INTERNET TECHNOLOGY FACTORS, QUALITY INFORMATION DELIVERY AND SUPPLY CHAIN INFORMATION PERFORMANCE IN MALAYSIAN MANUFACTURING COMPANIES

ABDULLAH YAHYA MOQBEL AHMED

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By

ABDULLAH YAHYA MOQBEL AHMED

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DEDICATION

To

my family

for the understanding and encouragement

they provided during all these years of study

Kolej Perniagaan
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ABSTRAK

Kualiti Penyampaian Maklumat ditakrifkan sebagai gelagat pengurusan dalam menyimpan dan mengagihkan maklumat bagi memastikan maklumat yang tepat diberikan kepada pelanggan dan pembekal pada masa, tempat, keadaani, kuantiti dan kos yang betul. Dimensi utama kualiti penyampaian maklumat dibangunkan daripada perspektif tingkah laku seperti ketepatan masa, persembahan yang konsisten dan kebolehakses. Dalam hal ini, kualiti penyampaian maklumat merujuk pada kejayaan pertukaran maklumat dalam talian yang menepati masa, yang boleh diakses, dan tekal untuk pelanggan dan pembekal.

Kajian ini melihat hubungan antara kualiti penyampaian maklumat (QID) dan prestasi rantaian bekalan maklumat (SCIP) dalam kalangan syarikat pembuatan di Malaysia. Kajian ini juga melihat pengaruh faktor teknologi Internet (ITF) terhadap kualiti penyampaian maklumat (QID). Seterusnya kajian ini menyiasat kesan perantara kualiti penyampaian maklumat dalam perhubungan antara faktor anteseden dan prestasi rantaian bekalan maklumat (SCIP). Sejumlah 151 syarikat pembuatan terlibat dalam kajian ini yang telah suka rela memberikan maklum balas terhadap soal selidik yang diedarkan. Hasil kajian mendapati kualiti penyampaian maklumat mempunyai kesan positif terhadap prestasi rantaian bekalan maklumat. Empat faktor penentu utama telah didapati memberi pengaruh signifikon terhadap kualiti penghantaran maklumat iaitu kolektif efikasi, komiten rantaian bekalan, sokongan pengurusan dan persepsi jaminan. Kualiti penyampaian maklumat didapati menjadi perantara sebahagian dalam *perhubungan antara sokongan pengurusan, komitmen rantaian bekalan, dan prestasi rantaian bekalan maklumat. Kajian ini seterusnya memberikan cadangan kepada industri, membincangkan limitasi kajian serta cadangan kajian yang perlu dilaksanakan pada masa hadapan.*

ABSTRACT

Quality Information delivery (QID) is defined as a managerial behavior in storing and distributing material to get the right information to the right customer, and supplier, at the right time, at the right place, in the right condition, in the right quantity, and at the right cost. The main dimensions of information quality delivery are developed from the behavior-based perspective such as timeliness, consistent representation and accessibility. In this manner QID refers to the success online information exchange in a timely, accessible and consistent fashion to both customers and suppliers.

This study examined the relationship between information quality delivery and supply chain information performance (SCIP) among Malaysian manufacturing companies. This study also investigated the influence of Internet technology factors (ITF) on QID. Last but not least, this study also examined the mediating effect of QID on the relationship between antecedent factors and supply chain information performance. A total of 151 manufacturing companies are involved in this study by voluntarily completing the survey questionnaires. The study's results indicated that QID has a positive influence on supply chain information performance. Four major antecedent factors i.e. collective efficacy, supply chain-commitment, management support and perceived security were found to have significant influence on QID. Quality Information Delivery partially mediates the relationship between management support, supply chain-commitment, and supply chain information performance. This research ends with the suggestion for the industry, discusses the limitations of the study and gives some suggestions for future research.

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ABBREVIATIONS

AMT	Advanced Manufacturing Technology
APS	Advanced Planning and Scheduling
ASPs	Application Service Providers
AVLS	Automotive Vehicle Location System
B2A	Business to Administration
B2B	Business-to-Business
B2C	Business-to-Customer
BI	Behavioral Intention
C2C	Customer to Customer
CBT	Computer Based Training
CCE	Computer Collective Efficacy
CE	Collective Efficacy
CORBA	Common Object Request Broker Architecture
CPFR	Collaborative Planning, Forecasting and Replenishment
CRM	Customer Relationship Management
CRP	Collaborative Replenishment Planning
CRP	Continuous Replenishment Program
CS	Customer Satisfaction
CSCMP	Council of Supply Chain Management Professional
CSFs	Critical Success Factors
CTT	Commitment Trust Theory
DCI	Development Composite Index
EDI	Electronic Data Interchange
EPC	Electronic Product Code
ERP	Enterprise Resource Planning
e-SCM	Electronic Supply Chain Management
FTP	File Transfer Protocol
GDP	Gross Domestic Product
GIF	Graphic Interchange Format
GSCF	Global Supply Chain Forum
GVU	Graphic, Visualization And Usability Center
HTML	Hypertext Markup Language
HTTP	Hyper Text Transfer Protocol
ICT	Information Communication Technology
IDC	International Data Corporation
IOS	Inter-Organization System
IS	Information System
ISPs	Internet Service Providers
IT	Information Technology
ITA	Information Technology Application
ITF	Internet Technology Factors
JIT	Just In Time

JPEG	Joint Photographic Expert Groups
LAN	Local Area Network
LBS	Location-Based Services
LMS	Learning Management System
LSQ	Logistics Services Quality
MCMC	Malaysian Communications and Multimedia Commission
MIMOS	Malaysian Institute of Microelectronics Systems
MIS	Management Information System
MITI	Ministry of International Trade And Industry
MNCs	Multinational Companies
MOSTI	Ministry of Science, Technology And Innovation
MPS	Manufacturing Participation Strategy
MRP	Material Requirements Planning
MS	Management Support
NIE	National Institute Of Education
OP	Organizational Performance
POS	Point Of Sale
PP	Perceived Privacy
PS	Perceived Security
PT	Perceived Trust
PU	Perceived Usefulness
QID	Quality Information Delivery
QID	Quality Information Delivery
RFID	Radio-Frequency Identification
ROI	Return On Investment
SC	Supply Chain
SCA	Supply Chain Analytics
SCC	Supply Chain Commitment
SCIP	Supply Chain Information Performance
SCM	Supply Chain Management
SCOR	Supply Chain Operations Reference
SCPS	Supply Chain Participation Strategy
SCT	Social Cognitive Theory
SIM	Supply Inventory Management
SIT	Social Influence Theory
SKMM	Suruhanjaya Komunikasi Dan Multimedia
SMEs	Small And Medium Enterprises
SMIDES	Small And Medium Industries Development Corporation
TAM	Technology Acceptance Model
TBP	Theory of Planned Behavior
TCP/IP	Transmission Control Protocol/Internet. Protocol
TIGeR	Technology, Industry and Government for The e-Economic Revolution
TQM	Total Quality Management
TRA	Theory Reason Action
TS	Technical Support
TSS	Training Supporting System

UTAUT	Unified Theory of Acceptance and Use Of Technology
VAN	Virtual Area Network
VMI	Vendor Management Inventory
WWW	World Wide Web
XML	Extensible Markup Language

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter contains eight parts which are: (i) background of study, (ii) statement of research problem, (iii) research objectives, (iv) research questions, (v) definition of key terms (vi), significant of study, and (vii) organization of remaining chapters

1.2 BACKGROUND OF THE STUDY

Global trade and partnership provide more opportunities for entrepreneurs economically and socially. Furthermore, this development has led to a new growing market that has spurred the volume of consumption, imports and production. This phenomenon subsequently increases a demand for and use of information (AIMD, 2008; World Bank, 2004). It is a fact that Information Communication Technology (ICT) assist companies to communicate faster and cheaper, increase productivity and save cost (Economist Intelligence Unit, 2007). In addition, the Internet technology plays a significant role by providing various types of services and applications to the firms and users at the same time (Person, 2005, p. 418).

Growing importance of using internet technology leads to make their applications highly commercial and widely accepted for all sorts of customers and suppliers relations such as advertising, brand building, and online buys and sells (Hyperdictionary, 2008). According to Internet World States update (2009a), on 30 June, 2009, the total population of the world is 6,767.8 million but Internet users are just 24.7% of the world population, which are 1,668.8 million. This means that a substantial number of the world population do not have access to the Internet (Kripanont, 2007). But in Malaysia, for example, the penetration rate is 59% more than the half of the world and for this Malaysia is ranked 34th in terms of Internet Penetration Rate in the world (Internet World Stats, 2009). This is because the Internet users in this country are 16.9 million of its total population of 28.3 million. There are many people in many countries, especially in developing countries that still have no chance to access the Internet. However, in Asia Malaysia ranked as the ninth of ten countries with highest number of Internet users, it gets 2.2 % and located after Pakistan and Thailand (Internet World state, 2008). On the other hand, it still needs more times and efforts to reach at the level of developed countries which have highest Internet penetration such as Greenland (92.3%), Netherlands (90.1%), and Norway (87.7%), or to reach to the countries that have highest number of the Internet user such as China (18.7%), United States (14.2%), and Japan (5.9%).

Data from Malaysian Communications and Multimedia Commission (SKMM) 2008, the Klang Valley contribution had the highest percentage of users, Selangor registered 27.2 percent while WP Kuala Lumpur 13.0 percent. Percentage share for the rest of the state has shown in following table 1.1

Table1.1

Level of Internet Access in Malaysia for 2008

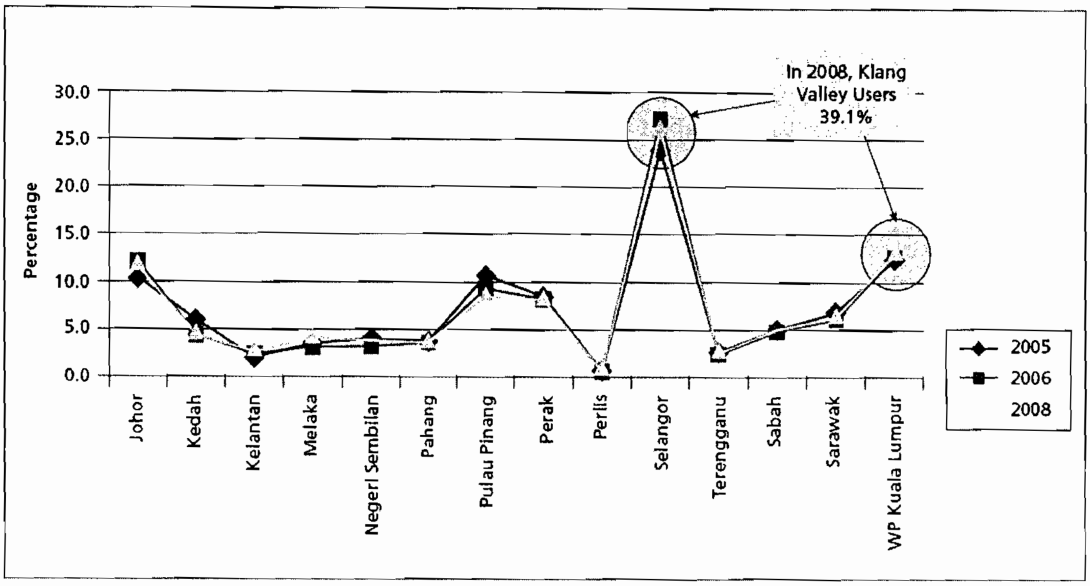
State of Residence	2005	2006	2008
Johor	10.4	12.1	11.6
Kedah	6.0	4.4	4.4
Kelantan	2.0	2.4	2.6
Melaka	3.5	3.1	4.1
Negeri Sembilan	4.0	3.2	3.8
Pahang	3.7	3.6	3.6
Pulau Pinang	10.7	9.3	8.4
Perak	8.5	8.2	8.1
Perlis	0.6	0.6	0.6
Selangor	23.9	27.2	26.1
Terengganu	2.6	2.4	2.5
Sabah	5.0	4.8	5.0
Serawak	6.8	6.1	6.3
WP Kuala Lumpur	12.4	12.6	13.0

Source: Household use of the Internet Survey, Malaysian Communications and Multimedia Commission, 2008, (SKMM, 2008).

A survey by the Malaysian Communications and Multimedia Commission in 2008 showed that 39.1% of the Internet access subscribers are in Klang Valley which contributed the highest percentage of users. Selangor registered 27.2 percent while WP Kuala Lumpur 13.0 percent. Percentage share for the rest of the states are shown in the figure below.

Figure 1.1

Shows percentage share of household user base when charted the distribution of users shows a consistent pattern through 2005 to 2008



Source: (SKMM, 2008)

The prediction of the Information Technology market in Malaysia increase from US $ 1.2 billion in 2007 to US $ 2 billion in 2012 with annual growth rate 11.1 percent (IDC, 2009). IDC also forecasted that, the percentage of business services will grow between 17 percent to 18 percent in 2009, and Malaysian IT spending estimated to grow in the percentage between around 4 to 5 % in 2009. Despite of increase IT investment in Malaysia, Malaysian business have been relatively slow in internet applications adoption (Alam, Khatibi, Ahmad, & Ismail, 2007). Moreover, Tarofder, Marthandan, and Haque, (2010) mentioned that the percentage of Malaysian firms that adopt information technology in their daily operation is low, which reflects the poor of exchange information among these companies.

The Internet has become as a gate way for organizations to re-evaluate their operations when they exchange and use information (Power, Sohal, & Rahman, 2001). McCormack and Kasper (2002) highlighted that Internet usage strongly extends outward suppliers to share forecasting planning and scheduling information. They added that the digital technology is used to obtain information about customers and suppliers, and to arrange special interaction data such as usage, forecasts, complaints or other order performance data.

A comparing study between Singapore and Malaysian conducted by Khadaroo (2005) in multimedia software such as methods such as audio, video, graphic and imaging technology in term of acceptability and quality of these applications to delivering the reporting information between their companies, found that only 25 per cent of Singaporean and Malaysian companies are selling their product and service online. Thus, Khadaroo (2005) stated that full e-commerce potential of these companies not yet fully realized, and directed for further research among firms of these countries to advance level of information quality based on the Web- based reporting and information disclosed. Furthermore, Russell (2007) suggested that supply chain information system required integrated business process among players up and down a supply chain, and sharing of business plans, real time inventory and demand information to improve coordination of manufacturing scheduling in SC. For instance, real time visibility on inventory quantity and allocation, collaboration the process, and shared data foster flexible and responsive management for customer orders across global supply chains also improve performance level of supply chain information system (Russell, 2007). Given the above discussion, it is apparent that an investigation into quality information delivery in supply chain performance among manufacturing sectors is warranted.

Within the context of supply chain, quality information delivery refers to managerial behaviour in providing the right information about storage and distribution of material to the right customers, and suppliers, at the right time, at the right place, in the right condition, in the right quantity, at the right cost (Russell, 2007). Most organizations lack information about various operations and administration systems, and this consequently affects the delivery of information to other organizations (manufacturing) and people who mostly need it (Scheer, Theling, & Loos, 2002).

Despite many studies on information flow process within supply chains over the Internet, a complete understanding of the process and its antecedents and consequences is presently lacking (Li & Lin, 2006; Madlberger, 2008; Mentzer, Min, & Zacharia, 2000; Moberg, Cutler, Gross, & Speh, 2002). Little is known regarding the underlying internet technology factors that influence information sharing and information quality (Chang & Tung, 2008; Lippert, 2005; Masrek, Abdul Karim, & Hussein, 2007; McKnight, Choudhury, & Kacmar, 2002; Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Seddon & et Kiew, 1994), and how quality information delivery impact the supply chain information performance (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006; Lin, Chow, Madu, Kuei, & Yu, 2005; Xiao-feng, 2007). As such, many have called for further empirical research in this area (Cagliano, Caniato, & Spina, 2003; Forslund & Jonsson, 2007; Frohlich & Westbrook, 2002; Hsu & Chen, 2004; Skjøtt-Larsen, Kotzab, & Grieger, 2003; Williams, Esper, & Ozmet, 2002).

1.3 PROBLEM STATEMENT

In the 8^{th} and 9^{th} Malaysian Plan, the Malaysian government had taken a proactive approach to put up shutters in the issue of digital divide. The government tried helping firms to adopt the ICT to communicate faster and cheaper, increase productivity and save cost. By doing so, companies can have electronic global supply networks (Economist Intelligence Unit, 2007).

The 2002 budget granted RM5 million for the development of RosettaNet, an internationally standardized supply-chain-management platform, and extended income tax deductions for expenses incurred to implement it in Malaysia (Economist Intelligence Unit, 2007). This adoption of RosettaNet standards by local manufacturers of components and parts has enabled them to interact with their partners around the world, coordinate business activities and share real time information, besides reducing inventory cost (BusinessDictionary, 2010).

Many managers believe that Internet can enhance SCM decision making by providing on real time information and enabling collaboration between trading partners (Gimènez & Louren, 2003). In SCM, information quality will improve the level of operation performance by enhancing firms's flexibility, reducing lead time in production, forecasting accuracy, resource planning, cost saving and reducing inventory level (Bayraktar, Tatoglu, & Zaim, 2007; Zain, Rose, Abdullah, & Masrom, 2005). Meixell (2006) concluded that further research can explore alternative applications which improve web reliability in communication with suppliers to improve SC performance. With high level of e-SCM performance, manufacturing companies will get accurate information from the right suppliers to the right customers or vice versa at the right time. Unfortunately, empirical studies on information quality delivery over internet application particularly in the Malaysian manufacturing companies have been less than encouraging. Therefore, empirical work needs to overcome on this shortcoming.

Moreover, the Malaysian Communications and Multimedia Commission (MCMC) which agency of the Ministry of Science, Technology and innovations aims to regulate the industry, ensure internet services are available to the public at low-cost, and develop relevant infrastructure and promote Malaysia as a regional information-technology (IT) hub (Economist Intelligence Unit, 2007). Moreover, in 2004 RosettaNet launched control engineering centre in Northern Region in Penang, and focuses on standards engineering and implementation support throughout the region (Economist Intelligence Unit, 2007). A number of B2B Internet hubs have emerged mostly centred on specific industries. Tradenex.com, the B2B electronic marketplace of the Federation of Malaysian Manufacturers, had enrolled more than 28 different sectors by April 2006. Tradenex also takes part in the TIGeR (Technology, Industry and Government for the e-Economic Revolution) plan to link Malaysian companies to global buyers and to roll out secure e-commerce services to manufacturing companies (BusinessDictionary, 2010).

However, a survey conducted by Suruhanjaya Komunikasi dan Multimedia in 2008 to determine the purpose of online visits by subscribers discovered that the main purposes of online visits among subscribers were to get information (94.4 percent) and to communicate (84.7 percent). This was followed by education purpose (64.5 percent) and leisure (63.5 percent). No more than 31.8 percent used internet for e-banking while 29.2 percent accessed public service website. However, only 19.8 percent engaged in e-government transactions and 5.9 percent of users did online stock trading. As e-trading is concerned, with the reported usage of 5.9 percent, it indicates that the usage of internet in business between Malaysian firms still not encouraging as appear in Table 1.2.

