dependency moderates the relationship between Top Management Support and Intention to adopt B2B EC	ns	Not supported	ns	Not supported
H8f	Dependency moderates the relationship between Competition Pressure and Intention to adopt B2B EC	ns	Not supported	sig (-)	Supported

sig: significant, ns: not significant, (+) positive relationship, (-) negative relationship

241

4.4 Summary of the Chapter

This chapter was designed to empirically achieve research objectives and to answer research questions. It starts by preparing the data for analysis. Descriptive analysis about the characteristics of the data follows next. The researcher then employed PLS approach to perform SEM. The measurement models have been examined to ensure the reliability and validity of the measurement model. Validity and reliability were satisfied with all the minimum requirements of the conventional rule of thumbs. Hypotheses testing have been tested and the findings confirm some of the theoretical expectations as predicted.

CHAPTER FIVE: DISCUSSIONS AND CONCLUSION

5.1 Introduction

This chapter deliberates on the results of the data analysis presented in Chapter Four. The first section 5.2 recapitulates this study. While section 5.3 discusses the fundamental findings from the hypotheses testing that are designed to answer the research questions and objectives. Section 5.4 presents and discusses the implications of this study from theoretical, methodological and practical points of view. Finally, the limitations of this study, suggestions for future research, and the concluding remarks are presented in Sections 5.5 and 5.6 respectively.

5.2 Recapitulation of Study

The unsatisfactory level of B2B EC adoption has entailed large volume of research to understand why, how, and when the adoption takes place. Whilst this stream of research has increased our understanding by identifying several determinants of the adoption of B2B EC, empirical evidences regarding these determinants have been found to be inconsistent. In attempting to understand the conflicting conclusions regarding the impact of these determinants, this study proposes three related objectives which are also reflected in three research questions namely; (1) what are the influences of technological, organizational and environmental factors on the firm's intent to adopt B2B EC, from marketing and purchasing perspective, (2) does dependency moderate the role of technological, organizational and environmental

factors on the firm's intent to adopt B2B EC, from marketing and purchasing perspectives, and (3) does trust moderate the role of technological, organizational and environmental factors on the firm's intent to adopt B2B EC, from marketing and purchasing perspectives.

Accordingly, the researcher has developed a theoretical framework grounded on the DOI and RDT theories and TOE framework. The variables involved in this study were grouped into technological, organizational, environmental and relational factors. Relative Advantage, Compatibility, and Complexity are the technological factors that determine the degree of B2B EC's appropriateness to a potential adopting entity. Meanwhile, Organization Readiness and Top Management Support are organizational factors that reflect firms' ability to adopt B2B EC. In addition, Competition Pressure is considered as an environmental factor that represents the extent to which firms face competition necessity to adopt B2B EC. Finally, Trust and Dependency exhibit the context of partners' relationship in which the B2B EC will be operated.

In the marketing channel literature, there is a consensus that the perception of purchasers and marketers regarding the joint action decision could differ (Corsten & Kumar, 2005; Roh, Whipple, & Boyer, 2013; Whipple *et al.*, 2015). Yet, in the extant literature, relatively less attention has been given to understand the differences between the two groups. In response, the proposed framework was designed to be tested from the perspectives of purchasing department and marketing department.

244

Since the research objectives are to examine the proposed framework from marketing and purchasing perspectives, the targeted population for this study comprised of firms with high level of supply chain activities at both downstream and upstream functions. Due to cultural considerations and the scattering nature of the targeted respondents in *Amman,* capital of Jordan, questionnaires were distributed by employing the self-administered survey through personal contacts. The total response rate was 30 percent.

All variables employed in this study have been validated to ensure their validity and reliability. The result shows satisfactory level of reliability and validity to perform further analysis. The researcher employed PLS-SEM approach to examine the specified relationship between research variables and the moderation effects related to Dependency and Trust. From marketing point of view, the results have shown that the effects of Relative Advantage, Complexity, Top Management Support, and Competition Pressure were supported while Compatibility and Organization Readiness were not. On the other hand, in purchasing side, the results have shown support only for the effects of Complexity and Top Management Support. With regard to the moderation effect of Trust and Dependency, the results have shown that Trust doesn't play any moderation effect in both model; marketing and purchasing model. Meanwhile, the moderation effect of dependency is partially supported. Next section discusses the results in more details.

5.3 Findings Discussion

This study was undertaken to explore the technological, organizational, and environmental determinants of firms' intention to adopt B2B EC from marketing and purchasing sides as well as to explore the moderation effect of Dependency and Trust on the specified relationships. The following subsections provide discussion of each of the issues concerned.

5.3.1   The Impact of Perceived Relative Advantage

This study was intended to determine the impact of perceived Relative Advantage on the intention to adopt B2B EC across marketing and purchasing sides. Consequently, along with the first research question, the result of data analysis shows that the role of perceived Relative Advantage is supported across marketing side but not across purchasing side.