Table 1.2

Show activities of using Internet

	Percentage share of household user base		
Internet usage	2005	2006	2007
Getting information	40.5	84.5	94.4
Communications by text	99.6	80.7	84.7
Leisure	47.1	52.7	63.5
Education	46.8	45.9	64.5
Financial activities	14.6	23.6	31.8
Public services	12.7	12.0	29.2
e-Government transactions	-	-	19.8
Online stock trading	-	-	5.9
Others	1.3	0.2	0.7

Source: (SKMM, 2008)

Liu and Chen, 2008 mentioned that the key problem as to why millions of dollar is wasted by the organizations through heavy invested in the information technologies that have never been used. Furthermore, Zain, Rose, Abdullah, and Masrom, (2005) show that even though information technology strongly influences performance of industries in Malaysia, not much attention is paid to study the impact variables of IT adoption such as ease of use and usefulness on organizational performance. Despite the complimentary policies and infrastructures in Malaysia, technology acceptance is not as high as expected and this affects adoption of new technology (Ramayah, Chin, Norazah, & Amlus, 2005).

Moreover, few of the research investigated perceived ease of use or usefulness as organizational factor which depend on the behaviour of the company as user (Ortega, Martínez, & Hoyos, 2007).

In addition to that, usefulness of information technology contributes to assisting supply chain partners to perform their task perfectly, and to proceeding adoption of IT in their organization. Therefore, Seddon and Kiew (1996) and Cheng and Wang, (2009) have suggested that future research should study the impact of perceived usefulness on the information system and information quality from organizational perspective toward supply chain performance in the context of B2B such as e-SCM.

Even though online applications provide channels for searching information of products and services, firms still worry a bout the security of transmitting credit card information via net (Bhatnagar, Misra, & Rao, 2000; Li & Huang, 2009).This is because attackers can still reach the infrastructure of SC partners and disrupt their business operations and functions because the lack of security programming (Sheu, Lee, & Niehoff, 2006). In addition to that, many customers worry that companies will use their information for marketing and other secondary purposes without their permission (Painea, Reipsb, Stiegerc, Joinsona, & Buchanan, 2007; US Public Interest Research Group, 2000). Besides privacy and security, perceived trust is critical role in creating outcome expectation and improve information quality over online transaction between sellers and customers (Ryssel, Ritter, & Gemünden, 2004; Yousafazi, Pllister, & Foxall, 2003). Fore these reasons and others Pikkarainen, Pikkarainen, Karjaloto, and Pahnila (2004) called further research between the organizations that use Internet in financial transactions, and to establish a correlation between multidimensional constructs (perceived privacy, perceived security, and perceived trust).

On the other hand, by advancing the collective efficacy (capabilities and skills to operate computer and internet) of supply chain partners, firms will achieve their goals in limited time. Likewise, collective efficacy helps managers in manufacturing sectors in Malaysia to understand what makes employees perform in their job (Mahyuddin et al., 2006). Additionally, expected behaviour from collective efficacy to supply chain partners leads to accumulates various types of efforts which make behaviour of sharing information more accurate update, and have high level of data quality during information exchange between SC partners (Carroll, Rosson, , & Zhou, 2005). Recently, there has been growing interest in examining the role of collective efficacy in affecting performance and expectation outcomes such as quality in sharing information between supplier and customers (Carroll, Rosson, & Zhou, 2005; Eastin & LaRose, 2000; Hodges & Carron, 1992; Pang & Cai, 2008).

As research has been shown groups with a strong sense of collective efficacy have bracing effect on group members, and enforce their commitment to the organization (Walumbwa, Wang, Lawler, & Shi, 2004). The term commitment includes trusting the partners with shared information, proprietary information and other sensitive information that affects overall supply chain performance (Li & Lin, 2006). While few address the role of commitment in e-commerce particularly in supply chain management context (Ambrose, & Fynes, 2006).

Several studies have investigated the role of management support (technical support and non-technical support) as part of Information technology factors that influence on the online quality of sharing information between the firms (Abdul Karim, & Hasan, 2007; carried out Venkatesh, Morris, Davis, & Davis, 2003; Li & Lin, 2006) carried out). However, research is limited on how this support influence on quality information delivery in the SC context (Madlberger, 2008).

Furthermore, Li and Lin (2006) recommended that future research should apply suitable theories to explain the causal relationship among antecedents of information sharing and information quality such as trust, commitment and shared vision between supply chain partners and IT enablers. Lippert (2005) argued that TAM has been empirically validated by research in a variety of settings but with limited application in SCM. Nevertheless, the research theoretical model is Unified Theory of Acceptance and Use of Technology (UTAUT), which formulated with four core determinants of intention and usage which are performance expectancy, effort expectancy, social influence, and facilities conditions (Venkatesh, Morris, Davis, & Davis, 2003). Based on the previous research this study investigated the internet technology factors which are usefulness, perceived security, trust, privacy , SC commitment, and management support as determination of intention to sharing information and their influencing in actual behaviour which is supply chain information performance (Atallah, Elmongui, Deshpande, & Schwarz, 2003; Lippert, 2005; Staw, 1976; Shin, Coller, and Wilson 2000; Venkatesh, Morris, Davis, & Davis, 2003; Uzoka, 2008; Xu, Gupta, and Shi, 2009).

Behavioural intention consists of word of mouth communication, purchase intention and continued interaction (Morgan & Hunt, 1994). Based on that, behavioral intention can be achieved through contacting by internet applications. Moreover, the quality usage of the system is impacted by actual ability and attitude (Autzen, 2007).

Even though, some users have negative attitude towards usage behavior, they can be enforced by their superiors to use the system. Therefore, their attitude will impact their usage quality and thereby implementation success (Autzen, 2007). In this study the antecedent variables which are: perceived usefulness, Supply Chain commitment and collective efficacy reflect the actual capability and ability of Internet application users in the manufacturing companies, and affect on quality information delivery and consequently success supply chain system implementation.

To date, the majority of studies on quality information delivery conducted in the West countries, have focused in Internet technology acceptance factors such as perceived trust, privacy, security, commitment, management support and technical support in banking adoption, industrial buyers- sellers relationships, telecommunication industry (Li & Lin, 2006; Luhmann, 1988; McKnight, Chervany, 2002; Schurr, & Ozanne, 1985; Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Xu, Gupta, & Shi, 2009). However, findings of these studies in many cases have produced very mixed results (Li & Lin, 2006). This leads to the conclusion that the factors that influence quality information delivery may not be generalized to the manufacturing sector and tend to be industry specific (Li & Lin, 2006; Pikkarainen, Pikkarainen, Karjaloto, & Pahnila, 2004).

Furthermore, little systematic effort has been devoted to understanding the underlying factors by which quality information could be developed at the organizations by their employees (Li & Lin, 2006; Madlberger, 2008; Venkatesh, Davis, & Davis, 2003). Most studies conducted tend to focus on the impact of information quality on competitive advantage (Lin & Tseng, 2006), firms performance (Byrd & Davidson, 2003), market performance (Byrd & Davidson, 2003; Li, Ragu-Nathan, Ragu-Nathan, &

Rao, 2006), purchasing performance (Hemsworth, Sánchez-Rodríguez, & Bidgood, 2005), SC practices (Zhou & Benton, 2007), and customer satisfaction level (Zain, Rose, Abdullah, & Masrom, 2005). As far as performance of supply chain information is concerned, there is still no clear understanding of the impact of quality information delivery on SC performance, particularly in the manufacturing sector (Forslund & Jonsson, 2007; Lippert, 2005; Lee, Strong, Wang,2002). Beside that, manufacturing companies get more supportive from the government policies through market-oriented economy (with a strong emphasis on k-economy), it contribute to made Malaysia a highly competitive manufacturing and export base by adoption IT (Zain, Rose, Abdullah, and Masrom, 2005). Zain, Rose, Abdullah, and Masrom, (2005) added that use IT will make the operation more efficient and increase innovation market to the market pace and increase the profitability of the firms.

In many conditions, sharing information and quality information mediates the relationship between antecedent factors and supply chain information performance. McDowell and Karrike (2008), and Yu, Yan, and Cheng (2001) confirmed the mediating effect of quality in sharing information in the relationship between trust and firm performance. They demonstrate that trust in the technology led to the adoption of information technology. In 2009 Amoroso and Hunsinger confirmed an indirect relationship between perceived ease of use and usefulness on the actual system use through behaviour intention to use the Internet.

In different study Hsu, Chen, Chiu and Ju, (2006) confirmed that outcome expectation of interactions and information sharing among teamwork in computer software learning can be consider as a mediator between team's collective efficacy and its performance. In 2005, another empirical research by Hemsworth, Sánchez-Rodríguez, and Bidgood confirmed the mediating effect of information system practices between quality management practices (supplier quality management, personnel management, cross-functional coordination, management commitment, and benchmarking) and purchasing performance. Eng (2006) found that organizational norms and SCM performance are mediated by cross-functional coordination. Based on these research findings, the present research proposes that quality information delivery acts as a mediator in the research model.

Consequently, the problem that this research seeks is to explicate an empirical understanding of the factors affecting the quality information delivery in supply chain management. This study tries to fill a knowledge gap about internet technology in supply chain management in Malaysia, and aims to identify the factors that are important exchange information of internet technology in supply chain management. Moreover, the study investigated the relationship between quality information delivery and supply chain information, and it examined whether quality information delivery plays a mediating role between internet technology factors and supply chain information performance.

1.4 RESEARCH QUESTIONS

Based on the research background, foregoing literature, this study seeks to address the following research questions:

1. What is the level of quality information delivery amongst manufacturing companies in Malaysia?

2. Does quality information delivery (QID) of manufacturing impact performance of supply chain information?
3. What are the Internet Technology factors that influence SCI performance based on shared information with suppliers and customers?
4. Is there any mediating effect of quality information delivery (QID) on the relationship between Internet Technology factors towards SCI performance?

1.5 RESEARCH OBJECTIVES

The general purpose of this research is to investigate the antecedents and consequences of quality information delivery in the context of supply chain management performance. The specific objectives of this research are:

1. To determine the level of quality information delivery performed by manufacturing companies in Peninsular Malaysia.
2. To investigate the relationship between quality information delivery and supply chain information performance.
3. To identify the underlying Internet Technology factors that may influence supply chain information performance to share information.
4. To investigate the mediating effect of quality information delivery (QID) on the relationship between Internet Technology factors towards SCI performance.

1.6 DEFINITION OF KEY TERMS

Some important terms appearing repeatedly in this study are briefly defined as follows:

1. Manufacturing is defined as the business of using machines, raw materials, tools and labour to make thing for use and sale as customer's expectations (BusinessDictionary, 2010).
2. Malaysians manufacturing sector consists of companies in various types of industries such as basic metal, electric and electronic, transport, and food, who are members of the Federation of Malaysian Manufacturers (FMM), achieved high a growth percentage rate, shared to increase GDP, and continued contribute significantly in output growth, exports and employment to face the increasing of the international competitive (MIDA, 2008).
3. Supply Chain Management (SCM) is a process of flow of goods, service, and information from original suppliers to the final customers to reduce system-wide cost, raise the value to end consumer and to increase profit for each channel (Sahin & Robinson, 2002; Simchi-Levi & Simch-Levi 1999; Stock & Boyer, 2009).
4. Electronic Supply Chain Management (e-SCM) is a system that emphasizes to create Internet enable links and optimize information and products flow among the process and business partners within a supply chain (Brien & Marakas, 2008; Charless, Poirier, & Baver, 2002).
5. Supply Chain Information Performance (SCIP) is defined as an exchange of accurate information between supply chain partners to improve decision making of supply chain partners related to ordering, production/materials planning, and capacity allocation, to enable the supply chain as a whole to reduce costs and

respond more quickly to end consumer demand (Legner & Schemm, 2008; Sun & Yen, 2005).

6. Quality Information Delivery (QID) on supply chain is defined as a managerial behaviour by using Internet as a media to deliver the right information to the right customer, and supplier, at the right time, at the right place, in the right condition, in the right quantity, at the right cost (Russell, 2007).

7. Internet is an enormous electronic communication around the world that connects many people in governments, schools, universities, or to link amongst organizations by using Internet software and TCP/ IP protocol so that exchange of information can be made very smoothly (Richard, et al., 2001, p. G-9).

8. Internet technology is defined as applications and services which include the whole software, tools, process, systems through all SCM transaction of business activities such as sales, purchasing, business or non business activities. It is also used to solve problems and increase organization performance (Lancioni, Schau, & Smith, 2003; Person, 2005; Ruppel, 2004; Rahman; 2004).

9. Perceived usefulness refers to the belief that using a particular Internet application can enhance one's job related productivity, performance and effectiveness (i.e. reduce time to accomplish a task or provide timely information) (Mathwick, Malhotra, & Rigdon, 2002; Venkatesh, Morris, Davis, & Davis, 2003).

10. Perceived security refers to the requirements of protection by prohibiting disclosure about any of the important information, disallowing infringement to the information systems used during communication between SCM partnerships, and forbidding

attackers from disrupting SC partners' business operations (Sheu, Lee, & Niehoff, 2006; Lallmahamood, 2007).

11. Perceived privacy refers to the claim of supply chain partners to determine when, how, and to what extent, information about them is communicated to others in an online environment (Agranoff, 1991; Lallmahamood, 2007; Westin, 1967).

12. Perceived of trust refers to supply chain partners' beliefs about the ability, benevolence, integrity, and predictability of organization applications during online transaction (Wu, Chiag, Wu, & Tu, 2004).

13. Collective efficacy refers to organization members' judgment of their capabilities or abilities to perform exacting behaviour, share capacities and collaborative activities in field of information system (Carroll, Rosson, & Zhou, 2005; Hsu, Chen, Chiu, & Ju, 2007; Little & Madigan, 1997).

14. Supply chain-commitement defined as trusting the partners with shared information, proprietary information and other sensitive information that affects overall supply chain performance (Li & Lin, 2006).

15. Management supports refers to managers recognizing the importance of using Internet application to have quality information sharing with supply chain partners, and provide sufficient resources, and make a right decisions to support that (Igbaria, Guimaraes, & Davis, 1995; Li & Lin, 2006).

16. Technical support refers to various types of assistance that provide information centre to improve user's skill in terms of Internet operations and supply chain systems (Dyer, Cho, & Chu, 1988; Igbaria, 1993; Moyaux, Chaib-draa, & D'Amours, 2006).

1.7 SIGNIFICANCE OF THE STUDY

This study expects to contribute to the theoretical, methodological and practical use of quality information delivery toward supply chain information performance in manufacturing sectors in Peninsular Malaysia.

From the theoretical perspective, the contributions of the present study are as follows:

1. Theoretically, while behavioural intention consists of mouth communication, purchase intention and continued interaction (Morgan & Hunt, 1994), limited literature has investigated intention to deliver the information to others due to quality information sharing. Moreover, Lippert (2005) argued that TAM has limited application in SCM practices. Previous researchers highlighted that empirical study on the understanding the antecedents of information quality delivery is lacking in the context of supply chain. In recognition of the need to bridge these gaps in knowledge pertaining to quality information delivery, this study contributes to the body of literature by responding to the need for empirical research on the antecedent of information sharing and to validate the previous findings in supply chain information environment (Li & Lin, 2006; Madlberger, 2008; Mentzer, Min, & Zacharia, 2000; Moberg, Cutler, Gross, & Speh, 2002).

2. Previous researchers using United Theory of Acceptance and Use of Technology (UTAUT) concluded that further research should link between acceptance and organization usage outcomes, and effect of information technology on productivity and other performance-oriented constructs (Venkatesh, Davis, & Davis, 2003).

However, to our knowledge, there is no single study that has simultaneously investigated factors from each of the above domains and built a multivariate model of quality information delivery in the supply chain context. The unique contribution of this study in our opinion is that, we assess the relative influence internet technology factors usefulness, security, privacy, trust, collective efficacy, SC-commitment, technical support and management support factors by including them simultaneously in one model with Quality information delivery. Simultaneously inclusion of antecedent variables provide information on their relative utility elicit higher quality information delivery.

3. Despite many interesting studies of information flow process within supply chain, they do not empirically address the critical issue of the impact of quality information delivery on supply chain information performance (Lee, Strong, & Wang, 2002). A better understanding on the impact of quality information delivery on supply chain performance in the manufacturing industry should give a clearer theoretical perspective on the nature that affects information sharing in supply chain environment, especially in Malaysia where ICT is rapidly growing and this provides a good infrastructure for information quality in e-SCM.

4. It is held that quality of usage as a manner of usage behaviour to success of IT implementation is influenced by actual ability/knowledge (Autzen, 2007). Therefore, the antecedent variables such as perceived usefulness, supply chain commitment, collective efficacy, reflect the level of actual ability and knowledge of Internet applications users, whereas management support and technical support

affect on their actual abilities and knowledge. Toward this end, the present research to study the situation when quality of usage is mandatory, where other research assumed that usage (quantity) and voluntary (Hartwick & Barki 1994).Therefore, this study address this gap by examining the ability and capability of Internet factors as the antecedents of behavioural intentions which is quality of usage in the context of supply chain information performance.

5. Furthermore, Eng (2006) suggested that the scope of sharing information in SCM should be replicated in similar contexts as firms in the U.K., and with variety of industries, and from multiple respondents in SCM .On other hand, other research studied the effect of Internet technology constructs such as efficacy, trust, privacy, security on the behaviour intention in other countries like United State and in Finland (Amoroso & Cheney, 1991; Li & Lin, 2006; Pikkarainen, Pikkarainen, Karjaloto, & Pahnila, 2004; Yi & Hwang, 2003). However, they recommended that further research should be expanded in other countries, in different context, and with other characteristics group of respondents. The present study attempts to contribute to the expanding research stream by considering the Malaysian perspective. It is important to investigate this issue in the Malaysian manufacturing sectors to validate the Western findings in a different context (Zaitun, & Crump, 2005).

From the methodological perspective, the contribution of the present study is as follows:

1. Knight and Burn (2005) argued that whether or not the dimensions of IQ data can be applied depend on the task and environment the users are in. In this study the environment includes supply chain information over the Internet application. However, the important work in developing quality information instrument was done in America in various organizational settings, such as the financial, healthcare, and manufacturing industries (Lee, Strong, Kahn, & Wang, 2002). They mentioned that the valid measures of IQ are critical for further test with different group and different settings. In response to their recommendations, this study will assess quality information delivery scale and test among supply chain supply chain partners in the Malaysian manufacturing sector.

From the practical perspective, the contributions of the present study are as follows:

1. The findings of this study are important to develop context of e-SC in Asian Region which move steps towards becoming more integrator in a global supply chain, for this reason Malaysia Manufacturing sectors moved ahead in this process by adopting and implementing RosettaNet standards (MITI, 2004). Also, Ninth Malaysian Plane takes in its account the R&D that increases the areas of Advanced Manufacturing Technology AMT (robotics, intelligent software, smart sensors, high-tech packaging, automation and nano-processing) (Government Malaysia, 2006).

2. As an integrated parts of SC system performance, which determine by various competitive priorities in operations such as cost, quality, time, flexibility, innovativeness and customers responsiveness (Dîaz, Gil, & Machuca 2005; Hus, 2006; Shepherd and Gůnter, 2006) the manufacturing industry in Malaysia is an economically important sector and has shown marked improvement in its performance in recent years (Federation of Malaysian Manufacturers, 2007, p. A5). For instance, it is important to treat measurement system as dynamics entities that response to environment and strategic change (Shepherd & Gůnter, 2006). Consequently, evaluating the system of SC for manufacturing sectors will improve overall their behaviour and performance.

1.8 ORGANIZATION OF THESIS

This thesis comprises five chapters. The first chapter provides background of the study, the problem statement, objective of the study, research question, and potential contribution of the study.

The second chapter focuses on a review of the existing literature related to the variables considered in this study including the concept of quality information delivery, its antecedents and consequences. Based on the literature reviewed, this chapter subsequently discusses the theoretical framework and hypotheses generated for this study.