With regard to marketing side, perceived Relative Advantage is found to have a significant positive relationship with intention to adopt. This result is in line with the prediction of DOI and several empirical studies (Chwelos *et al.*, 2001; Khalifa & Davison, 2006; Kuan & Chau, 2001; Lin, 2013a; Tarofder *et al.*, 2013) in which perceived Relative Advantage improves the firm's intention to adopt B2B EC. In this concern, this outcome concurred with the emphasizes of Ansari and Zajac (2010) and Rogers (2003) that the connection between the presumed economic benefits that result from the adoption of a practice and the likelihood of adoption is one of the most widely reported findings in the innovation diffusion literature. In

246

fact, potential adopters rationally behave and actively carry out cost-benefit analyses to build cognition about appropriateness of B2B EC. They will adopt B2B EC when it produces greater returns than the method used previously (Rogers, 2003; Tarofder *et al.*, 2013; Venkatesh & Bala, 2012; Yoon & George, 2013; Zhu *et al.*, 2006b).

However, contrary to expectations, the rationale mentioned above was not supported across purchasing sample, in which perceived Relative Advantage did not significantly influence the intention to adopt B2B EC. This outcome is not consistent with the prediction of DOI. Nevertheless, several empirical works have produced similar results (Chan & Chong, 2012a; Chong *et al.*, 2009a; Seyal & Rahman, 2003).

A possible alternate explanation for the insignificant role of perceived Relative Advantages in purchasing side is that adopting a new technology such as B2B EC is emerging and allowing for tighter links among strategic partners and has resulted in large amount of benefits. Despite these benefits, adoption of such technology could change the structure of existing relationship between trading partners (Nakayama, 2000; Nakayama, 2003). Indeed, buyer-supplier relationships are never at parity; there is always a power trade-off (Nakayama, 2000; Nakayama, 2003; Petersen, Handfield, Lawson, & Cousins, 2008). In most cases, buyer has more power advantages over the suppliers. Researchers have reported that shifts in power from buyer to supplier could be resulted from adopting B2B EC technology (Lonsdale, 2001; Nakayama, 2000; Nakayama, 2003). In one hand, adoption of B2B EC could lock the buyers in high IT-asset specificity, which in turn, limits the buyers' flexibility. This is because B2B EC requires a high level of investment in assets such as hardware, software, human resources, and others (Amit & Zott, 2001; Amit &

247

Zott, 2012; Chatterjee, 2013; Rai, 2014). On the other hand, adoption of B2B EC enhances the marketing capability of the suppliers and favors bargaining negotiations on their side (Nakayama, 2000, 2003).

These rationales offer two important insights. Firstly, although B2B EC provides significant economic benefits, the adoption of B2B EC can have negative repercussions on the relationship structure. Secondly, the benefits and risks of adopting B2B EC are not necessarily equal between purchasers and marketers. Therefore, it can be suggested that if adoption of B2B EC is perceived to threaten prevailing relationship structure between trading partners, it is more likely that firms will not adopt B2B EC and vice-versa. Examination of such rationale in future research could provide a valuable insight.

5.3.2 The Impact of Perceived Compatibility

Along with the first research question, the impact of perceived Compatibility has been compared between marketing and purchasing sides. The empirical result did not support the presumed influence of perceived Compatibility on the intention to adopt B2B EC in neither purchasing side nor marketing side. That is, perceived compatibility of B2B EC with operating environment of a firm was not associated with intention to adopt B2B EC. This finding is not in accordance with DOI's prediction, which predicts that greater fit and consistency between existing operating environment and the B2B EC increase the degree of achieving successful diffusion of B2B EC by way of reducing the modification and resistant effort (Rajaguru & Matanda, 2012; Rogers, 2003; Venkatesh & Bala, 2012; Wu & Chuang, 2009). In

248

fact, this prediction received considerable support by empirical research (Cao *et al.*, 2013b; Rajaguru & Matanda, 2012). Despite the fact that the result of this study is in contrast with the aforementioned prediction, it is in line with several works that reported insignificant role of perceived Compatibility in facilitating B2B EC adoption (Chan & Chong, 2012b; Chong *et al.*, 2009a).

A possible explanation could be derived from Institutional Theory to justify why perceived Compatibility has no significant influence on the intention to adopt B2B EC. Compatibility is defined as the degree to which adopting an innovation is consistent with existing operating environment of business, including work style, business culture, business strategy, and business operation (Karahanna *et al.*, 2006; Tornatzky & Klenin, 1982). This operational definition refers to operational Compatibility, which was adopted in this study and often across diffusion research (Karahanna *et al.*, 2006). This definition needs to be kept in mind in interpreting and understanding the results of this study. However, Institutional Theory emphasizes the critical role of innovation's Compatibility with social environment instead of the operational Compatibility (Ansari & Zajac, 2010; Karahanna *et al.*, 2006; Son & Benbasat, 2007; Teo *et al.*, 2003). It stresses that an innovation being operationally compatible with a potential adopter is not sufficient to ensure its adoption, particularly, when it is not socially acceptable and compatible (Ansari & Zajac, 2010; Tornatzky & Klenin, 1982; Van Slyke, Ilie, Lou, & Stafford, 2007). That is, when an innovation is highly complex and there is high uncertainty surrounding the innovation, as the B2B EC is, the potential adopter will be affected by social processes, norms and expectations to justify his adoption behavior (Angst, Agarwal, Sambamurthy, & Kelley, 2010; Ansari & Zajac, 2010; Tornatzky & Klenin, 1982).