The third chapter discusses research methodology. This includes research design, variables measurements, population and sample, data collection procedure, questionnaire design and result of pilot test. Statistical techniques used for this study are explained at the end of this chapter

The fourth chapter is devoted to the finding of this study. The profile of respondents, goodness of measures, descriptive analyses and the result of hypotheses testing are presented. At the end of this chapter, a summary of result of result is presented.

The fifth chapter offers an in-depth discussion on the testing of resersh objectives as well as critical anaysis of other findings. Finally, Chapter six outlines implications for both research and practice, and qualifies the results within the frame of theoritcal and statistical limitations. The study concludes with limitations of the study, suggestion for the future avenues of research and final thoughts regarding this and similar studies within the domain of Supply Chain Information Performance.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents an overview of SCM, SCI performance, technology context and e – SCM. This is followed by a discussion on general concept of information quality delivery as a mediating variable between Internet technology factors (ITF) and SCM performance. Internet technology factors chosen as the independent variables for this study are then discussed. Last but not least, this chapter reviews a wide range of previous studies in quality information delivery and then the research framework and hypothesis are proposed.

2.2 SUPPLY CHAIN MANAGEMENT (SCM) DEFINITION AND RE-EVALUATION

A supply chain is sequentially-linked organizations and activities, such as in running your home and managing a manufacturing business either in health services, hotel, banks, government, utilities, nonprofit organizations, universities, entertainment, retail or professional services (Basu & Wright, 2008). Supply chain can also mean value chain as much as suppliers, transporters, manufacturers and other parts of supply chain add value (Russel, 2007).

In 1982, Keith Oliver coined the term supply chain management (SCM) (Laseter & Oliver, 2003) when he was looking to develop the vision for tearing down the functional soils that separated production, marketing distribution, sales and finance. The concept was extended by Houlihan (1985) in his article that expounded upon the efficiencies and joint benefits associated with information sharing and corporative benefits up and down a supply chain.

The concentration of the entire culture to supply chain, however, began in the 1990s. From there onwards, many universities, such as University of Wisconsin, Syracuse University, and Arizona State University, introduced supply chain management in their masters of business administration programs (Russel, 2007). The concept of SCM was honed by Wall-Mart to develop their relationship networks and worldwide communication with suppliers to improve reliability of material and lower inventories. Indeed, Wal-Mart have many implementations of SCM which show its ability to get real time information through network of worldwide suppliers, warehouse, and real stores (Friedman, 2006; Webster, 2008). However, famous companies like Dell and Wal-Mart depend on the exchange information to assist supply chain members working together efficiently and effectively. By information sharing, Wal-Mart have permitted to outsource its inventory and panning replenishment, while exchange information in Dell reduces the cost of entire chain, customer service and value (Fawcett, Osterhaus, Magnan, Brau, & McCarter, 2007).

In the year 2000, the general direction for major organizations tended to establish high-level executive position and named it supply chain managers. In 2005 the Council of Logistics Management changed its name to be the Council of Supply Chain Management Professional (CSCMP) (Friedman, 2006). These developments indicate the increasing importance supply chain management has been accorded to by organizations worldwide.

There are universal SCM definitions and interpretations offered by several authors as shown in Table 2.1. It is important for us to understand the definition of SCM before proceeding with the discussion on e-SCM.

Table 2.1

Definitions of SCM

Sources	Definitions of SCM
Christopher (2005, p.5)	SCM is the management of upstream and downstream relationships in order to deliver superior customer value at less cost to the supply chain as whole.
Lambert, Cooper and Pagh (1998, p1)	Defined by Global Supply Chain Forum (GSCF) members as " ….the integration of key business from end user through original suppliers that provides products , services and information that add value for customers and other stakeholders".
Wong, and Wong, (2007, p.356.)	A set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed in the right quantities to the right locations, and at the right time, in order to minimize system costs, while satisfying level requirements.
Simchi-Levi, Kaminsky , and Simch-Levi (1999)	Enables firm to enhance the flow of goods, services and information from original suppliers to the final customers, to reduce system-wide cost and maintain requirement service level.
Mentzer (2000, p.18)	Supply chain management is defined as the systemic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.
Hill (2002.)	The methods, systems, and leadership that continuously improve an organization's integrated processes for product and service design, sales forecasting, purchasing, inventory management, manufacturing or production, order management, logistics, distribution, and customer satisfaction.
Lummus, Krumwiede, & Vokurka (2001, p.	All activities involved in delivering a product from raw material through to the customer, including sourcing raw materials and parts, manufacturing and assembly, warehouse and inventory

428)	tracking, order entry and order management, distribution across all channels, delivery to all customer, and information systems necessary to monitor all of these activities.
Sahin and Robinson (2002, p.505)	Supply chain consists of supplier/vendors, manufacturers, distributors and retailers interconnected by transportation, information, and financial infrastructure to raise value to end consumer in term of products and services, and to score high profit for each channel.
Cox, Ireland, Losdale, Sanderson, and Watson(2003)	Supply chain performance issues can show up just about any where in a business: profit-and-loss statement, balance sheets, employee satisfaction surveys, customer report cards, analyst rating and commentary, and new products or other indicators of innovation.
CSCM (2005)	Supply Chain Management is an integrated function with primary responsibility for linking major business function and business processes within and across companies into a cohesive and high-performing business model. It includes all of logistics management activities as well as manufacturing operations, and it drives coordination of processes and activities with all across marketing, sales, product design, finance, and information technology.
Caldelas and Pastor (2006, p.6)	A group of information systems that, working together in an inter-organizational environment, supports business partners to carry out their operations and decision making in those logistic and production processes relative to planning, sourcing, making, delivering and returning of products.
Stock and Boyer (2009)	The management of a network of relationships within a firm and between independent organizations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information from original producer to final customer with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction.

For the purpose of this study, supply chain management can be defined as a process of flow of goods, service, and information from original suppliers to the final customers to reduce system-wide cost, raise the value to end consumer and to increase profit for each channel.

The concept of SCM deals with commerce activities in a perfect way. Russell (2007) indicated that the performance of supply chain management includes all up and down the chain to coordinate supply and demand at all levels, the exchange of information and technologies, to shorten product development cycles, to increase innovation, to replace stock with flow, to reduce order cycle time, to reduce costs, to effectively and efficiently respond to customer demands, and to increase customer satisfaction.

Modern logistics move hand in hand with modern manufacturing by incorporating lean practices among organization activities, and by using real time information and accurate forecast and visibility of inventory location (point of sale, for example) (Russell, 2007). In addition to sharing timely and accurate information, flexibility can be enhanced when SC partners form alliances with key partners. Furthermore, information technology permits more efficient and responsive supply chain operations (Lambert, 2006). The final component of SCM is that it makes supply chain operational-integration of key business process among the players up and down a supply chain (Russell, 2007).

an important role in integrating success supply chain management and hence making it a success.

Hsu and Pant (2000) stated that SCM basically consists of suppliers, manufacturers and customers. According to them, SCM techniques are going to improve the relationship between suppliers and buyers and increase competitive advantage of the firms. In addition, they point out that the relationship between manufacturers and suppliers is very complex as it involves numerous sources of uncertainty. According to Hus (2006), there are three major sources of uncertainty: manufacturing, demand and supply uncertainties.

Manufacturing uncertainty is the result of system suspension that will make the quality of production poor and hence reduce customer satisfaction. Demand uncertainty happens when there are fluctuations in market demand and consumer preferences. When this happens, manufacturing firms will have to increase purchases from suppliers, and this will lead wrong forecasting and insufficient supply. In order to solve this problem manufacturers prefer increasing inventory to meet dynamic demands. Supply uncertainty occurs when suppliers usually fail to commit to promised date due to possible damage during transportation, natural disasters, poor quality of the material or insufficiency of natural resources, etc.

Choi and Hong (2002) highlight that the supply network structure can be present in three dimensions: formalization, centralization and complexity. Formalization is a guideline that defines work norms or formalized rules procedures depending on cost negotiations. Formalization provides rules for enterprises or suppliers to follow, and increases the credibility and reduces any illegality. High centralization as opposed to decentralized is less risky in maintaining the supply network, as centralization of authority and decision making influences the interaction between enterprises. When the level of production increases so will be the level of complexity. Level of complexity has a direct relationship to the stages of the integration between upstream and downstream of suppliers from one side, and to the activities from other side. Global Supply Chain Forum (GSCF) points seven parts of business process in SCM i.e. (a) customer relationship management, (b) customer services management, (c) demand management, (d) order fulfillment, (e) procurement, (f) product development and commercialization, and (g) manufacturing flow management, as shown in Figure 2.1.

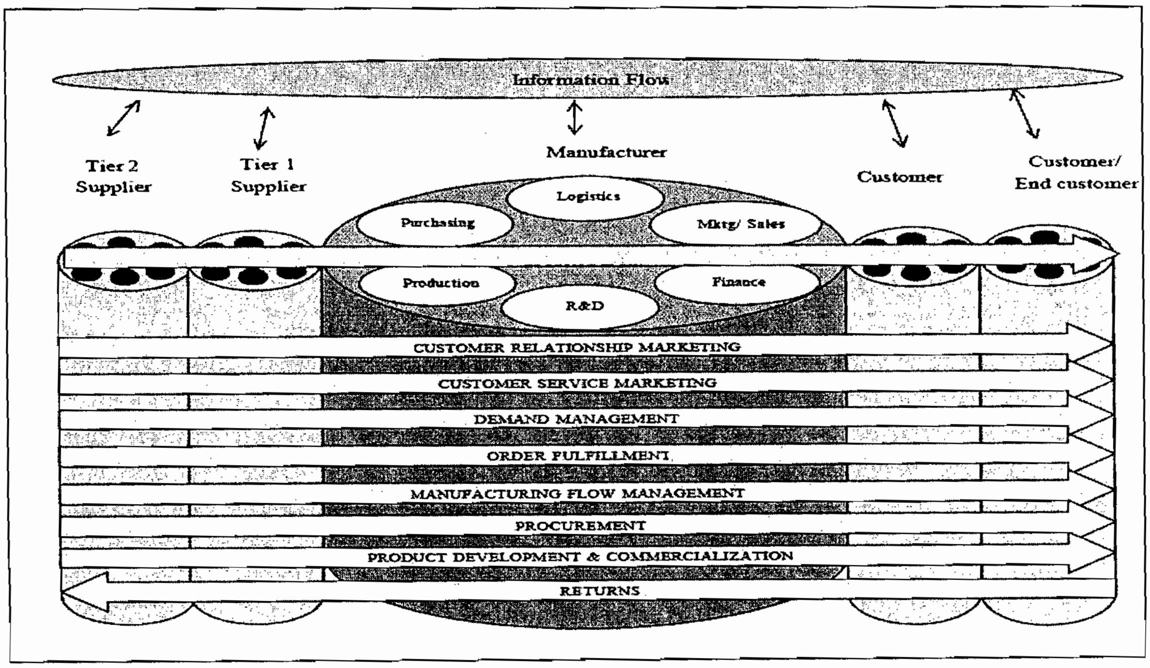


Figure2.1 Supply chain management process

Source: Cooper and Lambert (1998)

The level of complexity also requires better sharing of information and other resources to serve customer orders (Hus & Chen, 2004). McKnight, Choudhury, and Kacmar (2002) added that technology dynamics can reduce the gap which appears in the interaction between the processes. According to Russell (2007), in supply chain the integrated businesses process of collaborative planning and forecasting, sharing business strategies, real time-inventory, and demand information will increase coordination of manufacturing scheduling and management.

The traditional view of SCM starts when companies develop the internal process and external relationship with supplier. In this stage of e-commerce, access to online catalogue by partners and online support are limited. Hence SCM organization starts to access software application and program internally. Externally the SCM organization uses the software via Internet and extranet to fill the requirement of the suppliers, distributors, and customers. In that period firms have to communicate through the web to make the manufacturing operations more effective and efficient. The last stage of SCM is to develop and implement collaborative SCM application by using SCM software. In this stage business processes roll to reduce demand and uncertainty in communication during supply chain (Lothair, 2001). The customers in modern supply chain driven pull system by knowing their demand in downstream. This increased supply forecasting capabilities and drove supply function by real time demand (Russell, 2007).

The view that supply chain is a process involving a single integrated flow across all functions of the business is relatively new. Traditionally activities within a supply chain were seen as separate and specialist function such as purchasing, planning, scheduling, manufacturing and distribution. However, with supply chain management the flow of materials and flow of information (Melnyk & Swink, 2002) is integrated. The main objective of product development process is to bring final product that customer desires better than any competitor. This requires more internal integration across function and more involvement between SC partners. The integration in SC environment will be between engineering, manufacturing, procurement, logistic, marketing, suppliers and sometimes customers. Suppliers as well as supplier's supplier contribute information in early design stage of new materials, new technologies, and process engineering on new products. On the other hand, downstream customers are frequently offered into the process through cooperation to appreciate their design requirements (Russell, 2007).

The new initiative of SCM includes sharing information, foresting, planning information, and replenishment the inventory over the Internet (Chou, Tan, & Yen, 2004). Order fulfillment across global supply chain occurs by real-time visibility on inventory quantity and location, flexibility in sharing data, collaborative processes and responsiveness to customer orders (Russell, 2007). This initiative will improve performance strategy which leads to quick financial payment, improved relationship, quicker delivery to customer position and quality in products (Attaran & Attaran, 2007). Chin, Tummala, Leung and Tang (2004) noted some barriers that need to be solved during the implementation of SCM such as weak information sharing, lack of employee training, skill deficiency, and unclear organization's vision.

Thomas and Griiffin (1996) divided SC into three stages: strategic, tactical and operational stage. These three levels are the hierarchies in function which depend on time horizon for activities and suitable decision. The strategic level measures influence the top level management decision, very often reflecting investigation of broad based policies, corporate financial plans, and competitiveness. Tactical level deals with resource allocation and measuring performance against targets to be met in order to achieve results specified at the strategic level by providing valuable feedback on mid-level management decisions. Operational level measurement and metric require accurate data and assess the workers' operational objectives that, if met, will lead to the achievement of tactical objectives (Gunasekaran, 1999).

Other researches such as Brien and Marakas (2008) add another level i.e. execution level that involves achieving objectives and planning of SCM partner. Supply chain partnership during different stages changed from open-market negotiation to cooperation, to coordination and finally to collaboration (Brien & Marakas, 2008). The collaboration will be among supplier, customers and competitors through sharing of information and knowledge (Tyndall, Gopal, Partsch, & Kammauff, 1998). The main purpose of SCM is sharing of information and coordination of strategies among firms to improve delivery to customer and reduce logistics costs (Demerbag, Bayraktar, & Zaim, 2007). The manager specifies the type activity of system usage such as communication, collaboration and exchange of information that affect the system performance (Brewer & Speh, 2000). Poirier and Reiter (1996) noted that SCM is a term that improves the competitive position of collaborative companies because it supports the construction of operations among these companies.

Sharing information will be more important in logistic transaction. Council of Logistics Management (CLM) defined logistic as follows: "The part of supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, service and related information from the point-of-to the point of consumption in order to meet customer requirements (Poirier & Reiter, 1996, p.10)

Vickery, Jayaram, Droge, and Calantone (2003) discuss the relation and impact of JIT, TQM and SCM in business performance. They investigated the effect of integration practices of firms to include suppliers and customers on time-based performance. They found positive and direct relationship between (1) integrated information technologies and supply chain integration, (2) supply chain integration and customer service, and (3) customer service and firm performance.Winser (2003) indicates that firms seeking further to refine their SCM capabilities will improve or expand their direct supplier and customer relationship capabilities first.

In general formula cited by Russell (2007) to define Supply Chain Management is: Alliances + Information Technology + Lean Manufacturing + Lean Logistics + Integration of Key Business Processes.

2.3 DEFINITION AND OVERVIEW OF TECHNOLOGY CONTEXT

A number of research endeavors have been carried out in an attempt to identify the concept of technology. For example a study by Khalil (2000) defines technology as the all knowledge, products, processes, tools, methods and systems that employ goods and provide services. He further highlights that technology consists of a number of components. They are "hard-ware", "soft-ware", "brain-ware" and "know-how". "Hard-ware" represents the physical structure and logical layout of equipment used to carry out certain tasks. "Soft-ware" represents the programs needed for carrying out requirement tasks. "Brain-ware" provides the reason for using technology in a particular way. Finally "know- how" stands for the technical knowledge and skills required to perform action. This part requires high expertise.

However, technology has been defined in different ways and has various meaning. Gaynor (1996) provides descriptions of technology, as follows. He said that technology is (a) a means to achieve tasks, (b) the knowledge and resources required to achieve the objectives, and (c) the body of scientific and engineering knowledge, which can be applied in the design of products and/or processes or in the search for new knowledge. Rahman (2004) noted that technology applied to enterprise resource planning (ERP) and SCM functions (procurement, inventory control, and logistics) is to reduce cost, enhance efficiencies and increase profit. Lancioni, Smith, and Oliva (2000) add that technology includes the Internet, World Wide Web (WWW), broadband and wireless technology.

The year 1990 was the year when the Internet and the web technology took on the globe by storm and since then the Internet is ubiquitous technology. According to Leiner et al. (1998), the Internet has revolutionized communications like nothing before. Chin, Tummala, Leung and Tang (2004) argued that Internet-based (WWW), intranet, extranet and electronic data interchange (EDI) are used as a tool to share information such as B2B and computer to computer. Within the context of SCM, the technology has enabled and facilitated companies to collaborate with their partners. The technology has also enabled managers to control inventory and forecast demand (Frohlich & Westbrook, 2002). Furthermore, the most important advantage of Internet technology over other technologies is it provides a low-cost communication infrastructure available almost anywhere in the world. This advantage allows companies to increase information stream and to make it more precise. The other advantage of Internet is it provides some standardized files like (HTML,OWL,etc) (Moyaux, Chaib-draa, & D'Amour, 2006).

The Internet provides many services and applications such as e-mail, telnet, video conferencing, newsgroup, file transfer protocol and chatting (Person, 2005,p.8). The main functions of the Internet include: remote login, electronic mail, discussion groups, and sharing of data resources (Moyaux, Chaib-draa, & D'Amour, 2006). Login will permit users to log into another application via certain software program such as Telnet. Electronic mail provides an easy and inexpensive way to communicate with other users over the Internet and to exchange information with them. An e-mail will receive and send messages for any users anywhere at any time. Similarly, chatting gives a person a chance to communicate with other person over the Internet. It is possible when two or more people make appointment to chat at a given time. This application is a useful communication tool in business. Discussion group via the Internet enables a group to make an important decision and to discuss relative topics in a newsgroup. File transfer protocol or (FTP) is a program that permits users to send and receive files that include other programs similar to Archie and Gopher tools that use FTP site to search for the files.

According to Masrek, Karim, and Hussein (2007), the purpose of using Internet applications is to have quality information sharing that can be classified into five modes. These modes are: publishing, transaction, interaction, searching, and recording. Furthermore, previous researchers have demonstrated some Internet applications to perform these activities such as web page, discussion room, technical documents, and search engine (Kefos & Riedl, 2005; Stenmark, 2005; Vaast, 2001). However, the study by Khadroo (2005) demonstrated different methods such as audio, video, graphic and imaging technology over commercial website that can present information more clearly and in real time. He observed that these methods are not homogenous and they reflect the meaning of multimedia software. Stair and Balduaf (2008) mentioned that W3 usually uses HTTP (Hyper Text Transfer Protocol) to communicate with web client (web browser) that helps open web pages by web server. Recently, using markup languages like Extensible Markup language (XML) to construct the Web site and Hypertext Markup Language (HTML) to design the Web site have become very popular. A browser is a software application used to enter the website, and it communicates by HTTP and administered by HTML. HTML was designed for formatting the presentation of text and graphics on web pages (Khadaroo, 2005). There some difficult techniques of HTML not widespread among various companies in Malaysia. The main reason is that because it has a much longer history, and new programming needs employees to be trained so that they will have the necessary skill to use the new programs (Khadaroo, 2005). Moreover browsers exhibit some kind of data like GIF (Graphic Interchange Format) and JPEG (Joint Photographic Expert Groups) and Microsoft Windows sound (Efrain & Ridchard, 2001).

When comparing between companies in Malaysia and Singapore, Khadaroo (2005) found that Malaysian companies have been using some applications such as graphic, image, sound and video animation over their websites more than Singapore companies. Besides, the Internet tools such as conference calls, e-mail and others were very extensively used in daily transactions. In addition, the hyperlink and advertisement of company products is another practice that is popular in these companies. The majority of

Malaysian companies are using the Internet as a distribution channel to sell their products and to provide their services. Some web pages have some popular attributes such as table of content or sit map for the whole website. Other webs include information that are more related to users such as links to news related to user demands, number and current of stock price, number of stockholders (Khadaroo, 2005).

Electronic Data Interchange (EDI) system has played great role in communication and exchange information. It was at the beginning a traditional technology of supply chain. But EDI helps to adopt the new policies and strategies of SC. Walton and Miller (1995) mentioned that EDI plays an important role to make communication with partners easier and faster at the same time especially in logistics organizations that use SCM. As such, EDI has been described like a "glue" that combines supply chain collectively (Khadaroo, 2005).

Brien and Marakas (2008, p.147) defined EDI as "the automatic electronic exchange of business document between the computers of different organizations". In addition, Ruppel (2004, p.313) defined EDI as "the electronic data communication of invoices, purchase order, or other standard formats need between customers and suppliers and which follow the standard EDI format for such form" .

EDI is widespread in the SCM to exchange and transact documents over the Internet and other networks. In the literature EDI and e-commerce are regarded as tools of SCM. It is used to communicate among different companies via computers to receive orders, make the purchasing, enter the information of the suppliers and customers, and determine the inventory situation and shipment (Porier & Bauer, 2001). Ruppel (2004) in his study indicated that 61 percent of his respondents look forward to exchange EDI via the Internet in the near future.

SC will continue to grow especially when huge firms depend on the database, Internet system (intranet and extranet) and web in carrying out their business applications (Brien & Marakas, 2008). It is anticipated that using web will be more popular in e-commerce operations like business-to-business (B2B) or business-to-customer (B2C). Person (2005) explained different types of e-commerce applications like Business to Business (B2B), Business to Customer (B2C), Business to Administration (B2A) and Customer to Customer (C2C). B2B is a communication system that connects between different organizations; it allows organizations to perform a lot of activities between them such as distribution, fulfillment of inventory, performance of bank procurement and management of trading between partners. These kinds of applications appear in organizations that use electronic technology to make their service more standardized such as e-exchange and e-marketplace. B2C is another type of communication system. It permits customers to do whole customization activities online, and this system can receive information about the product, price, news and weather condition. B2A, on the other hand, can perform many public sector activities like patent registration, planning application and tax return. Finally C2C that is useful during auction exercise. This system allows buyers and sellers to bargain until they reach an agreement about product price. Websites of www.ebay.com and www.amazon.com are good examples of organizations that handle this system.

David, Tan, and Yen (2004) highlighted that Internet has played a critical role in transaction from industrial economics to network economics. They further added that it has two important benefits in business activities. First, the Internet is present anywhere at a low cost. Second, the Internet is a faster network in transaction and communication. Attran and Attran (2007) demonstrated some transactions like ordering, invoicing and payment can be done faster via the Internet. Rahman (2004) investigated how Internet technology affects decision making among more than 100 companies in different business activities such as purchasing and procurement, inventory management, transportation, order processing, customer service, production scheduling and relation with vendors. He found that the Internet has the most influence on business in general and in specific practices. As result, the challenge now is to know how to integrate Internet applications with SC operations (Lancioni, Schau, & Smith, 2003).

2.3.1 E-commerce Growth in Malaysia

The development of e-commerce in Malaysia started in 2000. Prior to that, companies whose business plans depended on online operations found some difficulties to continue long time, particularly in the business-to-customer (B2C) sector. The largest companies went after market share by file transfer documents, business-to-business (B2B) portals and application service providers (ASPs). Firms that based on traditional industries of "brick and mortar" as well began using the Internet application to enlarge their market border (Economist Intelligence Unit, 2007). Even though the e-business faced some challenges, the Malaysian government continues to provide a major support to the Internet, and take specific measures to build a knowledge-based economy. It was the master plan in early 2001 to guide Malaysia's operation from labor-intensive economy to a higher-value-added one (Economist Intelligence Unit, 2007).

The digital divide in Malaysia is in the earlier stage and this requires serious efforts to overcome it (Zaitun, & Crump, 2005). In the 2005 Economist Intelligence Unit e-readiness survey, Malaysia ranked 35th out of 65 countries, with a score of 5.43 out of 10. This represented a loss of two places from the previous year (when 64 countries were surveyed); its score dropped from 5.61. Malaysia ranked in front of Thailand, Indonesia, India and China but behind Singapore, Hong Kong, South Korea and Taiwan. The survey measures how amenable a market is to Internet-based opportunities (Economist Intelligence Unit, 2007).

During the 8th and 9th Malaysia plan the government has taken a pro-active approach to put up the shutters on the issue of digital divide. Moreover, the government has embodied ICT in its policy since 1991 with the introduction of Vision 2020. This strategy regards ICT as a key enabler for Malaysia to reach the developed-nation status. The Malaysian Communications and Multimedia Commission (MCMC), established in 1998, is charged with promoting and regulating the converging industries of broadcasting, telecommunications and online services. The MCMC is an agency of the Ministry of Science, Technology and Innovation. Its main objectives are to regulate the industry, to ensure that Internet services are made available to the public at "affordable costs", to guide the development of relevant infrastructure and to promote Malaysia as a regional information-technology (IT) hub (Economist Intelligence Unit, 2007). Besides, there are three technology focus areas identified by the National Strategic ICT Roadmap that could advance Malaysia economically and technologically over the next ten years, and assist to fulfill the tentes of Vision 2020: (i) Wireless Sensors Networks, (ii) Predictive Analysis, and (iii) 3-Dimensional Internet (MOSTI, 2007).

There are several international organizations that monitor countries trading globally. However, Malaysian is still in the way toward developing global trade and partnership that can create more opportunities both economically and socially for entrepreneurs in small and medium enterprises (SMEs). By adopting ICT firms can communicate faster and cheaper, increase productivity and save cost. To let companies tap into electronic global supply networks, the 2002 RM$5 budget was granted for the development of RosettaNet, an internationally standardized supply-chain-management platform, and income tax deductions for expenses incurred to implement it in Malaysia were extended. RosettaNet itself had begun its Asia engineering centre in the northern Penang state since February 2004. The centre focuses on standards engineering and implementation support throughout the region (Economist Intelligence Unit, 2007).

Furthermore, a number of B2B Internet hubs have emerged most centered on specific industries. Tradenex.com, the B2B electronic marketplace of the Federation of Malaysian Manufacturers, had enrolled more than 28 different sectors by April 2006. Tradenex also takes part in the TIGeR (Technology, Industry and Government for the e-Economic Revolution) plan to link Malaysian companies to global buyers and to roll out secure e-commerce services to manufacturing companies. International Data Corporation IDC Malaysia, a leading industry forecaster, estimates that the local B2B e-commerce was worth RM$28.5bn in 2005. This marks a growth of 88% in 2004, and IDC Malaysia forecast expansion of the market by 77% in 2006. Though eBay, a giant US Internet auction site, expanded its operations into Malaysia in December 2004, a domestic auctioneer, Lelong, remained the leading domestic auction site in April 2006 (Economist Intelligence Unit, 2007).

Six companies, including the government-run Malaysian Institute of Microelectronics Systems (MIMOS), have licenses to operate as Internet service providers (ISPs), although two control the market: MIMOS, through Jaring, and Telekom Malaysia, through TMnet. Celcom Net, Time Net, Digi Net and Maxis Net are other, much smaller ISPs. Though all ISPs offer broadband connections, the market still consists mainly of dial-up connections (Economist Intelligence Unit, 2007).

2.4 E-SUPPLY CHAIN MANAGEMENT (E-SCM) AND INTERNET TECHNOLOGY

In recent decades, B2B transactions have increased on the Internet, thus it will be very critical for companies to depend on web-based supply chain or e-supply chain. Consequently, e-commerce provides significant response to market conditions in real time (Shih & Wen, 2006).

Since 1990 Internet technology has improved the relationship between SC partners in supply chain. But it was in 2000 when e-commerce become more visible. Ruppel (2004) mentioned that SCM software was motivated by the desire of organizations for profit, hence many firms recognize what is SCM software, how to use it and when. Indeed, scholars stressed that the various packages of supply chain software in market place will integrate with the operations of a firm's SC, and this will improve their efficiency and competitiveness (Glushko, 1999; Henriott, 1999; Hsu & Pant, 2000; Mecker, 1999; Raghunathan & Madey, 1999; Sheridan, 1998). The scholars further added that there is no standard solution that can fit supply chains, because different supply chains have different requirements.

Various definitions have been given of e-SCM. Table 2.10 below highlights some of the definitions used by authors.

Table 2.2

Definition of e-SCM

Authors	Definition of e-SC
Hsu and Pant (2000), Charless, Poirier, and Baver, (2002)	E-supply chain is system designed to create the necessary Internet enable links among data, communication, and network effectiveness.
Poirier and Bauer (2002)	Is SCM organizations linked within and between their trading partners by Internet and/or EDI to buy, sell, move products/services and cash flow.
Williams, Esper, and Ozmet (2002)	The impact that Internet has on the integration of key business processes from end user through original suppliers that stakeholders.
Gimenez and Lourenco (2003)	Integrating management practices and information technology to optimize information and product flows among the processes and business partners within a supply chain.
Frohlich and Westbrook (2002)	Internet and web-based systems enable organizations to form strong customer and supplier integration for inventory management, demand forecasting, customer and supplier relationship management.
Koh, Demirbag, Bayraktar, Tatoglu, and Zaim (2007)	By contributing new technology like Internet and web-based in getting better tracking of products logistics, improved efficiency in information processing, improved security, reduced counterfeit, fast-tracked quotation and ordering, improved customer relationships, and better control of supplies on the SCM.
Fawcett, Osterhaus, Magnan, Brau, and McCarter (2007), Mendelson (2000)	By investing heavily in information technologies companies are able to enhance their ability to manage information and knowledge across the supply chain, response to company's strategic SC, rapid change in productivity, aware to new information generated in its environment, and to adopt structure that enable fast decision making and practices that

	reduce information overloaded.
Ruppel (2004)	The coordinated flow of material and products across the enterprise and with trading partners, and the management of information flows, cash flow and process/work flow by using flows, information technology tools.
Bu´ rca, Fynes, and Marshall (2005)	e-SCM focuses on the management of information flows and represents a philosophy of managing technology and processes in such a way that the enterprise optimizes the delivery of goods, services and information from the supplier to the customer.

For the purpose of this study Electronic Supply Chain Management (e-SCM) is a system that emphasizes to create Internet enable links and optimize information and products flow among the process and business partners within a supply chain (Brien & Marakas, 2008; Charless, Poirier, & Baver, 2002).

Various authors have suggested the various impacts the Internet has on SCM. Chou, Tan, and Yen (2004) asserted that Internet will develop and change SCM gradually to make its functions more collaborative and perform better at the same time. Moreover, they found that the Internet and web technology could improve business process by reducing the middleman inside SCM. They also point out the innovative business model which appears in some companies, like Dell, adopt a direct sell model that is built-to-order to replace its old one that is build-to-stock. Moreover collaborative in SCM in which logistics operation are integrated into the systems based on the Internet is meant to achieve high level value of customer service and increase SC performance. Brien and Marakas (2008), and Gimènez and Louren (2003) concluded that as logistics is subset of SCM, e-logistics will also be part of e-SCM. Therefore, Gimènez and Louren (2003, p.3) illustrated that the impact that Internet has on Logistics refer to the impact of that internet has on the supply chain process that plans, implements, and control the efficient, effective flow and storage of consumption in order to meet customers' requirements"

Protocols and standards provided by the Internet have led to the lowest the cost of communication inside the organizations (Gimènez & Louren, 2003). More increasing information flow enables manufacturing companies to enhance their productivity and to make collaborations between partners more efficiently. In other words, high level of the collaboration inside SC requires that companies take full advantage of the Internet technology.

Lee and Whang (2001) speculated four types of impacts of Internet on SCM: information sharing, knowledge sharing, e-commerce (design of new products and services to fit special market segments) and new SC structure to serve customer in a more direct way. Swaminathan and Tayour (2003) briefly described three ways how the Internet influences SCM. First, they consider that Internet has facilitated the use of ERP (Enterprise Recourse Planning) and APS (Advanced Planning and Scheduling). Second, they consider the impact of the Internet on information sharing. Finally, they consider the possibility of integrating information sharing and decision making across supply chain. Gimènez and Louren (2003) proposed that the Internet technology must be used to restructure the internal and external process that encompass SC during any business activity.

In sum, the impact of the Internet on SCM can be understood as part of a business philosophy as follows:

1. E-commerce - The Internet in these days allows companies to have a new commercial channel to enable them to sell and buy their products, and get and

provide their services. New SCM processes have to be identified in order to answer the challenges of this new channel. For example the order fulfillment processes, known in this case e- fulfillment, have new activities that are different from the traditional distribution channels (Aldin, Brehmer, & Johansson, 2004; Emiliani, 2000; Gimenez & Lourenco, 2003; Hsu & Pant, 2000; McGuffog & Wadsley, 1999). In this stage the users are still insecure about SCM technologies, and the level of trust about how the new information systems tools can fit with their needs should be improved (Ruppel, 2004)

2. Information sharing - The Internet is the medium to access and transmit data and information among supply chain management to different parts like suppliers, partners, and customers. The information inside supply chain management will provide effective and efficient collaboration and integration on the length of supply chain management (Byrd & Davidson, 2003; Frohlich & Westbrook, 2002; Gimenez & Lourenco, 2003). Moreover, the Internet proffers high speed and global medium to enable the flow of information via its networks like LAN, VAN and EDI. Consistently, the investment in IT will enhance real time information needed to capture TQM in SCM, reduce transaction cost greater profitability, and inventory turnover (Bu'rca, Fynes, & Marshall, 2005; Frohlich & Westbrook, 2002; Hemsworth, Sánchez-Rodríguez, & Bidgood, & 2005; Sriram & Stump, 2004; Wu, Chiag, Wu, & Tu, 2004; Zhou, & Benton, 2007). Information sharing also facilitates clearing on the procurement process, or this case it is called e-procurement, while broad upstream and downstream SC integration using the

Internet is called e-integration (Gimenez & Lourenco, 2003; Vereecke & Muylle, 2006).

3. Knowledge sharing - The stage of knowledge sharing does not only allow different parts in SCM to access and share information, but it also allows access for data analysis and modeling jointly to make better planning and decision making. Most consideration in knowledge sharing is in the Information System Management that will enable companies not only to share information but also share different management functions like planning, orientation, controlling and decision making (Gimènez & Lourenco, 2003). This collaboration among different firms will reduce cost and increase response to the market. Decision technologies that offer access to this technology or the tools to obtain it will become important issues in the future (Swaminathan & Tayour, 2003; Sodhi, 2001). Collaborative forecasting is one example of knowledge information sharing. This can help companies to guide customer demands by using analytical tools available (like forecasting models for example) to convert sales data into meaningfui knowledge and business intelligence. For instance, Forslund and Jonsson (2007) argue that forecast information in supply chain is impacted by information quality information deficiencies, which affect the planning and control process.

4. Efficient supply chain design - To ensure high level of responsiveness and maintain an effective cost structure of SC, companies need to be serious in managing communication, collaboration and competition. The Internet allows users to access to the information and have the knowledge at a faster rate and at a lesser cost (Gimenez & Lourenco, 2003; Graham & Hardaker, 2000). Therefore, the impacts

of the Internet on SCM need to emphasize the design of fast responsive chains. For example, the design of agile supply chain management that depends on the quick response of customer needs to change in terms of volume and variety, depending on dimensions of strategic, people, systems, and technolog (Gunasekaran, 1999; Meixell, 2006; Power & Sohal, 2001). Likewise, Agarwal, Shankar, and Tiwari (2006) argue that using information technology to share data between buyers and suppliers enable supply chain to be lean by maximizing profit through cost reduction, by providing what customers require, and by making cost effective in upstream and downstream to achieve high service level in marketplace.

Additionally, most of organizations use the Internet to reengineer the relationship with their suppliers, distributors, and retailers. Hsu and Chen (2004) indicated that technology dynamics can reduce the gap in the interaction process, and it enhances information sharing and other resource to serve customer orders. Their philosophy of SCM was focused on how firms operate their suppliers' processes, technology, and capability to advance marketing competitive advantage. The Internet, extranet, e-commerce and web portals in manufacturing can be innovatively toward this direction.

One study by Gimenez and Lourenco (2003) cited that the impact of the Internet in each process of SCM depends on the process itself. Cooper and Lambert (1998), and Croxton and Gracà-Dastugue (2002) indicate the different types of impact of the Internet on the SCM process, as follows: (a) customer relationship management process, (b) customer service management process, (c) demand management process, (d) e-fulfillment process, (e) manufacturing flow management process, (f) e-procurement process, (g) product development and commercialization process, (h) reverse logistics and returns process, (i) information flows, (j) supply chain relationships, (k) planning and optimization, and (l) e-supply chain management. In the following paragraphs will describe briefly these impacts depend on each process:

The impact of the Internet on SCM process can be described depend on each process as follow:

1. (a) Customer relationship management (CRM) process: there two types of impact of the internet on CRM: Internal and downstream. Internal effect refers to the impact on the focal company, means that all business units can have access to the same information about the customers. On the other hand, the downstream effect is more impact on the relationships with customers. The websites in this part allow companies to collect data which will be very useful in CRM (Geoffrion, and. Krishnan, 2001).
2. The customer service management process: in this process the most impact are internal and downstream. In the downstream part of process internet can be used to listen and communicate response procedure to the customers. In the internal part internet can be used to enable information sharing on real time among different function areas of the firm (Croxton, &García-Dastugue et al., 2001).
3. The demand management process: impact of internet in this process along all supply chain: internal, upstream and downstream. Internally: For example in the a grocery industry manufacturing can receive information about actual sales enable to improve company's forecasting, whereas in

downstream this information will help customers (a grocery) to eliminate the replenishment orders. Upstream, the information observed about actual sales would be shared with the focal company's suppliers to improve their production and production planning (Gimenez & Lourenco, 2003).

4. The e-fulfillment process; the internet impact in this part have two main aspects: the efficiency of the order, and less cost over the internet (Croxton, &García-Dastugue et al., 2001).
5. The manufacturing flow management process: internet impact in this part along all supply chain. It's appear during implement internet based production planning system to analysis the production requirement and plans of the different manufacturing facilities the company has (Croxton, &García-Dastugue et al., 2001)..
6. The e-procurement process: there two types of e-procurement: B2B which consider the procurement and sourcing through internet between two companies, while marketplace is multi-enterprise environment that allow the suppliers and customers to announcing, selling, and buying on real time via the internet. However, the knowledge sharing is a key issue in this process to make better decision over the internet (Croxton, &García-Dastugue et al., 2001).
7. The product development and commercialization process: the most impat of the internet through develop the product through truly collaborative process among designers, manufacturers, and customers without limited of geographical location and time zone (Cheng, & Pan, 2000).