249

Consequently, the operational Compatibility is inextricably bound up with the social Compatibility of innovation (Kshetri, 2010; Van Slyke *et al.*, 2007).

Therefore, it can be concluded that since B2B EC adoption in Jordan is not well institutionalized and is not widely adopted, the impact of perceived Compatibility was not highly significant. Furthermore, it is important to suggest that Compatibility is a multidimensional concept that should be defined at macro and micro level in future research.

5.3.3 The Impact of Perceived Complexity

The findings from the data analysis indicated that perceived complexity, in both sides (marketing and purchasing), is found to have a significant negative relationship with firms' intention to adopt B2B EC, and this is in support of H3. This result is consistent with the prior studies (Cao *et al.*, 2013b; Premkumar *et al.*, 1994; Ramdani *et al.*, 2013; Tarofder *et al.*, 2013), which indicate that raising perceived Complexity of B2B EC adoption erodes the firm's intention to adopt. The result of this study entails that as B2B EC is perceived as being difficult to use, the lower the intention of the firm to adopt is expected.

Although B2B EC may appear to be useful for a firm, it may not have the necessary technical know-how and expertise required to use it. A higher level of Complexity limits the firm's ability to easily integrate B2B EC within its marketing and purchasing activities. Furthermore, a higher level of Complexity involves an elevated level of uncertainty about successful Competition of B2B EC. This, in turn,

increases the level of risk perceived in the adoption (Premkumar & Roberts, 1999; Ramdani *et al.*, 2009). The result of this study, also confirms the wide beliefs that buyer and supplier express hesitation to adopt B2B EC, if the technology is difficult to understand, install, learn and use. Therefore, the easier to understand the technology, the faster and more immediately the adoption will take place and vice versa. In summary, Complexity of B2B EC constrains adoption, through the uncertainty resulting from a lack of understanding regarding the B2B EC's causal ambiguity. Due to this uncertainty, potential adopters will be likely to abstain from adopting B2B EC.

5.3.4 The Impact of Organizational Readiness

The first research question was also designed to examine the importance of Organization Readiness in understanding behavioral intentions regarding B2B EC adoption across marketing and purchasing sides. Organizational Readiness was operationalized as a multidimensional concept that expresses firm's ability to adopt B2B EC. Two measures were employed to determine the degree of firm readiness to adopt B2B EC, namely: IT sophistication and financial resources. Organizational Readiness, in both sides, was ascertained not to have any significant effect on firm' intention to adopt B2B EC, leaving prove to reject the proposed hypothesis. The present finding is not in accordance with the prior studies (Chwelos *et al.*, 2001; Rai *et al.*, 2009; Zhu & Kraemer, 2005; Zhu *et al.*, 2003) which reported positive link between Organizational Readiness and firm's intention to adopt B2B EC. Those studies have concluded that organization readiness as manifested by the widespread

use of IT (IT sophistication) and the availability of financial readiness would speed up the adoption process.

In this regard, one potential explanation for this unexpected relationship could be derived from the characteristics of the sample. The descriptive statistics of Years in Operation (Table 3.10) show that matured firms dominated the research responses. Matured firms are those whose structure, routine and resources have become institutionalized over time. Maturity is usually represented by greater size and age of firm (Dougherty & Hardy, 1996; Gilbert, 2005; Hannan, Pólos, & Carroll, 2003; Kim, Hongseok, & Swaminathan, 2006b). Gilbert (2005) and Mcelheran (2013) argue that matured firms have two types of inertia that limit their ability to exploit their resources and capabilities in acquiring new innovation. These include resource inertia and routine inertia. The former refers to firm's failure to change resource investment pattern, whereas, the later refers to failure to change the organizational processes that use those resource investments (Gilbert, 2005). Bala and Venkatesh (2007) suggest that if a firm does not have the willingness and/or abilities to overcome routine and resource rigidities, it is unlikely to adopt B2B EC. Moreover, even though firms have greater resources, they may be unwilling to mobilize resources for B2B EC adoption, because of factors such as tradition, culture, market success, and perceived performance loss (Bala & Venkatesh, 2007; Gilbert, 2005; Mcelheran, 2013; Venkatesh & Bala, 2012). The refusal to employ the technical and financial resources to invest in innovations that are perceived to interrupt current, successful organizational routines and status quo has been highlighted in prior research (Bala & Venkatesh, 2007; Gilbert, 2005). In other words, the important and significant role of Organizational Readiness on intention to adopt is contingent on

252

the firm willingness to overcome its rigidities and to mobilize its resources towards new innovation adoption.

5.3.5 The Impact of Top Management Support

The examination of Top Management' role was one of the interests of the first research question. The researcher examined the role of Top Management Support across the marketing and purchasing sides. The result indicates that Top Management Support across marketing and purchasing sample significantly and positively influences firm's intention to adopt B2B EC. In other words, more support from Top Management ensures strong tendency towards B2B EC adoption. The result is consistent with DOI and TOE prediction which suggests that to increase the adoption rate, strong Top Management Support is needed (Liang & Saraf, 2007; Premkumar *et al.*, 1994; Zheng *et al.*, 2013).