8. The reverse logistics and returns process: the impact of internet by providing better information and knowledge to all elements of SC involved in this process, and achieved greater return than traditional commerce (Gentry, 1999).
9. Information flows: the impact of internet consist by enabling companies to share information on real time (Gimenez & Lourenco, 2003)
10. supply chain relationships: the impact of internet on how companies manage all type of relationships (Gimenez & Lourenco, 2003)
11. planning and optimization: the impact will be more great on the developing decision technology by :(a) improving planning and optimization within SC by provide access to decision support system, (b) ability to access an enormous quantity of data and information (Gimenez & Lourenco, 2003).
12. E-supply chain management: the impact of internet in this part will appear in all above process.

In sum, it is important for the companies to understand the impact of the Internet applications on three major variables: (i) process efficiency and transactional cost reductions, (ii) reliability and quality of information flows, and (iii) products/service innovation (Cox, Ireland, Losdale, Sanderson, & Watson, 2003). It is the second variable that is the major consideration in this study because, for instance, the impact of the Internet on information flow process requires organizations to be able to share information on real time. Meixell (2006) investigated e-procurement scenario involving emergency material purchases where the web service provide real time response to enhance supply chain. They concluded that further research can explore alternative applications to improve web reliability in communication with suppliers to enhance SC performance. The sharing of information affects all supply chain management processes in that inventory can be reduced due to better forecasting reduce, firms can use advanced planning and optimization tools because they have available information, and firms can implement collaborative planning and design, to name a few (Gimenez & Lourenco, 2003).

From the above discussion, information sharing particularly of quality information is very important in SCM, e-SCM, and their process.

2.5 SUPPLY CHAIN INFORMATION PERFORMANCE (SCIP)

While the notion of information supply chain is slightly new, information distortion and the value of exchange information in supply chains have been extensively studied (Chou, Tan & Yen, 2004; Hsu & Chen, 2004; li & Lin, 2006; Lee et al., 2002; Melnyk & Swink, 2002; Russell, 2007; Sahin & Robinson, 2002). This is because exchange of information mostly on supply chain plays a major role in improving performance of companies via Internet applications. So much so, the issue of supply chain information performance has become a main concern and enhancing the performance of supply chain information has become one of the most urgent tasks that mangers face (Lenger & Schemm, 2008). Consequently, this has sparked the concentration of many researchers to examine the antecedents and consequences of supply chain performance (SCIP).

According to Sun, Wang, and Cao (2009), supply chain information fulfill customers' information demand through network of companies that mostly include suppliers and manufacturers, by gathering and interpreting accurate information. Information sharing is said to improve decision making of supply chain partners related to ordering, production/material planning, and capacity allocation, enabling the supply chain as a whole to reduce costs and respond more quickly to end consumer demand (Legner & Schemm, 2008). Similarly, Vereecke and Muylle (2006) maintain that information exchange between both suppliers and customers contribute to the largest performance improvement in terms of cost, flexibility, procurement and quality. Indeed, because lack of technologies capabilities indirectly affect the accurate of flow information that reduces the coordination of demand and supply chain (Dupre & Gruen, 2004; Kurnia, 2000), both SCM and SCI face unbalanced demand and supply that could lead to poor supply chain performance. This problem (bullwhip effect) is caused either by information overload or deficiency (Sun, Wang, & Cao, 2009).

SCM uses information systems to integrate manufacturing operation with marketing and finance, strategic sourcing, business process connectivity, risk sharing, and supplier participation in new products development, and logistic (Basu & Wright, 2008). Russell (2007) indicate that supply chain management has been supported by information system in four aspects :(a) enterprise resource planning (ERP) software, (b) electronic data interchange (EDI) or Internet connectivity, (c) electronic product code (EPC) technologies, and (d) supply chain analytics (SCA). In this study major of consideration will be in the second aspect i.e. Internet connectivity.

Several scholars have argued the importance of developing IT and the Internet applications in advancing the function of supply chain (Rahman, 2004; Trappey, Trappey, Hou, & Chen, 2004). Legner and Schemm (2008) demonstrated that companies need various data in managing their supply chain such as general information, product information, plant information, stock information, personal information and cost information. They argued that different types of data have impact on supply chain performance.

Hemsworth, Sanchez-Rodriguez, and Bidgood (2005) investigated the impact of purchasing-related information systems on purchasing performance within SCM context. The major enabling technologies tested were namely EDI and the Internet. They found that information systems practices (e.g. online purchasing, product scheduling, order process, inter-company communication) have positive impact on both purchasing performance, and supply chain performance when managers have effectively contributed to these two areas.

According to Neely, Gregory, and Platts (1995) performance measurement is quantify process which have efficiency and effectiveness action. They considered on some approaches of performance measurement such as balance scorecard (Keegan, Eiler, & Jones, 1989), system design assessments (Globerson, 1985). Other researchers measure SC depends on the: strategic, tactical and operational levels (Thomas and Griiffin, 1996). Consequently, Chen and Paulraj (2004) have been distinguish between cost and no-cost measures (time, quality, flexibility and innovation) in view of the fact that the considering on cost indicators can produce unclear picture of supply chain performance. Moreover, other studies used time and quality to show the ability of supply chain to deliver to the customer service, while flexibility and innovativeness to deal with change demand and supply (Leem & Yoon, 2004; Morgan, 2004). Moreover, Hus (2006) cited that the benefit of SCM system consist of tangible and intangible benefits. The tangible benefit of SCM implementation includes shorten the product development life cycle, increase on-time order delivery, reduce production cost, improve quality, reduce inventory an better inventory management. On the other hand, the intangible benefits including improving service quality, faster response to customer needs, sharing and exchange information, providing information accurately, timely, and consistently.

The measure firm performance will be by advance their employees' duties which guide to increase the profitability the organizations in supply chain (Frendendall & Hill, 2001). There are some measurement of the operational performance like flexibility ,reduce lead time in production , forecasting , resource planning ,cost saving and reduced inventory level (Ackfeldt & Coole, 2003; Ingrram, Lee, & Lucas, 1991). The managing supplier involvement will guide to better supplier performance , improving manufacturing , and advancement in the product and process (Demerbag, Bayraktar, & Zaim, 2007). Integrated – Interactive performance is a measurement which used to measure the results of interaction activity between SC members (Shin , Coller, & Wilson 2000; Vonderembse & Traacey 1999).

For instance, process model like supply-chain operations reference (SCOR) have been considered on the role of sharing information to improve organization performance (supply-chain operations reference, 2005). The comprehensive overview of performance measurement of SC provided by Shepherd and Gŭnter (2006). They identified around 362 articles in the period between 1990 and 2005. These articles were considered on developing performance measurement systems and matrices and supply chain. Moreover, they categorized the measures according to articles relevancy to five supply chain processes. These processes defined in model supply chain operations reference

(SCOR) model (plan, source, make, deliver, and return or customer satisfaction); whether they measure cost, time, quality, flexibility and innovativeness; and whether they are quantitative or qualitative as appear in figure 2.2 and table 2.3

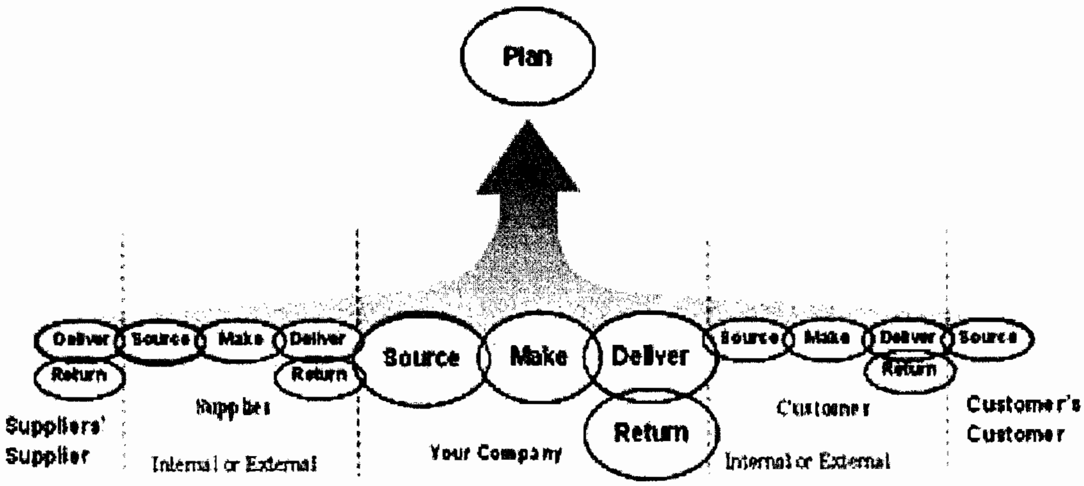


Figure 2.2 Management process of SCOR model (SCORE, 2005)

Table 2.3

Taxonomy of measures of supply chain performance

Stages in supply chain	Measure	Cost (C) Time (T) Quality (Q) Flexibility (F) Innovativeness (I)	Quantitative (QN) or qualitative (QL)
Plan	Sales[b]	C	QN
	Profit[b]	C	QN
	Return on investment (ratio of net profits to total assets)[b]	C	QN
	Rate of return on investment[a]	C	QN
	Net profit vs productivity ratio[a]	C	QN
	Information carrying cost[a]	C	QN
	Variations against budget[a]	C	QN
	Total supply chain management costs[d]	C	QN
	Cost of goods sold[d]	C	QN
	Asset turns[d]	C	QN
	Value added productivity[d]	C	QN
	Overhead cost[n]	C	QN
	Intangible cost[n]	C	QN
	Incentive cost and subsides[n]	C	QN
	Sensitivity to long-term costs[n]	C	QN
	Percentage sales of new product compared with whole sales for a period[n]	C	QN
	Expansion capability[n]	C	QN
	Capital tie-up costs[o]	C	QN
	Total supply chain response time[c]	T	QN
	Total supply chain cycle time[a]	T	QN
	Order lead time[a,o]	T	QN
	Order fulfilment lead time[d]	T	QN
	Customer response time[b]	T	QN
	Product development cycle time[a]	T	QN
	Total cash flow time[a]	T	QN
	Cash-to-cash cycle time[d]	T	QN
	Horizon of business relationship[e]	T	QL
	Percentage decrease in time to produce a product[n]	T	QN
	Fill rate (target fill rate achievement & average item fill rate)[b,c,m,n]	Q	QN
	Order entry methods[a]	Q	QN
	Accuracy of forecasting techniques[a]	Q	QN
	Autonomy of planning[e]	Q	QL
	Perceived effectiveness of departmental relations[f]	Q	QL
	Order flexibility[m]	Q	QN
	Perfect order fulfilment	Q	QN
	Mix flexibility[b,n]	F	QN
	New product flexibility[b]	F	QN
	Number of new products launched[n]	I	QN
	Use of new technology[n]	I	QN

Stages in supply chain	Measure	Cost (C) Time (T) Quality (Q) Flexibility (F) Innovativeness (I)	Quantitative (QN) or qualitative (QL)
Source	Supplier cost-saving initiatives[a]	C	QN
	Percentage of late or wrong supplier delivery	C	QN
	Supplier lead time against industry norm[a]	T	QN
	Supplier's booking-in procedures[a]	T	QN
	Purchase order cycle time[a]	T	QN
	Efficiency of purchase order cycle time[a]	T	QN
	Buyer-supplier partnership level[a]	Q	QL
	Level of supplier's defect-free deliveries[a]	Q	QN
	Supplier rejection rate[a]	Q	QN
	Mutual trust[e]	Q	QL
	Satisfaction with knowledge transfer[g]	Q	QL
	Satisfaction with supplier relationship[h]	Q	QL
	Supplier assistance in solving technical problems[a]	Q	QL
	Extent of mutual planning cooperation leading to improved quality[j]	Q	QL
	Extent of mutual assistance leading in problem-solving efforts[k]	Q	QL
	Distribution of decision competences between supplier and customer[i]	Q	QL
	Quality and frequency of exchange of logistics information between supplier and customer[i]	Q	QL
	Quality of perspective taking in supply networks[i]	Q	QL
	Information accuracy[p]	Q	QL
	Information timeliness[p]	Q	QL
	Information availability[p]	Q	QL
	Supplier ability to respond to quality problems[a]	F	QL
Make	Total cost of resources[b]	C	QN
	Manufacturing cost[b,n]	C	QN
	Inventory investment[b]	C	QN
	Inventory obsolescence[b]	C	QN
	Work in process[b]	C	QN
	Cost per operation hour[a]	C	QN
	Capacity utilization as incoming stock level, work-in-progress, scrap level, finished goods in transit[a,c]	C	QN
	Inventory cost[n]	C	QN
	Inventory turnover ratio[c]	C	QN
	Inventory flow rate[m]	C	QN
	Inventory days of supply[d]	C	QN
	Economic order quantity[a]	C	QN

Stages in supply chain	Measure	Cost (C) Time (T) Quality (Q) Flexibility (F) Innovativeness (I)	Quantitative (QN) or qualitative (QL)
	Effectiveness of master production schedule[a]	C	QN
	Number of items produced[b]	C	QN
	Warehouse costs[m,n]	C	QN
	Stock capacity[m]	C	QN
	Inventory utilization[m]	C	QN
	Stockout probability[b,n]	C	QN
	Number of backorders[b]	C	QN
	Number of stockouts[b]	C	QN
	Average backorder level[b]	C	QN
	Percentage of excess/lack of resource within a period[n]	C	QN
	Storage costs per unit of volume[o]	C	QN
	Disposal costs[o]	C	QN
	Planned process cycle time[a]	T	QN
	Manufacturing lead time[b]	T	QN
	Time required to produce a particular item or set of items[b]	T	QN
	Time required to produce new product mix[n]	T	QN
	Inventory accuracy[m]	Q	QN
	Inventory range[o]	F	QN
	Percentage of wrong products manufactured[n]	Q	QN
	Production flexibility[d]	F	QN
	Capacity flexibility[c]	F	QN
	Volume flexibility[b,n]	F	QN
	Number of tasks worker can perform[n]	F	QN
Deliver	Total logistics costs[o]	C	QN
	Distribution costs[b,n]	C	QN
	Delivery costs[m]	C	QN
	Transport costs[m]	C	QN
	Transport costs per unit of volume[o]	C	QN
	Personnel costs per unit of volume moved[o]	C	QN
	Transport productivity[m]	C	QN
	Shipping errors[b]	C	QN
	Delivery efficiency[o]	C	QN
	Percentage accuracy of delivery[n]	C	QN
	Delivery lead time[a]	T	QN
	Frequency of delivery[a]	T	QN
	Product lateness[b]	T	QN
	Average lateness of orders[b]	T	QN
	Average earliness of orders[b]	T	QN
	Percent of on-time deliveries[b,n]	T	QN
	Delivery performance[a,d]	Q	QN
	Delivery reliability[a,c,d,m]	Q	QN
	Number of on-time deliveries[b]	Q	QN

Stages in supply chain	Measure	Cost (C) Time (T) Quality (Q) Flexibility (F) Innovativeness (I)	Quantitative (QN) or qualitative (QL)
	Effectiveness of distribution planning schedule[a]	Q	QL
	Effectiveness of delivery invoice methods[a]	Q	QN
	Driver reliability for performance[a]	Q	QN
	Quality of delivered goods[a]	Q	QL
	Achievement of defect-free deliveries[a]	Q	QN
	Quality of delivery documentation[a]	Q	QL
	Delivery flexibility[h,m]	F	QN
	Responsiveness to urgent deliveries[a,m]	F	QN
	Transport flexibility[m]	F	QN
Return (customer satisfaction)	Warranty/returns processing costs[d]	C	QN
	Customer query time[a]	T	QN
	Customer satisfaction (or dissatisfaction)[b,n]	Q	QL
	Level of customer perceived value of product[a]	Q	QL
	Customer complaints[b]	Q	QN
	Rate of complaint[c]	Q	QN
	Product quality[h,m]	Q	QL
	Flexibility of service systems to meet particular customer needs[a]	F	QL

Notes: [a] = Gunasekaran *et al.* (2001); [b] = Beamon (1999); [c] = Schonsleben (2004); [d] = SCOR level 1 metrics; [e] = Hieber (2002); [f] = Ellinger; [g] = Sperka (1997); [h] = Artz (1999); [i] = Windischer and Grote (2003); [j] = Graham *et al.* (1994); [k] = Maloni and Benton (1997); [l] = Parker and Axtell (2001); [m] = Chan and Qi (2003); [n] = Chan (2003); [o] = VDI guidelines (association of engineers); [p] = Van der Vorst and Beulens (2001)

Source: Adopted from Shepherd and Gunter (2006)

In planning stage the organization need to balance between supply and demand requirements to make logistics, and production resources more effective (Caldelas & Pastor, 2006). In the ordered planning metric, the total order cycle time or order to deliver cycle time refer to the time available between the receiving the customer order until deliver his finish goods. The reduction of order cycle time leads to reduction supply chain response time, and as well as increase the performance and competitive advantage (Christopher, 1992).

The product range affects supply chain information system performance, depend on the organization plant should be more clear in introduce a new product range, have more perspective about added value per employee and environment change (Mapes, New, & Szwejczewski, 1997). The building process and performance measures hierarchy (PPMH), they considered on technology and engineering, internal Manufacture Operations, Research and development, and maintenance and storing as abases in plan for the production process (Wang, Chang, & Heng, 2004).

According to Bolstroff and Rosenbaum (2007) that, the source process interesting on obtain, receive, inspect, hold, issues, and authorize payment for raw material and purchased finished goods. In the environment of supply chain (efficiency, flow, integration, responsiveness and customer satisfaction) manufacturing should evaluate suppliers by using important measures at strategic, tactical and operational level. and tactical, operational and strategic level (Gunasekaran, Patel, & McGaughey, 2004). They cited that, in strategic level the managers there need to take care amount of measures like quality level, cost saving initiatives, lead time against industry norm. On other hand, the role of tactical level consists of booking in procedures, efficiency of purchase order cycle time, cash flow, quality assurance methodology and capacity flexibility, where as the operation level reflect the suppliers ability form day to other to have technical representation, capability to develop schedule, avoid complaints and have free defect deliveries this will improve competitive advantage of the organization (Gunasekaran, Patel, & McGaughey, 2004). From previous studies of the role and effects of IS, inter-organizational systems (IOS) research have used various categorization schemes and modes in order to systemize the different levels of external integration and their support for different styles of supplier-buyer relationship (Chound, 1997; Massetti & Zmud, 1996; Mukhopadhyay & Kekre, 2002; Saeed, Malhotra, & Grover, 2005).

The analysis purchasing and supply management of the suppliers on a periodic basis depends on their abilities to meet the firm's long term needs (Gunasekaran, Patel, & McGaughey, 2004).

In addition to that, there are some existing areas that need more attention such as supplier's general growth, supplier strategic planning which depend on the role of purchasing and supply management to increase the future production capacity and have more financial ability (Fisher, 1997). The information process have more related with cost in various type such as discount, invoicing, order flow and order entry (Gunasekaran & Ngai, 2004).

The next step which is make the product will coming after both order planned and good sourced stage. This process commonly refers to schedule the logistics and production activities as well as design, product test, packing and production rules (Schmitz, Marais, & Rey, 2005). In this stage organization carried out majority of activities that hold production sites, and has a main impact on product cost, quality, speed of delivery, clear and delivery reliability and flexibility (Mapes, New, & Szwejczewski, 1997; Slack, Chambers, Harland, Harrison, & Johston, 1995).