The result of this study confirms that understanding the importance of B2B EC by top management and the degree of their involvement in B2B EC would increase the firm's likelihood to adopt B2B EC. Top Management usually, has controls on the most of firm's resources (i.e. technical, financial, and human resources). It also ensures efficient allocation of the resources which is necessary for smooth adoption of B2B EC. Moreover, strong management support reduces the organizational resistance by creating the cultural values that support innovation adoption. This study's results confirm the findings of previous works a great deal (Ahmad *et al.*, 2014; Damanpour & Schneider, 2008; Elenkov *et al.*, 2005; Hameed & Counsell, 2012; Quinn, 1985; Ramdani *et al.*, 2013).

5.3.6   The Impact of Competition Pressure

This study was also designed to determine the impact of Competition Pressure on the intention to adopt B2B EC across marketing and purchasing sides. Along with the first research question, the result provides evidence that Competition Pressure plays a substantial role on the Intention to adopt B2B EC across marketing side but not across purchasing side.

With regard to marketing side, Competition Pressure is found to have a significant and positive relationship with intention to adopt. This result supports previous research findings (Chan & Chong, 2012a; Chong *et al.*, 2009a; Huang *et al.*, 2008; Ifinedo, 2011; Lin, 2013a), which reported that high Competition Pressures significantly influence intention to adopt B2B EC. This result is in line with the prediction of TOE. This empirical result demonstrates that, in order to match the requirements of the competition environment and to achieve performance improvements over competitors, firms should express more tendencies to adopt B2B EC. Competition encourage firms to offer faster responses to customer demands, shorter lead times, lower costs in uncertain and volatile environments, and a greater degree of customization. Indeed, B2B EC can help firms to do so.

However, in contrary to the expectations, the findings reveal that Competition Pressure did not contribute to Intention to Adopt B2B EC across purchasing side, in which Competition Pressure did not significantly influence the intention to adopt B2B EC in purchasing activities. The insignificant relationship between Competition

and intention to adopt B2B EC seems to contradict the predictions of the TOE framework. Nevertheless, several empirical researches have produced similar results (Ahmad *et al.*, 2014; Elia *et al.*, 2007; Iskandar *et al.*, 2001a; Jeon *et al.*, 2006; Ranganathan *et al.*, 2004). This interesting result warrants some explanation.

There are at least two possible explanations which are presented as follows. Firstly, in competition arena, adoption of B2B EC provides several efficiencies and coordination benefits to gain competitive advantages. Nevertheless, it is well established that adopting B2B EC would change the structure of relationship between trading partners. As adoption of B2B EC would entail asset specificity between trading partners, buyer will find itself locked-in to its supplier, as it will not want to write-off investments by revisiting the market. It may be very difficult for the buyer to revisit the supply market and appoint a new supplier once the B2B EC systems are initiated (Lonsdale, 2001; Nakayama, 2000; Nakayama, 2003). In other words, the bargaining power would shift from buyer to supplier as a result of adopting B2B EC. Therefore, a desire to avoid being locked-in to a particular relationship would reduce the buyer's response to Competition Pressure. Unfortunately, this study cannot make definitive judgments regarding this rationale with the data. Therefore, it is left to the ultimate resolution for further research.

Secondly, B2B EC focuses on managing firm's strategic supply chain partnership. And firm's overall portfolio is composed of relationships that may have different levels of importance (Ivens, Pardo, Salle, & Cova, 2009; Miocevic & Crnjak-karanovic, 2012). Facing high level of competition would lead firms initially to adopt B2B EC with the most key partner having to cope with competitive

255

environments, since the primary and ultimate goal of any supply chain system is to deliver value to the ultimate customer. However, B2B EC could be more critical to be initially adopted with key customer in an attempt to strengthen customer relationships. Nevertheless, since B2B EC in Jordan is still at early stage and the Jordanian market is a service/customer oriented one; Jordanian firms would initially put more priority on adopting B2B EC with their customers rather than their suppliers. From Jordanian context, Al-qirim (2010a) reported that the role of the environmental pressure on EC adoption was almost non-existence with the exception of pressure from suppliers. The empirical result of this study is consistent with such finding. In addition, there are many theoretical and empirical evidences suggesting that firms attempt initially to adopt IT innovations in their most important functions (Mohamad, 2012; Mohamad & Ismail, 2011; Mohamad & Ismail, 2012).

5.3.7 The Moderation Role of Trust

Along with the second research question, this study was designed to examine whether Trust moderates the drivers (TOE factors) of B2B EC adoption across marketing and purchasing sides. Trust was postulated to play an amplifier role on all specified relationships. That is, inter-organizational interactions rely heavily on a high level of trust (Kumar *et al.*, 1996; Sridharan & Simatupang, 2013). In such context, building a good buyer-supplier relationship is considered as a base for creating sophisticated inter-organizational technologies (Beth *et al.*, 2003; Chae *et al.*, 2005). Furthermore, adopting B2B EC is a resource-intensive process that involves considerable investment in terms of resources as well as changes in organization's processes and routines. A potential adopter will have the incentive to

256

invest in B2B EC, only if there is substantial degree of trust with a trading partner. Thus, any motivation to adopt B2B EC may not lead to adoption without the presence of trust.