Gunasekaran, Patel, and McGaughey (2004) highlighted that the scheduling techniques described by the time or the date by which activities are to be achieved, such as ERP, MRP, and JIT have implications on purchasing, throughput time and batch size. Since in SCI context scheduling depend on the customer demands and supplier performance.

Stewart (1995) argued that, the delivery performance will be more achievable through a reduction lead time attributes, on time delivery. It include deliver the complete product either to a warehouse or directly to final consumer as well as the management therefore (Schmitz, Marais, & Rey, 2005). It measures the customer services level. However, there are various factors that influence delivery performance such as frequency of delivery on, vehicle speed, upon on the efficiency in these areas that can straight to decrease in the inventory level. All of that depend on the flexibility of deliver systems, which influence by customer's decision to place order, consequently, these lead to enhance this service from time to other (Novich, 1990).

There some determinates of delivery stage such as customer satisfaction, increasing the competition, changing the environment, and difficulties the system (Gunasekaran & Ngai, 2004). They added that, the design of efficient and cost effect distribution systems is basis of transportation activates, and impact on customer services.

Defective, warranty, and excess return processing, including authorization, scheduling, inspection, transfer, warranty administration, receiving and verifying defective products, disposition, and replacement all of these represent some types of return (Bolstroff & Rosenbaum, 2007). Even though, few measures were considered on process of return, or customer satisfaction. it was reached just to 5 per cent in with some researchers such as Shepherd and Gúnter research (2006).

According to Beamon (1999) that, the product should be in high quality to meet future customer demands, this level of quality depend on customer feedback , and it will contribute to improve supply measurement performance side. They conclude that customer' values and product quality are importance measurements to evaluate output process of SC.

Along the same line, Dîaz, Gil, and Machuca, (2005) determined various competitive priorities in operations (cost, quality, delivery and flexibility) as indicators to measure performance of investment in advanced manufacturing technologies (AMT). Bessen (2002) maintained that investment in information system practices are very significant to increase productivity and reduce cost. Later, Byrd and Davidson (2003) examined the impact of IT applications on supply chain operation and activities, and the effect of these relationship on firm performance. They found that using these applications assist some way to buying raw materials, selecting suppliers, managing operation and interacting with customers. Similarly, Lin and Tseng (2006) have constructed a research model that attempted to link supply chain participation strategy (SCPS), information technology application (ITA), and manufacturing participation strategy (MPS) on customer satisfaction (CS) and organizational performance (OP). They found a positive and significant relationship between ITA, CS and OP. This finding is consistent with the finding of Bayraktar, Tatoglu, and Zaim (2007) that information sharing capability will enhance organizational performance trough operational and competitive performance.

The ability to exchange information has become a serious basis for organizations to differentiate themselves from their competitors. Therefore, many firms are focusing on using IT as a source to facilitate the effective collection and utilization of information. In other words, when the data is available and easy to share between SC partners, information can be considered as a source of competitive advantage (Lin & Tseng, 2006; Novack, Langley, & Rinehart, 1995; Tan, Lyman, & Wisner, 2002). In 2006, Li, Ragu-

Nathan, Ragu-Nathan, and Rao studied the relationship between level of information sharing as a dimension of SCM practices and competitive advantage and organizational performance. Competitive advantage was measured by price/cost, quality, delivery dependability, product innovation, and time market; while organization performance had two measures i.e. market performance, and financial performance. They found that high level of SCM practices lead to have high level of both competitive advantage and organization performance.

Indeed, because of the importance of information sharing in organizations, Li and Lin (2006) suggested that future research should look at the relationship between information sharing and information quality in context of SCM, and the IT enablers that facilitate sharing exercise. Xiao-Feng (2007) also recommended that future studies examine the adoption of modern information technology in SCM method. According to Lee, Strong, Khan, and Wang (2002), even though much has been said about the importance of quality information sharing to serve consumer base, little is still understood as how it can influence performance especially in manufacturing companies. To fill this gap, this study focuses on quality information delivery as behavioral performance and its ability to predict SCIP. Study on this type of behavior is relevant in manufacturing context that has close partnership with suppliers and customers.

2.6 QUALITY INFORMATION DELIVERY AND SUPPLY CHAIN INFORMATION PERFORMANCE

As a mean for achieving competitive advantage and operation performance, many firms consider quality of information delivery between firm mangers and their customers and suppliers. However, Lee, Strong, Khan and Wang (2002) state that the need for quality of information has increased because of the growth of data warehouse and the direct access of information from various resources by managers and information users. Flow the information normally appears in various activities in the organization such as sales data, inventory information, order condition for tracking and tracing, sales forecast data, production and delivery schedule as well as capacity information and performance metrics (Farley, 1997).

The impact of SCM practices on quality of information will be more significant depending on what the information is, who share the information, when the information is shared, and with whom is shared (Chizzo, 1998; Fawcett, Osterhaus, Magnan, Brau, & McCarter, 2007; Holmberg, 2000). Within the context of supply chain, information quality delivery can be defined as a managerial behavior in a storing and distributing material to get the right information to the right customer, and supplier, at the right time, at the right place, in the right condition, in the right quantity, and at the right cost (Russell, 2007).

Many organizations lack information in various operations and administration systems, and this consequently affects the delivery of this information to organizations and people who mostly need it (Scheer, Theling, & Loos, 2002). It is through the concept of SCM practices that information quality will improve the level of operation performance constructs i.e. flexibility, reduced lead time in production, forecasting, resource planning, cost saving and reduced inventory level (Bayraktar, Tatoglu, & Zaim, 2007; Zain, Rose, Abdullah, & Masrom, 2005).

Good quality information will helps managers make specific decision making especially in terms of production status and cost, transportation availability and quantity discount, inventory cost, inventory levels, and planned promotional strategies (Sahin & Robinson, 2002).

According to Cooper, Lambert, and Pagh (1997), information sharing during integrated business process have significant role to add value for customers and other stakeholders. Because the main elements of supply chain relationships units are goods, and flow of financial and information data (Soultion., 2008), availability and accessibility a data between different parties within SC and organizations will accelerate information flow in an efficient and effective way (Akkermans, Bogerd, Yücesan, & Van, 1999; Altum 1999; Stadtler, 2000). The quality of information declines when the information value has very poor reliability or validity (Li & Lin, 2006). Lee, Strong, Khan and Wang (2002) emphasize that an organization needs to develop comprehensive measures of information quality to enable it to benchmark its efforts against other organizations.

The examination of information quality dimensions (accuracy, timelines, formatting) must reflect the exchange of information in internet (Feldmann & Mrller, 2003; Moberg, Cutler, Gross, & Speh, 2002). Feldmann and Mrller, (2003), and Moberg, Cutler, Gross, and Speh, (2002) added that managers and members cannot use SC partner's information if they have difficulty perceiving the level of information quality.

According to Sahin and Robinson (2002), the degree of information sharing ranges from sharing the immediate replenishment order only to sharing all POS, inventory and cost data. Because of this, timing of information plays an important role in quality of information delivery.

Boyer and Olson (2002) find that accuracy of information is more important for accounting purposes. Sales bill must be prepared accurately and so is availability of supplies and materials online. Indeed, Boyer and Olson maintain that ever since traditional method of transaction had been replaced by online transaction, online transactions have been easier to make because of their accurate properties. Internet based platform in SC has given retail store managers and suppliers an opportunity to sharing information and knowledge. This practice has led to increased order accuracy and fewer out- of -stock situation (Boyer & Olson, 2002). Pramatari (2006) pointed out that the integration between various systems levels strongly enhances information exchange within the industry. In SC more particularly it increases flexibility (volume and time) of the supplier, leads times and improves delivery accuracy. Indeed, increased forecast accuracy and delivery performance, reduced supply chain planning cycle time, synchronized inventory supply/demand schedules, automated inventory replenishment, elimination of unnecessary administrative burden and drive for continuous improvement with integrated intelligence have been important elements in Supply Inventory Management (SIM) (Sahin & Robinson, 2002). Lin and Tseng (2006) argue that accurate and useful information will contribute to enhanced strategy making formulations.

Li, Ragu-Nathan, Ragu-Nathan, and Rao (2006) examined quality of information sharing in terms of accuracy, adequacy and credibility of information exchange toward competitive advantage. They measured competitive advantage on financial criteria, consisting of return on investment (ROI), and market share including growth of sale. They found that strategic supplier partnership, level of information sharing, and quality of information delivery are strong indicators of of SCM practices, and lead to provide the organization competitive advantage on cost, quality, dependability, flexibility, and time-to-market dimensions. Fawcett, Osterhaus, Mangnan, Brau, and McCarte (2007) found that willingness dimension of quality information have impact on completive performance such as sales growth, market share, and growth return, return on investment (ROI).

Accuracy and flexibility of information are important criteria of quality information delivery to respond to customer demands and supplier's offers. Lin and Tseng (2006) state that in developing information system, it is important to consider high level of services, cost and quality.

Zuckerman (2005) argue that cost leadership significantly improved planning process when demand information has been shared with the suppliers. Furthermore, sales information system of organization also can provide demand information based on booked orders from final customers. Similarly, other researchers have mentioned that product-related information is one of the important elements to develop convincing customer satisfaction (Gregus & Benova, 2006). In a similar vein, Palanisamy (2005) conceptualizes quality as one important element of information system that can contribute to improved user satisfaction and organizational performance.

There are two stages to successful the relationship between suppliers and customers. The first one is corporative level, the next one coordination and collaboration level. During those stages share and flow the information through electronic data interchange (EDI) and the internet is very necessary to improve the product quality and to provide high level of service (Mayer, Davis, & Schoorman, 1995). Consistent with Sriram and Stump (2004), Hemsworth, Sánchez-Rodríguez, and Bidgood (2005) view information quality as a major aspect of quality management practices in close collaboration internally with other function such as purchasing, marketing, production and externally with suppliers.

In the related research Brewer, Speh, (2000) and Cooper et al. (1998) found that the main roles of SCM is coordination and sharing of information between the firms in SC. They also believed that those roles will improve value delivery to customers and reduce total logistics cost.

Xiao-feng (2007) states that SC collaborative have been happened when two or more companies share the responsibility of exchange common planning management, execution, and performance measurement information. In addition to that, during this exchange these companies have implemented some practices such as Continuous Replenishment Program (CRP), Vendor Management Inventory (VMI) and Collaborative Planning, Forecasting and Replenishment (CPFR). The manufacturer (supplier) has a responsibility for managing the customer inventory police which include the replenishment process based on the difference of the stock level in customer's main warehouse or distribution centers (Anthony, 2000). Actually CRP will be in front of VMI since the inventory policy is based on the sales forecasting, and it is created from historical demand data on the variations of inventory levels at the customers main stock-holding facility (Cook, 1998).

Moreover, the negative impact of the bullwhip effect on supply chain can be reduced by sharing information with trading partners (Yu, Yan, & Cheng, 2001). Doney and Cannon (1997) highlight that buyer will trust supplier who share confidential information which provides a signal of "good faith" to the buying firm. The new business contentious grows and flourishes by using the internet in the exchange information. Therefore, internet technology has been made supply chain process more speedily, flexibility and timely (Holmberg, 2000). As consequence, using particular of technology very well will reduce the amount of time to complete the work, and increase the accuracy and efficiency of job. Moreover, information accuracy in the web site or organization system comes to be very essential to internet users, and that will facilitate the managers to making a right decision and to improve performance organization activities (Boyer & Olson, 2002).

The application of information technology in SCM includes the following features : Electronic data interchange (EDI), Bar Code Technology, Expert system/ Artificial Intelligent, communication technology, Database Technology / Data Warehouse Technology, and Networking Technology / Electronic Business which will be more consideration in this research (Mentzer, Min, & Zacharia, 2000). Wang Hu and Qing-nan (2001) state that goods consist of products and /or services could be either digital or physical, while Information and financial transaction all times handled digitally. Moreover, they added that material products and services involve exchange relations in a physical environment, digital exchange relations, like digital products and services, financial transactions and information itself also can be used by information technology particular the internet technology.

The internet has made e- business easier to share information among SCM and that improve operational performance, customer services, and solution development (Scheer, Theling, & Loos, 2002). Recently, the retail scoter has started moving away from EDI to new ways of information exchange, mostly facilitated by internet- based communication platforms and retail exchanges, furthermore applied (e-marketplaces) (Swaminathan & Tayur, 2003). During these facilities suppliers can access to more buyers, and the buyers can make a lot of transaction with many suppliers. These exchanges require more efficient supply system, rapid communications facilitating improvement in planning, transporting, warehouse management and procurement procedure (Sparks & Wagner, 2003).

According to Andraski (1994) that information flow have three models to sure about the quality of information: Firstly, information transfer model, in this model information flow moves when actors in SC sure about the maintain date. This function will be achieved by specific actor in IT-system. The next one is third party model; the main activities of third party consider on collecting and maintaining information in database for supply chain. The last one is information hub model. In this model a distribution information system have a similar task of third – party in second model, and have extra management functions. All of these information systems linked by Common Object Request Broker Architecture (CORBA) as an information sharing technology. In other related studies information flow interface based on TCP/IP technology clarified as semi-structured and structured data (Scheer, Theling, & Loos, 2002; Tancnbaum, 1997). Both of these classifications not allow exchange of any information does not contain any fix scheme or cannot interpreted semantically expect address of e-mail and www. Also usage EDI-system to linkage between suppliers and customers among companies requires high quality of documents among large amount of transactions (Steffen, 1995).

Internet presents basic instrument for sharing information. Both internet and intranet are support organization SC (WWRE, 2000). Moreover, he highlighted that on the internet applications roles which provide timely and low cost of sharing information for members in SC, and it's improve the efficiency of service. By using computer and network technology, the Internet environment enhances the commercial activities for both products and services (Xiao-feng, 2007). It reduces transaction cost, improves information management and effective decision-making (Yu, 2001). He added that electronic business can advance the efficiency of SC form system management, stocking management, transportation management and information flows.

The research in the area of IT adoption can be compared depend on the level of analysis. Moreover, it depends on the individual acceptance by employees of organization, while organizations have to make decision of the adoption, and every result have different theoretical model (Venkatesh, Morris, Davis, & Davis, 2003). Based on Theory of Reason Action (TRA) which explained human behavior by behavior intension, attitude and subject norm (Fishbein & Ajzen, 1975). However, Theory of Planned Behavior (TBP) extended TRA by (Ajzen, 1985) and (Ajzen, 1991) to include the construct of behavioral control. Furthermore, Technology Acceptance Model (TAM) which established by Davis (1986) argued that the IT acceptance depend on the usage behavior which existing by perceived ease of use and perceived usefulness. Whereas, behavioral intension consists of mouth communication, purchase intention and continued interaction (Morgan & Hunt, 1994). Depend on explanation above, majority types of behavior intension can be achieve through internet applications.

According to TAM, behavioral intention (BI) is a major determinant of use behavior; and that behavior can be predicted by measuring BI. Therefore, when internet technology users have the intension to deliver the information to others due to quality information sharing that improve the supply chain information performance.

Previous research user acceptance on the success information technology such as (Autzen, 2007) investigated IT adoption by conceptualizing both quantity and quality usage. He argued that depend on extended TPB model by (Taylor & Todd, 1995) to context of IT usage, the main difference to this model is replaced behavioral control by actual behavioral control. He added that, the quality of system usage toward implementation success impact by: attitude, and knowledge regarding system usage (actual ability). In other hand, quantity of system usage impact by attitude and subject norm only by the influence of superiors. However, this research will be consider on the quality usage, and in the following parts will show some variables that reflect use knowledge and ability to use actual system.

Even though, some users have negative attitude towards usage behavior, they can be enforced by their superiors to use the system. Therefore, their attitude will impact their usage quality and thereby implementation success(Autzen, 2007). The linkage between technology usage and firm performance was examined, and firm that were high users of warehousing information technology higher levels of warehousing performance in the same areas (Mobering, Cutler, Gross, & Speh, 2002; Rogers, 1995). This emphasizes that linkage between quality of usage in internet application and SC information performance is very high. In other words, firms which have high level of quality usage have high level of SC information performance.

Either firm's users have high level of quality information sharing with their suppliers and customs, or they intension to have quality information delivery to other over internet applications that will improve the performance of SC Information system for the organizations (Autzen, 2007; Rogers, 1995).

2.7 ANTECEDENT FACTORS OF INFORMATION QUALITY DELIVERY

A review of work in the area of information quality in the context of SC information system indicates a substantial number of studies have examined its antecedents such as environmental uncertainty, intra- organizational facilities, and organizational relationships (Li & Lin, 2006), internal, intergenerational and economic factors (Madlberger, 2008), trust (McDowell & Karrike, 2008), intranet, organizational and individual characteristics (Masrek, Abdul Karim & Hussein, 2007), individual, internal, external, and system factors (Wu, Chiag, Wu, & Tu, 2004), IS dimension (facilities, competency, structure, and integration) and user support (Mellarkod, Appan, Jones, Sherif, & Attendence, 2007), intra organizational and extra organizational factors (Igbaria, Zinatelli, Cragg, & Cavaye, 1997), technological-level (infrastructure) and individual-level (reuse-related experience and self-efficacy) (Mellarkod, Appan, Jones, & Sherif, 2007). Despite the various antecedents examined, many calls have been made for further empirical research (Lee, Strong, Kahn, & Wang, 2002; Lenger & Schemm, 2008; Li & Lin, 2006; Mentzer, Min, & Zacharia, 2000; Moberg, Cutler, Gross, & Speh, 2002;

Venkatesh;, Morris, Davis, & Davis, 2003) to investigate the antecedent factors of IQD toward the high level of SC performance.

In the following sections, the antecedent factors that are considered in the present study are Internet technology factors (ITF),

2.7.1 Internet Technology Factors (ITF)

A large amount of research has been carried out in an attempt to identify the influence of Internet technology factors on quality information delivery (Carroll, Rosson, & Zhou, 2005; (Li & Lin, 2006; Lim & Paliva, 2001; McKnight, Choudhury, and Kacmar, 2002; Mohd.Yusoff, Muhammad, Zahari, Pasah, & Robert, 2009; Mukherjee &Nath, 2007; Seddon & Kiew, 1996; Sherrellb, & Stafforde, 2008; Wang, Wang, Lin, & Tang, 2003) In the present study, the focus is given on examining the influence of perceived usefulness, perceived security, perceived privacy, perceived trust, collective efficacy, supply chain-commitment, management support, and technical support motivation as potential antecedents of quality information delivery. The rationales for considering these variables are because, firstly, all these variables have been found to be consistently correlated with information quality in prior studies. However, since most of these studies have been conducted in the Western countries, there is a need to investigate these variables in a different country as a relevant extension of knowledge (Li & Lin, 2006). Secondly, these factors have been applied in various supply chain information settings in past studies to reflect organizational adoption Internet applications and the extent of information quality delivery between suppliers and customers, and thirdly, these Internet technology factors seem to have precipitated a lot of research interest in different SCM environments. It might be especially interesting to investigate their relationship with information quality delivery in other environment such as the manufacturing sector. Justifications for the selection of these factors are discussed in detail in sub-sections below.

2.7.1.1 Perceived Usefulness (PU)

The main two issues among many variables that may influence system use suggested by previous research are (a) whether users tend to use or not use an application they believe will help them perform their job better (perceived usefulness), and (b) whether users find the system not difficult to use (easy of use) (Davis, 1989). These issues have been largely examined on diverse technologies such as personal computers (Igbaria & Iivari, 1995), Electronic Data Interchange (EDI) (Angles & Nath, 2000), or e-commerce (Childers, Carr, Peck, & Carson, 2001), and few have investigated perceived ease of use or usefulness as organizational factor by considering the company as the user (Ortega, Martínez, & Hoyos, 2007).

The important role of perceived usefulness on the behavior of sharing information has been the subject of numerous studies (Armstrong, Fogarty, Dingsdag, & Dimbleby, 2005; Eriksson, Kerem, & Nilsson, 2005; Guriting & Ndubisi, 2006; Hus, 2006; Mohd.Yusoff, Muhammad, Zahari, Pasah, & Robert, 2009; Seddon & Kiew, 1994; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003; Yu, Yan, & Cheng, 2001). Perceived usefulness is defined as a type of extrinsic motivation which refers to the prospective user's belief that applying a system will be beneficial (Rouibah, 2008). Davis (1989) defined perceived usefulness as the degree to which a person believes that using a particular system would enhance his or her job performance (by reducing the time to accomplish a task or providing timely information). Efficient job performance is accomplished when the tasks are achieved in less time (Mathwick, Malhotra, & Rigdon, 2002).

Davis (1989) further notes that perceived usefulness in technology acceptance model (TAM) initially refers to job related productivity, performance and effectiveness. The purpose of TAM is to explain user acceptance of IS from measures that have been taken after a period of interaction with a particular system (Szajna, 1996). The unified theory of acceptance and use technology (UTAUT) involves five constructs postulated to affect performance expectancy i.e. perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations (Venkatesh, Morris, Davis, & Davis, 2003)

The importance of perceived usefulness has been commonly recognized in electronic transaction within organizations. The Graphic, Visualization and Usability Center (GVU) at the Georgia Institute of Technology listed that the most common uses of web by users are browsing (79%), followed by entertainment (64%), work (52%), and shopping (11%) (Pitkow & Kehoe, 1996). Usefulness is also identified as features of a website. Therefore, information on organization such as finance, human resource, marketing and research development might provide useful feature to a website (Lederer, Maupin, Sena, & Zhuang, 1998).

Perceived usefulness basically consists of three main clusters that are different but closely related and equally important behavioral components namely effectiveness, productivity and time saving, and the importance of the system to organizations' tasks (Davis, 1989). The effectiveness for the organization requires that information system contributes to improve its operation performance (Schultz & Slevin, 1975). The second cluster consists of two dimensions: productivity and time saving, in which the system is perceived to be useful if it contributes to quality in production and timeliness. The third cluster is the importance of system to help users in their job. This cluster considers on how using information system help managers perform the tasks related to their job and to address the organizations needs (Davis, 1989).

In essence, perceived usefulness helps the enterprise to adopt various kind of information system to improve the supply chain effectiveness. Moreover, the usefulness of information technology contributes to assisting supply chain partners to perform their task perfectly, and to proceeding adoption of IT in their organizations (Lippert, 2005). Therefore, the easier to use such technology and the greater benefits expected from it are closely related to the performance enhancement expected (Amoako-Gyampah, 2007).

Despite the limited number, studies have shown that there is positive and significant relationship between usefulness and information quality (e.g. Armstrong, Fogarty, Dingsdag, & Dimbleby, 1977; Seddon & Kiew, 1994). Because of the scarcity of research on this aspect, Seddon and Kiew (1996) have suggested that future research should study the impact of perceived usefulness on the information system and information quality from organizational perspective toward supply chain performance in the context of B2B such as e-SCM.

In SC process transportation gives significant result by improving customer service firms' cost structure. Taiwanese firms have Automotive Vehicle Location System (AVLS) to get real-time information for motor carrier (Cheng & Wang, 2009). Cheng and Wang noted that most previous researches have given attention to improving operation performance and cost effectiveness through AVLS application, but less of them investigated behavior intention and acceptance of AVLS. In their empirical study they found that both easy of use and usefulness affected behavior intention, and improved acceptance behavior of AVLS for logistic corporation.

Correspondingly, Bienstocka, Royneb, Sherrellb, and Staffordc (2008) showed that logistics services quality (LSQ) and TAM incorporate use and acceptance of information technology as critical components for LSQ model. Not only they tested the two main TAM constructs i.e. perceived usefulness (PU) and perceived easy of use (PEU) with intention to use information technology tools, but they also provided evidence that PU has a stronger relationship to intention to use information technology tools than PEU.

Reviews of the existing literatures indicates that most of the studies to examine the relationship between perceived usefulness as an organizational acceptance and intention in sharing information among various users have been conducted in academic departments, small wholesaling and manufacturing areas, and transportation sector (Alnsour, Trueman, & Tassabehji, 2007; Cheng & Wang, 2009; Bienstocka, Royneb, Sherrellb, & Staffordc 2008; Lippert, 2005). These studies have demonstrated a positive association between these two constructs. This indicates that organizations using Internet applications will have quality of sharing of information when they perform their activities in the SC context. Given the importance of perceived usefulness to operation management, the need for specific research on the effect of the perceived usefulness on the information quality delivered and towards supply chain information peformance is therefore justified.

2.7.1.2 Perceived Security (PS)

Another Internet technology factor that is identified as antecedent variable in the present study is perceived security. Pikkarainen, Pikkarainen, Karjaloto, and Pahnila (2004) studied acceptance factors on banking transaction recommended that future research looks into quality of sharing of information over the Internet and multidimensional constructs such as trust, security and privacy. In the present study, the relationship between perceived security and the behavior of sharing information among SC members (Faisal, Banwet, & Shankar, 2007) is considered. The other dimensions will be covered in the following sections.

The September 11 tragedy has undeniably affected the efficient operation of international logistics, and hence the security initiative for imports and exports has raised a lot of interests from international business managers (Kolluru & Meredith, 2001). Martin et al. (1999) mentioned that organizations still need to make appropriate arrangements to the issue of security of information, during sending and receiving date. The reason for that is to prevent any risks of losses caused by intrusion, system misuse and privilege abuse. Yousafzai, Pallister, and Foxall (2003) highlighted that perceived security and perceived privacy on online transaction are distinctive constructs, even though they are conceptually related. Therefore, security as defined by Kalakota and Whinston (1997, p.122) refers to “the threat which creates circumstances, condition or event with the potential to cause economics hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and /or fraud, waste, and abuse”

Security threat sometimes arise at the network level (the server), the user personal computer (the client) or during communication channel (Lallmahamood, 2007). The security of information requires prohibition of disclosure about any of the important information and disallowing infringement to the information systems used during communication between SCM partnerships. A substantial number of studies (Bhatnagar, Misra, & Rao, 2000; Faisal, Banwet, & Shankar, 2007; Goode & Harris, 2007; Laforet & Li, 2005; Li & Huang, 2009; Mohd.Yusoff, Muhammad, Zahari, Pasah, & Robert, 2009; Salisbury, Pearson, Pearson, & Miller, 2001; Shin , Coller, & Wilson 2000; Vijayasarathy & Jones, 2000; Yousafzai, Pallister, & Foxall, 2003) have shown that perceived security is associated with the behavior of sharing information in business process.

Warrington, Abgrab, and Caldwell (2000) categorized perceived security on the website into two dimensions namely decreased environment risk and raising the security. On the other hand, Knight (2003) proposes SC security of different elements: risk analysis, physical security, access control, personal security, education and training awareness, information security, training partner security and others. The different levels of security require different levels of collaboration and the sharing of data between the trading partners, and that lead to different types of relationships between them (Martin, Brown, DeHayes, Hoffer, & Perkins, 1999).

Faisal, Banwet, and Shankar (2007) include other kinds of risk that is information risk. They classify information risk from the perspective of supply chain as: (a) information security/breakdown risks, (b) forecast risks, (c) Intellectual property rights risks; and (d) IT/IS outsourcing risks. Knight (2003) also points out that information can be protected against erroneous information by a number of measures such as limiting access to supply chain information to those with a "need to know", safeguarding computer access and information, controlling access to information systems, physically securing computer areas, and installing a software system that registers the transaction or support operations and makes a follow up of activities it handles.

Faisal, Banwet, and Shankar (2007) argue that managers have to minimize the real-time risk in SCM and the free information. This is because reducing perceived risk is associated with transaction processes by increasing consumer online trust or by raising security (Koufaris & Hampton-Sosa, 2004; Pavlou, 2003; Warrington, Abgrab, & Caldwell, 2000). Even though online applications provide a channel for searching information of products and services, users still worry a bout the security of transmitting credit card information via net (Bhatnagar, Misra, & Rao, 2000; Li & Huang, 2009). This is because attackers can still reach the infrastructure of SC partners and disrupt their business operations and functions because the lack of security programming (Sheu, Lee, & Niehoff, 2006).

Ha and Stoel (2005) in their research among students who had experiences browsing and purchasing products online extended TAM variable by capturing key beliefs that influence consumers' attitude towards e-shopping. They found that e-shopping quality dimension (website, customer service, privacy/security, and atmosphere/experimental) determines perceptions of usefulness, trust, and enjoyment which in turn influence consumer's attitude toward e-shopping behavior.

Goode and Harris (2007) examined online behavioral intention as a consequence of six variables (i.e. website presentational consistence, perceived online reputation, perceived online security, banner advertising, perceived reliability, and appearance and site design), and looked at the moderating effect of switching inducements and switching costs. They found that perceived online security antecedent had a direct, positive and significant influence on online behavior intention. Likewise Laforet and Li (2005) found that perceived security is the most important factor that could motivate consumers in using mobile or online adoption in China. In addition, they demonstrates that hackers and fraud as the main barriers of online banking adoption there.

Salisbury, Pearson, Pearson, and Mille (2001) used theory of reason action (TRA) and TAM to examine the impact of beliefs about web shopping on intent to purchase products using the World Wide Web. They found that perceived security is a greater influence on intention to purchase followed by usefulness and ease of navigation. When users feel their credit card numbers and other sensitive information are safe on the World Wide Web, they are more likely to shop online. Shin, Coller, and Wilson (2000) used theory of acceptance and use technology (UTAUT) model in their empirical research with constructs of security, trust, social influence, and self-efficacy. They revealed that users' attitudes and intentions are influenced more by perceived security and trust than perceived ease of use and usefulness.

From the discussion above, it appears that perceived security has generally produced supportive evidence for quality information delivery. However, since most of these studies were conducted in the West, the applicability of the findings may be limited to different cultural contexts (Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004). As a newly industrialized economy, Malaysia still needs to work harder on ICT penetration rates, development of local content and security of infrastructure networks (Third Outline Perspective, 2006), particularly in the manufacturing and services sector in which supply linkages with large high-technology as well as more smart partnerships and strategic alliance are highly encouraged. For this reason, perceived security is included as a potential antecedent of information quality delivery in the manufacturing sector context.

2.7.1.3 Perceived Privacy (PP)

Another Internet technology factor which has been frequently cited in the quality information delivery toward supply chain information performance is perceived privacy. Salisbury, Pearson, Pearson, and Mille (2001) discuss that need for future effort to tackle the issue of privacy browsing versus security, and its influence on behavior intention.

Perceived privacy has long been accepted as the right of individuals, groups or institutes and they decide for themselves when, how, and to what kind of information they need to deal with during communication with others (Westin, 1967). Thus it is not surprising that many customers worry that companies will use their information for marketing and other secondary purposes without their permission (Painea, Reipsb, Stiegerc, Joinsona, & Buchanan, 2007; US Public Interest Research Group, 2000).

According to Yousafzai, Pallister, and Foxall (2003), perceived privacy includes both reliability and credibility dimensions related to sharing of information among users of IT. During the communication on the website many users handle a lot of information on certain procedures. Credibility and reliability therefore are important issues in these transactions (Choate, 2000). Demonstrating credibility is very clear in the relationship between a seller and a buyer, and whether the seller keeps his/her promise or not. The level of honesty from the buyer to the seller will reduce or increase depending on the credibility of the seller (Yousafazi, Pllister, & Foxall, 2003). But credibility will be ignored in business by sellers and buyers when they enter products to the marketplace without established brand name (Warrington, Abgrab, & Caldwell, 2000).

Wang, Wang, Lin, and Tang (2003) argued that the main threat that pushes many people from participating in the transaction over banking website is the lack of the credibility. They added that a privacy seal is a mechanism to exchange accurate information during transactions. They noted that perceived credibility is an important dimension that affects intention behavior to adopt Internet- based transaction systems in many studies. Conversely, credibility is perceived to be lacking when there is intrusion from hackers of the systems who transfer personal information or money that belongs to others without their knowledge or permission (Knight & Burn, 2005). Basing on theory of planned behavior (TPB) and TAM that integrate trust constructs such as perceived credibility, self efficacy and perceived cost in mobile commerce, Sun, Wang, and Cao (2009) found that all variables in the model which include credibility except ease of use significantly influenced user's behavioral intention to engage in online shopping.

In Taiwan, Wang, Wang, Tang, and Lin (2003) found that perceived credibility is the most predictive factor that affects behavioral intention to use Internet banking systems compared with perceived ease of use and usefulness. Jun (2002) divided Internet context based on service quality into two groups: Internet purchasing and non Internet purchasing in Hong Kong. She found that the most important dimension that affects the service quality assessment is "reliability" in Internet purchasers, while in non purchasing "security" was the most critical dimension factor.

Control over all information is a key dimension of privacy and has been emphasized by some researchers in different disciplines including information system, electronic commerce, organization and social sciences, information technology, management science, marketing, and banking (Kervenoael, Soopramanien, Hallsworth, & Elms, 2007; Liu, Marchewka, Lu, & Yu, 2005; Painea, Reipsb, Stiegerc, Joinsona, & Buchanan, 2007; Ranganathan & Ganapathy, 2002; Sun, Wang, & Cao, 2009; Xu, Gupta, & Shi, 2009; Yousafzai, Pallister, & Foxall, 2003). Liu, Marchewka, Lu, and Yu (2002) state that privacy phenomenon appears strongly in B2B applications, and it promotes customers' claims about the kind of information organizations want to disclose about. In order to protect the privacy of individuals, the responsibility falls on the organization that collects the personal information, and the organization that receives the secondary data (Liu & Arnett, 2002). Because of the data transmission and emerging technologies, collecting personal information from customers and sharing it with other parties become easier and cheaper than before (Clay & Strauss, 2000). As a result, Liu, Marchewka, Lu, and Yu (2005) noted that such situation requires high coordination within the companies. Managerial and technical measures are very necessary to protect users of information from any misuse, loss, data safety and unauthorized access (Liu & Arnett, 2002).

Ranganathan and Ganapathy (2002) evaluated key dimensions of B2C website and found that security and privacy had greater effect on purchasing intention. Correspondingly, Udo (2005) investigates the issue of privacy and security of IT that consists of e-mail and Internet shopping, and considered firms that do their business on the Internet. They found that the high presence of online purchase decision ranked perceived privacy as the most important variable followed by security and threats, children protection on the Internet, e-mail safety and censorship, impersonation and forged identity.

By using Unified Theory of Acceptance and Use of Technology (UTAUT) in 'Location-Commerce' by using Location-Based Services (LBS) as mobile devices, Xu, Gupta, and Shi (2009) found that the privacy concern has a significant influence on intention to use LBS in case push-based LBS, whereas privacy concern influences performance expectancy in case of pull-based LBS. Moreover, Kervenoael, Soopramanien, Hallsworth, and Elms (2007) concluded that privacy had contributed to growth transaction and purchasing level in e-grocery sector through retailer's ability to get accurate and up-to-date data via information sharing.

Since there is evidence on the importance of privacy for online users, companies have to understand how to get competitive advantage of the private information that is not available to one or more organizations in supply chain (e.g. retailer, manufacturing) (Atallah, Elmongui, Deshpande, & Schwarz, 2003). They add that private information will give power for supplier or buyer in SC by enabling them to achieve a desired system without revealing the private information to any parties and to improve supply-chain management practice.

As a summary, perceived of privacy is very important in transaction between customers and supplier providers online and users' behavioral intention in e-commerce (Yousafazi, Pllister, & Foxall, 2003). Therefore, perceived privacy is included as a potential antecedent of information quality delivery towards supply chain information performance.

2.7.1.4 Perceived Trust (PT)

In his study on online banking, Pikkarainen, Pikkarainen, Karjaloto, and Pahnila (2004) called further research between firms that use Internet in financial transactions, and to establish a correlation between multidimensional constructs (perceived privacy, perceived security, and perceived trust) and quality of sharing information. Furthermore, Li and Lin (2006) recommended that future research should apply suitable theories to explain the causal relationship among antecedents of information sharing and information quality such as trust, commitment and shared vision between supply chain partners and IT enablers. In addition, previous researches have used perceived trust as one of the antecedents of behavioral intention in Technology Acceptance Model (TAM) (Chen, & Barnes, 2007; Gefen, Karahanna, & Straub, 2003; Song & Zahedi, 2002; Yu, Yan, & Cheng, 2001). Based on these reasons, perceived trust is considered as an Internet technology factor and as an antecedent in the present study.

Trust is defined as the readiness to rely on a trading partner in whom one has confidence (Monczka, Petersen, Handfield, & Ragatz, 1998). Other definition considers the customers' belief that a supplier is honest, benevolent and competence (Ryssel, Ritter, Gemu¨nden, & Georg, 2004). Trust consists of various beliefs of integrity, benevolence, and ability (Yu, Yan, & Cheng, 2001). Rotter (1967, p.652) defined inter-organizational trust as "when one party has hold confidence in an exchange partner's reliability and integrity".

Mayer, Davis, and Schoorman (1995) argued that a trustee who possesses the above traits is very desirable as an exchange partner. Because of that a supplier who behaves more ethically, kindly, skillfully, and consistently during the exchange will be respected by consumers. Trust is a critical factor that makes e-commerce flourish and encourages many people to shop online (Ruppel, 2004; Wu & Chang, 2005). Yousafazi, Pllister, and Foxall (2003) also state that trust can eventually help in improving the quality and reducing the production time.

Trust is determined by a consumer's beliefs in the ability, benevolence, integrity, and predictability of a given company (McKnight, Choudhury, & Kacmar, 2002). It is also measured through supply chain partner's belief about the ability, benevolence, integrity, and predictability of the organization's applications (Wu & Chang, 2005). Similarly, Mayer, Davis, and Schoorman (2002), and Eppler and Muenzenmayer (2002) mentioned that trust is organizational determinant of behavior that is about ability, benevolence, integrity and predictability of the other groups.

In dealing with ability and benevolence dimensions, McKnight, Choudhury, and Kacmar (2002) pointed out that if an e-vendor interacts online with his/her customers, he/she should be able to convey them. When a website has high ability it means that it has a good quality (Mayer et al., 1995). Other researchers measured competence as the ability of the vendors to meet their customer's requirements (McKnight, Choudhury, & Kacmar, 2002), whereas the benevolence dimensions indicates the level which the seller believes is good to what the customers desire via the Internet media such as providing suitable help or answering frequently asked question during using particular application (Wu & Chang, 2005). In other words, it is a positive orientation of the trustee toward the trustor. To improve the relationship between customers and suppliers, and to advance level of quality of information sharing between the organizations, managers need to maintain the integrity of a set of rules for users so that they will accept the transaction during the Internet applications (Mayer et al., 1995). Likewise, Ring and Van de Ven (1992) consider moral integrity as fundamental in structuring corporative relationships between organizations. In other words, the trustee is sincere to keep his/ her promise (McKnight, Choudhury, & Kacmar, 2002). Last but not the least is the predictability dimension. It refers to customer's ability to predict the supplier performance whether positive or negative, or whether he/she has any interest in transacting with the customer or not (McKnight, Choudhury, & Kacmar, 2002).