The researcher created six interaction latent variables to examine the proposed interactions at marketing and purchasing sides. The researcher then used PLS-SEM to examine the proposed interactions. The results provided inadequate support on the moderation role of Trust from neither marketing side nor purchasing side. However, it is widely understood that trust is a very complex issue and many factors potentially influence trust in relationships (Dirks & Ferrin, 2001; Lai *et al.*, 2011; Li *et al.*, 2012; Shaw & Staples, 2004; Zaheer *et al.*, 1998). Accordingly, there is a lot of discussion and debate in the literature about the effects of trust and how it should be represented (Dirks & Ferrin, 2001; Shaw & Staples, 2004). With regard to the moderation role, the findings of this study are consistent with the recent work by Akter *et al.* (2011a) that the rationale behind the moderation power of trust is less pronounced. This is an interesting result, which needs alternative explanations.

Several scholars suggest that the need to trust is developed in response to outcomes of risk-taking (Kim, Ferrin, & Rao, 2008b; Mcknight, 2003; Pavlou, 2003). Some IS researchers define B2B EC as soft networks that mediate the existing practices between trading partners (Chae *et al.*, 2005; Sila, 2013). As trading partners involved in joint cost-reduction strategies using B2B EC (Chwelos *et al.*, 2001; Iskandar *et al.*, 2001a; Lin, 2013a), they experience lower levels of risk, because they are not sharing their tacit knowledge (Brunetto & Farr-wharton, 2007). Given the low level of risk in such case; it can be argued that the need for trust is at a minimum level.

257

Laaksonen *et al.* (2008), building on a case study, found support for the aforementioned argument. They illustrate how the importance of trust is interlinked and co-evolved in the course of different conditions related to buyer-supplier relationships.

Another alternative explanation could be derived from the nature of trust that needs long period of time to be established. Bower, Garber, and Watson (1997) argued that the past behavior of one party affects the present trust levels of the other party. The implication of this is that, advance level of trust is associated with well-established routine between trading partners. Zollo *et al.* (2002) and Bala and Venkatesh (2007, 2012) have developed the notion of inter-organizational routines, that are established patterns of collaboration among two parties developed and refined during repeated collaborations. Bala and Venkatesh (2007) argued that, despite the paybacks of changing routines by adopting B2B EC, managers may sense that changing to adopt B2B EC will cause a key disruption in current successful routines that are deeply embedded in their value system which is considered a source of success (Gilbert, 2005; Nelson & Winter, 1982). Therefore, as a high level of trust is associated with matured network between trading partners, firms in such context may have less abilities to absorb new technologies such as B2B EC.

5.3.8 The Moderation Role of Dependency

The last objective in this study together with the corresponding question is to examine the moderation role of dependency on all TOE factors across marketing and purchasing sides. In this study, the researcher defines Dependency as a situation,

when a firm is unable to replace or exchange a given partner, to find an alternative partner, and to achieve its goals if eventually the relationship is terminated (Bode, Wagner, Petersen, & Ellram, 2011). The researcher proposed two competing arguments regarding the moderation role of dependency. In the first view, dependency was suggested to play an amplifying role on TOE factors. This view was grounded on the idea that a high level of dependency entails uncertainty associated with the allocation of shared resources between trading partners. The more uncertainty a firm faces, the more information it needs to manage. As B2B EC is an inter-organization technology, it provides information processing capabilities that manage such uncertainty. Therefore, TOE as motivational variables, coupled with the serious need to mitigate uncertainty surrounding vital resources, encourages the dependent firm to adopt B2B EC. In the second view, dependency was proposed to play a mitigating role on the effect of TOE factors. This view was established based on the reasoning of RDT where a highly dependent firm has low level of power to implement its desire. As the TOE factors represent the B2B EC's drivers, a highly dependent firm is in a worse position to respond to those drivers due to the lack of power. Thus, high dependency would mitigate the influence of TOE factors.

To examine the two competing views of dependency across marketing and purchasing sides, the researcher created six interaction latent variables. The six variables were then tested using PLS bootstrapping procedure with 500 resamples. Since the interaction effects were non-directional ones, the results are evaluated on two-tailed test basis. In marketing side, with exception of complexity, the interaction effects were not significant. Meanwhile, three interaction effects were supported and

259

three were rejected across purchasing side. The following paragraphs discuss these results.

In purchasing side, the result support Hypothesis H8f, that increased levels of dependency would limit the firm response to the increased level of Competition Pressure. This result is in line with the second view of dependency. The finding suggests that a buyer with a high level of dependency in the relationship will have low propensity to adopt B2B as they are not able to cope with Competition Pressure. Indeed, at high levels of dependence, the buyer autonomy is at minimum. A response to Competition Pressure in an effective way requires some level of freedom and flexibility in decision making. Therefore, it is likely that at high level of dependency, the Competition pressure play insignificant role in motivating firms to adopt B2B EC.

Moreover, the results support the hypothesized interaction relationship between dependency and B2B EC's complexity. The finding indicates that a high level of dependency would increase the negative influence of Complexity on intention to adopt B2B EC. This is consistent with the second view of dependency, that is, as a high level of dependency decreases the firm's freedom of action and its managerial discretion, incorporating B2B EC into firm's activities would be more difficult and not easy to be undertaken. Greater degrees of dependency raise the requirement to take other participants into account when making individual decisions (Pfeffer & Salancik, 1978). Accordingly, the adoption efforts and difficulties would be increased. This is manifested by the increased need to demonstrate mutual benefit to partners when making individual decisions with potentially boundary-spanning

260

impact. Moreover, increasing dependency, lead to an increased importance in managing issues of information exchange and mutual knowledge (Cramton, 2001). This suggests that given the Complexity surrounding the adoption of B2B EC, firms need to have some levels of control over its actions and resources in order to adopt B2B EC with minimum difficulties.

In other respect, the hypothesized interaction relationship between dependency and Organizational Readiness had empirical support across the purchasing side. The result is parallel to the reasoning of the first view of dependency. That is, when a high level of dependency exists; Organizational Readiness and resources have more influence on firms' tendency to adopt B2B EC. This implies that the Organizational Readiness would not be conducive to B2B EC adoption, unless there is a serious need to adopt B2B EC such as the uncertainties inherited at high level of dependency. Therefore, a high level of Organizational Readiness coupled with a serious motivation (dependency) would lead to create a perception that firm's resources provide greater capability in dealing with uncertainty inherited in dependency. For instance, it may be that a firm has a great deal of IT sophistication and financial resources, but if these do not translate into a perception of efficacy, then the firm is less likely to adopt B2B EC. The result confirms that dependency creates serious need to utilize firm's resources in order to adopt B2B EC.

However, the role of dependency as a moderator was not supported by three independent variables on purchasing side, namely; Relative Advantage, Compatibility and Top Management Support. Neither the first view of dependency,

261

nor second view was able to describe the interaction effects between dependency and the aforementioned variables.

The reported results about dependency entail further important questions, namely; why does dependency in some relationships, such as its interaction with Organizational Readiness, play an amplifying role, whereas, it plays a mitigating role on other relationships such as its interaction with Competition Pressure and Complexity. And why does dependency play no interaction role on other relationships as postulated, such as its interaction with Relative Advantage, Compatibility, and Top Management Support. These interesting results about the moderating role of dependency are due to the fact that the concept of dependency is rather ambiguous and vague (Casciaro & Piskorski, 2005; Reimers *et al.*, 2010b).

Nevertheless, in order to answer these questions, the researcher develops an alternative view grounded on the findings of this study and the nature of underlining independent variables. Initially, the researcher suggests that both of the competing views of dependency would provide complement views rather than mutually exclusive. A closer look at the results of this study indicates that the low level of discretion (as suggested in the first view of dependency) is reflected by boosting the magnitude of adoption Complexity rather than other variables. Given Complexity is operationalized as the extent to which innovation is perceived as being difficult to understand and use, and it usually constitutes an inhibitor for innovation adoption, it would be more accurate to claim that Complexity captures the negative consequences of dependency. In a similar vein, while response to Competition Pressure requires more flexibility in decision making, the negative consequences of

262

dependency could play adverse effect by reducing ability of firms to cope with outside pressure originated from competition. On the other hand, the uncertainty inherited in high dependency (as suggested by the second view of Dependency) provides a necessitated justification and an interest to utilize and to mobilize the firm's resources and capability toward B2B EC adoption. Organizational Readiness is not simply conducive to B2B EC adoption without serious necessity to do so.

By understanding the role of dependency as described above, it would be more accurate to claim that dependency only moderates Complexity, Organizational Readiness, and Competition Pressure, rather than other independent variables. Those claims are supported by the result of this study. It appears that the moderation role of dependency, whether amplifying or mitigating other relationships is reliant on the nature of independent variables themselves.

In marketing side, however, only the interaction term between Complexity and Dependency is positive and significant, indicating that high level of Dependency diminishes the negative relationship between Complexity and firms' intention to Adopt B2B EC. The very high value of R^2 for model on the marketing side seems to indicate that the model captured high level of variance and strongly explain B2B EC adoption. This would suggest that marketing side is well motivated by those variables, and thus additional interaction would not explain too much of the phenomena. As mentioned earlier, since the Jordanian economy is more service/costumer oriented, firms put more emphasis and priorities to adopt B2B EC on marketing side to strengthen customer's relationships. This result is of a great

deal with findings by Al-qirim (2010a), that there is a considerable pressure to adopt B2B EC initiated by suppliers in Jordanian environment.

The results of the proposed model are discussed in this section, based on the grounded theories and the results of prior research. These findings have important theoretical and practical implications upon which more insights are given in the following section.

5.4 Research Implications

5.4.1 Theoretical Implications

Notwithstanding huge paybacks of B2B EC and governments' efforts to increase its adoption, B2B EC is adopted at minimum level. It has also been reported that many businesses face numerous difficulties to adopt B2B EC in reality and previous research in both information system and B2B channel have dealt primarily with the issue of what are the factors that motivate the adoption of B2B EC. Prior research has identified a number of factors related to organization characteristics, technological characteristics, and environmental forces. With regard to this, two important limitations have not been addressed in the literature, namely; (1) up to the researcher knowledge, there were limited studies attempting to explain the two sides of B2B EC including marketing and purchasing sides, (2) there is an underestimation to the role of relationship contextual factors and little consensus on how they should be incorporated into the adoption theories.

This study was designed to fill those important voids in B2B EC adoption literature by distinguishing the two sides of B2B EC and testing the TOE framework under the context of Trust and Dependency. By distinguishing the two sides of B2B, the objective was to deepen and differentiate our understanding of the determinants of B2B EC's diffusion. Meanwhile, testing the TOE framework under the context of Trust and Dependency was designed to capture the constraints and opportunities that may affect the meaning and occurrence of adoption behavior as well as functional association between underlining variables. Hence, incorporating Dependency and Trust as moderators into the TOE framework, makes our understanding of the relationship between TOE factors and adoption intention, more sensitive to the context of relationship between trading partners.

The results of this study are consistent with the prediction of TOE framework and DOI theory, although not all covariates are significant. This assessment particularly holds true for marketing side as it is indicated by the very high R-square. The findings of this study have confirmed that there are relatively small discrepancies between the two sides of B2B. These differences were mainly in terms of Relative Advantage and Competition Pressure. Purchasing side has perceived those variables as less important to drive their intention regarding B2B EC's adoption. The relatively low magnitude of R-square on purchase side, suggests that there are other considerations taken by buyer when they want to adopt B2B EC. This implies that such considerations could be the reasons behind the insignificant role of Relative Advantage and Competition Pressure. The result of this study further suggests that dependency is a significant moderator that explains the insignificant role of

265

Competition Pressure. And since this study has followed quantitative approach, the researcher was not able to identify other considerations. Future research could conduct a qualitative research to have in-depth understanding of the differences between the two sides of B2B EC. The leading implication from this result is that there is a necessity to discriminate between the two sides in future work dealing with the diffusion of B2B EC, because, dealing with B2B EC adoption in general without this differentiation could produce misleading results.

In addition, this study investigated whether trust beliefs shared between trading partners would moderate the influence of TOE factors. The study results did not find support for this proposition. One important implication from this result could target the ongoing debates regarding the role of trust; whether it has a direct effect or moderating effect on the organization behavior. The result provides earlier evidence that the moderation power of trust is less pronounced in the context of B2B EC's adoption. In addition, as trust has also received less empirical support in prior research as a driver of organization behavior, the researcher suggests the need to examine the mechanism by which trust can affect organization behavior. One suggestion for future research is to consider management beliefs as mediator for the influence of trust, given the fact that trust is formulated on interpersonal basis, and thus its influence is supposed to be on human beliefs rather than directly on organization behavior.

Furthermore, this study has integrated the causality of RDT with TOE framework and DOI theory. Specifically, this study investigated whether dependency would moderate the influence of TOE factors. The researcher has developed competing

266

hypotheses to test the validity of the two points of view of dependency as a moderator. The results partially confirm the contingency role of dependency, particularly on purchasing side. The result suggests that both points of views are working together rather than being mutually exclusive. Thus, the role of dependency could have negative and positive influence on the relevance of TOE factors. There are likely different scenarios regarding the role of dependency, where its effect was contingent on the nature of independent variables. Dependency has positive effect by creating a serious need that encourages firms to utilize their IT sophistication and financial resources in order to adopt B2B EC. Meanwhile, it increases the degree of adoption Complexity and decreases firm's ability to control and respond to external pressure. This study represents an initial attempt to explore some of these preliminary dynamics, and emerges with some important introductory elements for further study. Information system researchers could rely on this finding when they argue about dependency.

A closer look at the explained variance (R-square) of purchasing side model, suggests that Dependency and Trust boost the explained variance to be very strong. This finding suggests that buyer is greatly affected by relationship characteristics. Thus, researchers should focus on the nature of relationship characteristics in order to develop theoretical frameworks to reduce the difficulties inherent in the adoption process of B2B EC. This would also enhance our understanding regarding the underlining phenomena.

267

5.4.2   Practical Implications

This study has numerous important implications for managers and practitioners. From a managerial point of view, the empirical findings suggest that firms should pay great attention to their readiness to adopt B2B EC, and keep in mind that they should overcome several inertias in their resources to be effectively able to adopt B2B EC. Practically, this implies that those who are sought to increase B2B EC adoption, such as vendors and governments, may help change a firm's perception of their resources to one that carries greater efficacy.

In addition to Organizational Readiness, managers need to weigh the appropriateness of B2B EC to ascertain technological characteristics (e.g., Relative Advantage and complexity) as suggested by our empirical findings. This implies that managers should not be deceived by paybacks of B2B EC, unless they confirm that it is well understood and compatible with their operational business environment. Therefore, managers should be more proactive in evaluating B2B EC to make sure that B2B EC is an appropriate choice.

The results also seem to suggest that managers of B2B relationships should focus their attention on the nature of relationship with their supply chain partners, when planning to adopt B2B EC. Managers on marketing side should realize that business customers are more affected by characteristics of the relationship. They should focus on building strategies to minimize uncertainties inherent in high level of dependency. Moreover, as dependency increases the influence of adoption Complexity on purchasing side, managers on marketing side should provide

268

incentives and encouragements to their business customers in order to minimize the Complexity of B2B EC adoption. For instance, they can provide and share know-how expertise through training programs, and put more effort into assisting business customers, to develop their own capabilities to adopt B2B EC successfully. By doing so, they are likely to adopt and together to maximize their gains from using the B2B EC.

Another important implication arising from the findings is targeting the B2B EC vendors. Vendors are given an insight into factors that are significantly correlated with B2B EC adoption. Armed with such information, they can develop more efficient and effective promotion strategies for their B2B EC software. For instance, B2B EC vendors can put more of their attention on convincing top management about the potentials of B2B EC and how they can maximize their gains from using the B2B EC. Moreover, vendors can highlight numbers of adoptions among firm's rivals; at the same time, they can also present stories about firms that have successfully adopted B2B EC when emboldening adoption among potential adopting entities. Such efforts would serve the purpose of minimizing managerial uncertainty pertaining to the B2B EC. In addition, vendors can target predominant suppliers as they have control over their adoption decision and they are more orientated towards customers. Yet, software vendors should not neglect the dependent side of B2B EC. They should spend more effort on making alignment between both parties in order to accelerate the adoption process.

Finally, the result of this study provides useful understanding on how dependency structure, rather than acting as a catalyst for change, can also prevent change. This

suggests, the failure to adopt B2B EC seems to occur as a result of many predominant firms' inability to perceive B2B EC as useful or relevant to their business requirements. Equipped with this information, government should realize that failure to convince predominant firms to adopt B2B EC could have a negative impact on the overall adoption process and prevent the diffusion of B2B EC. Thus, in its efforts, government should not neglect the role of predominant firms and support weak firms, such as SMEs. Government should work together with predominate firms in order to accelerate the adoption. By doing so, predominant firms and its subsidiaries are likely to adopt B2B EC simultaneously, to maintain a pattern of consistent and compatible relationships. This effort is very important, particularly at initial stage of B2B EC diffusion. Once the diffusion reaches certain level of popularity, network effects would set in to speed up B2B EC diffusion.

5.5 Limitation and Future Research

No research is without limitations. Notwithstanding the implications of this study in understanding the B2B EC adoption, a number of limitations are acknowledged. This section presents the major limitations of this study which may also be fruitful for future research.

First, this study has focused on only two relationship characteristics between trading partners, namely; trust and dependency. Future research could explore the effects of other relationship characteristics such as partner commitments, relationship continuity, age of relationship, information sharing culture, interdependency and

270

other characteristics. In addition, this study investigated only limited number of technological, organizational, and environmental factors on firms' intent to adopt B2B EC. Future research may consider other independent variables as there is wide range of variables that can be investigated under each category (for details see Figure 2.4). Moreover, this study has tested the research propositions on the firms' intention to adopt. Future research should test the role of trust on post adoption behavior as it may be more important in that stage. Second, this study did not collect data on the role of partner readiness and how it affects the adoption behavior. It is suggested that partner readiness may play a moderating role on the motivational variables. One could argue that when a firm is motivated to adopt B2B EC, adoption of this technology would be contingent on the readiness of its counterpart.

Third, this study found that most of the adoption research relied on measuring firms' intention, which is operationalized as willingness to adopt. Literature from other disciplines reveal that intention has been operationalized in different ways, such as behavioral expectation (Warshaw & Davis, 1985) and planning (Conner, Sandberg, McMillan, & Higgins, 2006). Future research can utilize all of these approaches to provide new measures for adoption intention. Such measurements would increase the accuracy of measuring the intention to adopt and thus produce more accurate results.

Fourth, this study has used quantitative approach to study the differences between marketing and purchasing sides, which limit our understanding regarding the rationale behind these differences. In order to have an in-depth understanding of the differences between both sides, qualitative research could be adopted by future

271

researchers to provide deeper insight. Fifth, the study sample has relied on a list CCD database. Several sectors were represented in this sample. Replication of this study across specific industries, including services and manufacturing would also increase our understanding of the adoption issue. Moreover, the results of were obtained based on relatively small sample size. Using relatively large sample size and can help with the external validity and generalizability of the study.

Finally, this study followed the widest approaches to study the adoption behavior by identifying the influencing factors derived. Researchers can borrow insights from other literature. For instance, the contingencies suggested by Oliver (1991b) can be utilized to further understand the adoption of B2B EC. Oliver's framework suggests six types of contingencies that motivate firms to initiate intro-organization initiatives namely; Necessity, Asymmetry, Reciprocity, Efficiency, Stability, Legitimacy. These contingencies are interconnected and may overlay. The adoption literature on B2B EC does not appear to explore all the contingencies mentioned.

5.6 Concluding Remarks

With the proliferation of studies in recent years, a very large number of variables have been discussed in the literature to explain B2B EC adoption; resulting in a good deal of inconsistency in findings. In an effort to understand the conflicting conclusions regarding the impact of these variables, this study proposes two contingencies on the influence of TOE factors, namely: Trust and Dependency. In addition, this study investigates the differences and similarities in the two sides of

272

B2B EC with respect to the adoption determinants. The analysis of surveyed data showed that, marketing side and purchasing side do have slightly different views regarding the B2B EC determinants. This study has also revealed that increasing dependence asymmetries may lead to both negative and positive consequences. The moderating role of Trust, however, was less pronounced. It is our hope that the findings of this study contribute to a better understanding of the B2B EC.

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