Many studies have found significant and positive relationship between trust and behavioral intention in e-commerce adoption. For example, Chen and Barnes (2001) indicated the relationship between initial trust and online behavior in the context of Taiwanese online bookstores. They found that both initial trust and familiarity with online purchase have a positive impact on purchase intention. Likewise, Liu, Marchewka, Lu, and Yu (2002) conducted a survey in the US to investigate the level of trust an individual has in influencing his/her behavioral intentions to participate in an online business activity. Their study revealed that the degree of trust is positively related to whether the individual will visit the online again, would make an online purchase again, recommend the site to others, and make positive comments about the site. Similarly, Mukherjee and Nath (2007) who employed commitment-trust theory in online retailing context concluded that both trust and commitment have significant impact on behavioral intention. Behavioral intention consists of mouth communication, purchase intention and continued interaction (Morgan & Hunt, 1994). Hence, positive relationship is found to exist between trust, commitment and continued interaction between retailer and buyer.

McKnight, Choudhury, and Kacmar (2002) conducted an empirical survey to measure web trust model which includes four high level constructs: deposition to trust, institution-based trust, trusting beliefs, and trusting intentions. They found that perceived website quality is positively related to both trusting belief and trusting intentions, causing people to make trust-related assumptions about others depending on what they known about them. However, because there are various types of risk in e-commerce environment such stolen personal information by hackers or uncertainty of vendor behavior, trust creates a feeling of confidence to the web users, and accelerates the adoption of e-commerce.

Wu and Chang (2005) argued that online community members are more inclined to succeed in attracting people to depend on the Internet connection such as procurement, cooperation and sharing of information. Such behavior comes from online trust.

It is shown that trust has a positive relationship within the SC context to operation information, but not with strategic information (Wu & Chang, 2005). This is because organizations do not share sensitive strategic information that represents the firm's plan for establishing competitive advantage. Chen and Barnes (2007) and Gefen (2003) argue that different consumers have different readiness in trusting suppliers, specially if they have insufficient information or have information in an unfamiliar situation about the suppliers.

Mutual trust between suppliers and customers has significant influence in the quality of information sharing over Internet applications in the SC context. Ryssel, Ritter, and Gemünden (2004) found that in IT operations particularly in the Internet processes, trust enables sellers to process timely and accurate information to customers.

The same findings are reported by Li and Lin (2006) who conducted an empirical survey among managers in various manufacturing sectors. Their study estimated the impact of environmental uncertainty, intra-organizational facilitators, and inter-organizational relationships on information sharing and information quality in supply chain management. They found that both information sharing and information quality are influenced positively by trust and shared vision between SC partners, but negatively by supplier uncertainty.

Parker (1997) highlights that reduced information sharing is a result of mistrust within the organization or certainly outside the organization. Lack of trust within the organization is costly and decreases the competitive advantage of the organization. However, a certain level of trust can be replaced by technology that can save information and protect SCM systems from exploitation (Whitfield, 2002). That is why some companies depend on some programs such as Vendor Managed Inventory program (VMI) which control the inventory during the communication between suppliers and customers (Ruppel, 2004).

Beside trust technology, JIT systems can facilitate the sharing of scheduled information between supply chain partners, and obtain a high level of services from supplier (Kannana & Tanb, 2005). Kannana and Tanb considered total quality management (TQM) as a guide to developing quality management programs in the SC process. They found that supply chain coordination which depends on the level of the trust between SC partners have significant correlation with both strategies: JIT strategy and commitment to quality strategy.

Numerous studies have proved the linkage between trust and information quality delivery. However, there were conducted mainly on SCM and information system acceptance. Furthermore, they were carried in the West and as such their findings may not necessarily and accurately describe the phenomenon and situation in other cultural contexts (Li & Lin, 2006; McKnight, Choudhury, & Kacmar, 2002; Moberg, Cutler, Gross, & Speh, 2002; Mukherjee & Nath, 2007). This suggests that more research needs to be conducted to establish the relationship between perceived trust and information quality delivery over the Internet applications in the SCM context especially in the Malaysian manufacturing sector.

2.7.1.5 Collective Efficacy (CE)

Another technology acceptance factor chosen a variable in the present study is collective efficacy. Collective efficacy refers to organizations' member's judgment of the team's capability or ability to perform a job in hand (Little & Madigan, 1997). Bohn, (2002, p.68) defines collective efficacy as "a generative capacity within an organization to cope effectively with the demands, challenges, stressors and opportunities that it encounters within the business environment". Collective efficacy is also referred to as the "three factor solution" that exists as an aggregated judgment of the organization's individual members about their sense of collective capacities, their sense of mission or purpose/future, and their sense of resilience (Bohn, 2002). Other research defined organizational efficacy as organization individual members awareness of specific application or system in particular area (Yi & Hwang, 2003).

According to Carroll, Rosson, and Zhou (2005) that collective efficacy has been extended used in studies of technology adoption and impact. They added that, appropriation of technology occurs through changes in beliefs, shared the capacities and collaborative activities which provided by Collective efficacy measures. As is well known, felling of collective efficacy will encourage people to perform their job in community, and the internet provides channels and medium not just for social and civic use but also for business activities behaviors (Carroll, Rosson, & Zhou, 2005).

Social Cognitive Theory (SCT) is an important theoretical framework that explains task performance at both individual and organizational level (Hsu, Chen, Chiu, & Ju, 2007). This theory defines human behavior as triadic, dynamic, and reciprocal, and is a result of the interaction of personal factors and environment (Bandura, 1977, 1986, 1997). Each of these factors influences each other. According to Bandura (2002, p. 469) collective efficacy is considered performance efficacy of a social system.

Gibson et al. (2000) measured collective efficacy as the organizations' members' capabilities to perform ιasks, and to judge their capabilities to accomplish a task using Internet applications. Gist (1987) argued that there is a strong relationship between collective efficacy and future performance. Collective efficacy judgments are related to outcome expectations. Outcome expectations are estimates that a behavior will produce particular outcome (Oliver & Shapiro, 1993) but depending upon how well one thinks her or she can perform the behavior (Bandura, 1977).

According to Venkatesh and Davis (1996), SCT needs to be explored in context of using IT. Moreover, other researchers like Silver and Bufanio (1996) mentioned that a significant amount of the research that focuses on collective efficacy is still limited and more studies are needed in various disciplines such as the information system field. In employing SCT, the present study has chosen to consider collective efficacy as one of the Internet technology factors. One main reason is because collective efficacy in this research considers the capabilities and skills of supply chain partners to achieve their organizations goals. Moreover, it helps managers in manufacturing sectors in Malaysia understand what makes employees perform in their job (Mahyuddin et al., 2006).

In fact, quality and reliability of internal operations in manufacturing companies depend on various factors such as production systems, human factors, schedule system (Bayraktar, Koh, Gunnasekaran, & Tatoglu, 2008). This consist with Law, (2009) who Found that there are high relative between quality of internal operations during interacting Taiwan and the Mainland companies towards team efficacy, and work performance. Similarly, other research found that collective efficacy has high related with accurate team decision making (Sniezek & Henry, 1989), outcome expectation, and team performance (Hsu, Chen, Chiu, & Ju, 2007).

Furthermore, researchers have been calling on future studies to examine the role of collective efficacy in affecting performance (Eastin & LaRose, 2000; Hodges & Carron, 1992; Pang & Cai, 2008). Little and Madigan (1997) found that higher level of collective efficacy was related with higher levels of performance. In the present study collective efficacy should be positively related to the expectation of outcomes i.e. by having a quality information delivery to the right suppliers or customers at the right time through right Internet applications. In other words, it can be speculated that collective efficacy can enhance quality information delivery which can improve performance of SC by reducing purchase order cycle time, for example, and improve the relationship between partners of SC. Previous research found that higher level of collective efficacy of supply chain partners lead to high operation performance among high-tech manufacturers in Taiwan (Durham, Knight, Locke, 1997; Law, 2009). By using Internet applications collective efficacy can contribute highly to improving the performance in SCM systems.

The above arguments have presented some justifications why collective efficacy is considered as an antecedent of quality information delivery.

2.7.1.6 Supply Chain Commitment (SCC)

Supply chain commitment is a sixth variable chosen under the Internet technology factors in the present study. Previous authors describe commitment in various dimensions such as loyalty, willingness to make short term sacrifices, long orientation, and willing to invest in the relationship (Ryssel, Ritter, Gemu¨nden, & Georg, 2004). In addition to that, the term commitment includes trusting the partners with shared information, proprietary information and other sensitive information that affects overall supply chain performance (Li & Lin, 2006). As mentioned before about collective-efficacy, the level of supply chain-commitment depends on a particular application that confirms the users' own beliefs. Moreover, commitment was considering as consequence of collective efficacy "belief of collective efficacy affects the sense of mission and purpose of a system and the strength of common commitment to what it seek to achieve" (Bandura, 2002, p. 469).

Organizational commitment has taken different periods of development from 1960 until 2005. The development started by Becker (1960) one-side bet theory. This is followed by Porter's (1974) affective dependence theory. However, O'Reilly and

Chatman (1986) and Meyer and Allen (1984, 1990) extended organizational commitment into a multidimensional model. Today, we have Cohen's (2007) two-dimension and Somers's (2009) combined theory. Lastly, UTAUT has an external variable which is iPod ownership, which is derived form escalation of commitment (Staw, 1976). An iPod is a sign of commitment to the new technology.

The diversity among various types of commitment has led Kelman (1958) to develop social influence theory (SIT), which seeks to explain commitment among organizations by relating it to individual processes of identification, internalization, and compliance (Malhotra & Galletta, 1999, 2005). The commitment, or psychological attachment, is divided into two dimensions: (a) an affective conceptualization of commitment which is based on internalization and identification, and (b) continuance (cognitive) conceptualization of commitment, which depends on compliance (Meyer & Allen, 1997). However, Meyer and Allen (1996) propose three dimensions of organizational commitment i.e. affective, normative, and continuous commitment (Allen & Meyer, 1996). While affective commitment reflects individual's identification with the organizations, normative commitment refers to ethical obligation from individuals that they feel it is their duty and responsibility to continue work with their current employees (Aube, Rousseau, & Morin, 2007). In contrast, continuous commitment points out the level of costs employees have to bear if they leave the current employer.

Even though commitment dimensions have been found to be associated with behavior intentions and system usage behavior, the present study only looks at affective commitment as a supply chain commitment. This is because affective commitment is considered one of the most important factors for employee support for change initiatives, and for the readiness of the organization to change (Armenakis & Bedeian, 1999).

The organization system or Internet technology applications are used as a tool to perform a lot of activities such as communication, collaboration, and coordination which significantly affect user commitment. For instance, user commitment plays a significant role in the adoption and usage of such system (Alavi & Leidner, 2001; KPMG, 2000). However, previous researchers studied the affective conceptualization of commitment underlying employee behavior (Agyris, 1998; Ajzen, 1980; M aalhotra & Galletta, 2005; Malhotra & Galletta, 1999; Meyer & Allen, 1997; Mukherjee & Nath, 2007), while few address the role of commitment in e-commerce particularly in supply chain management context (Ambrose, & Fynes, 2006).

In the case of identification, the user system establishes and maintains a satisfying self-defining relationship to another person or group (managers, system champion, or other users of the systems) (Lewis, Agarwal, & Sambamurhy, 2003). But the user derives satisfaction from internalization due to the content of the new behavior, because the system enables him/her to do what actually he wants to do. Malhotra and Galletta (2005) found affective commitment (internalization and identification) to positively influence behavioral intention to use the volitional system.

Within online retailing context, Mukherjee and Nath (2007) examined the commitment-trust theory (CTT) among 251 employees in a large British university to investigate the antecedent and consequences of both trust and commitment. They found a significant and positive influence for both trust and commitment on behavioral intention, which was conceptualized as word of mouth communication, purchase intention and continued interaction. The result show that CTT can be adapted in digitized business environment, and promote continued interaction between online retailers and buyers. The researchers called for future works to replicate their study in other countries and in a different context for greater generalizability.

In a survey conducted among 162 companies with an average of 244 employees per company in German, Ryssel et al. (2004) found that supply chain partners' commitment leads to shared communication and process of IT, which leads them to increase investment on IT relationship, take short term scarifies, and long-term orientation. Similarly, Kannana and Tanb (2005) studied 56 senior operations and material managers to examine empirically the impact just in time, supply chain management, and quality management on the business performance in Northern America and Europe. They showed that strategic commitment to quality has significant correlation with both supply chain coordination and development. It also has a positive correlation with both SM information sharing and supply chain integration. This reflects the importance of strategic commitment to quality which is the most consistent driver of business performance.

However, Li and Lin (2006) discovered no significant impact of commitment on information sharing and information quality among 196 organizations from various sizes and industries in United States. They related the finding to time and effort firms need to customize until they manage to build a good relationship with their supply chain partners, and to advance their level of software instillation.

Mobering et al. (2002) conducted a study among logistic managers at a manufacturing firm to study the antecedent of the information exchange. He found that information quality and related commitment have positive and significant relationship to strategic information exchange only, while information technology commitment has a positive relationship to both strategic information exchange and operation information exchange. They related that to the high acceptance of use of the Internet for B2B and B2C, and to the increased levels of commitment to both SCM and newer IT.

Hence, based on the literature above, this study investigates further the impact of organizational commitment as one of the predictor variables for intention to sharing information in the manufacturing sector, where implementation of electronic commerce applications to share information between supply chains requires more improvement. This is in response to Mukherjee and Nath (2007), and Malhotra and Galletta (1999) who recommend that future research could include collaborative systems to investigate the effect of social influence process on technology adoption and usage behavior across different environments.

2.7.1.7 Management Support (MS)

Other internal organization factors that affect on the individual acceptance technology are: management support and user technical support. Igbaria (1993) divided organization characteristics into two attributes: application development support, represented by professional staff of information center, and general support which includes support and encouragement by managers. Some studies separated management support into two parts: technical support and non-technical support or general support (Venkatesh, Morris, Davis, & Davis, 2003). Others researchers extended TAM by adding intraorganizational factors which are divided into three parts: internal personal computing support (technical support), internal personal computing training, and management support (Igbaria, Zinatelli, Cragg, & Cavaye, 1997). Igbaria and his colleagues concluded that the strength of management support for personal computing can be measured by the provision of formal computing education and training programs. Therefore, this section will discuss management support under Internet technology acceptance factors, and the following section will be about user technical support factor.

Igbaria, Zinatelli, Cragg, and Cavaye (1997), and Igbaria, Guimaraes, and Davis (1995) investigated the effect of management support on personal computing acceptance among users in large organizations as well as in small firms. They defined management support as as managers who are able to provide sufficient resources such as time, space, equipment, and people and make decisions to create a more conducive environment for IS success. Other authors define top management support of information systems as the degree to which top management understands the importance of the IS function and involved it in IS activities (Masrek, Abdul Karim, & Hussein, 2007). Li and Lin (2006, p.1645) refer top management support as "the degree top manager understands of the specific benefits of and support for quality information sharing with supply chain partners. It also includes the support and encouragement by the managers to the organization's employees to improve their technical skills (Igbaria,1990). Therefore, top management need to understand the importance of delivering quality information to both their customers and suppliers. This means the information should be delivered without any delay and distortion (Feldmann & Mrller, 2003).

Additionally Igbaria, Guimaraes and Davis (1995) found that management support is the most important factor that improves sharing of information in the organization. They added that top management has to ensure successful information systems by breaking the barriers that affect the use of information technology. By sharing information top management provide clear vision, guidance, support, and orientation to the organization members (Li & Lin, 2006; Wu, Chiag, Wu, & Tu, 2004). Li and Lin (2006) found that top management support positively and significantly impact information sharing, but not information quality. They argued that even though top management understands the importance of sharing information in SCM, they need to improve organizational relationship as requirement to improve information quality. Moreover, top management has to play a critical role in integrating information sharing strategy in SCM, and also into an organization's overall business strategy. This requires that they look for the necessary resources to implement information sharing (Wu, Chiag, Wu, & Tu, 2004).

The positive and significant relationship between top management support and both behavior intention and system adoption have been studied in various contexts, in different countries, and by diverse researchers. Fore example, Tan and Teo (1998) concluded that management support is a positive and significant predictor of the Internet adoption. Similarly, Seyal, Rahman, and Hj Awang Mohammad (2005), when investigated 50 small and medium enterprises in Brunei Darussalam, found that management support is positively and significantly related to EDI adoption. Likewise, in a study among 446 government employees in USA to test the factors that influence learner's use of a computer-based training (CBT) system, Wagner and Flannery (2004) showed that behavioral intention was a strong predictor of user acceptance, and management support has an indirect influence on behavioral intention due to perceived usefulness for both civilian and military models. They argued that other research can work to support, modify and refine the resulting models by changing the research context. Wang, Chang, and Heng (2004) conducted a survey in industrial parks of Northern Taiwan. They found that strong support from top management has a positive influence on the implementation of higher levels of IT adoption and supply chain integration. In Malaysia, Mirani and King (1994) investigated the critical success factors (CSFs) to adopt Internet technology at different adoption period among 306 IT organization in Selangor and Kuala Lumpur. Their result showed that earlier adopters of Internet technology was greatly influenced by organizational compatibility, trading partner pressure, organizational support (top management support), perceived direct benefits, and perceived in-direct benefits than later adopters.

Tarofder, Marthandan, and Haque (2010) investigated the effects of top management on the diffusion process behind TAM. They proposed that both Rogers' innovation diffusion theory and Davis' technology acceptance theory stand their tests in both individual and organizational domains as levels for information technology adoption. They surveyed Malaysian organizations and revealed that top management support is the most influencing factor comparing with relative advantage, competitive pressure, and trialability on the diffusion of web technologies in supply chain function. Similarly, basing on TAM, Auer (1998) built a model to investigate factors affecting IS usage skills. She found that organization support variables have a positive relation to IS usage and skills. Her result emphasizes the role of the organizational decision maker when and whether an innovation is worth adopting, and how to control the diffusion processes. Recently, Macharia and Nyakwende (2010) surveyed 82 lectures from private and public universities in Kenya by extending TAM to include Vice Chancellor/CEO characteristics and organizational readiness together with other variables namely subjective norm, availability of ICT, organization support, and top management support. These variables were related to behavioral intention to use learning management system (LMS) for teaching and learning. The results found that top management support was dominant in predicting the acceptance of LMS, and a more critical factor behind organizational readiness and CEO in LMS adoption and diffusion.

Adopting unified theory of acceptance and use of technology (UTAUT) to investigate organizational influences on the adoption of e-commerce in a developing country with xenophobic tendencies, Uzoka (2008) showed that gender impacts negatively the adoption of e-commerce, while organization size, management support, communications and information availability contribute positively to the adoption of e-commerce.

Mirani and King (1994) argued that CEO has more influence in the small firms' performance than large firm because they are the owners or involved in most key decisions. They concluded that for any successful change in the organization to happen, management support is very fundamental and key (Igberia, 1993). Fore instance, increased management support causes rising acceptance and usage of Internet applications. This is evidenced from a survey involving 329 managers and executives in manufacturing firms in Malaysia by Zain, Rose, Abdullah, and Masrom (2005). They showed a positive relationship between IT acceptance (usage) and firm ability to be an agile competitor. In particular, six external variables (i.e. user involvement, job characteristics, system characteristics, user experience, top management support, information quality, and demographic characteristics) have direct and significant effect on agile competitor, but only job and systems characteristics has significant and direct effect on agile competitor. Furthermore, Igbaria, Zinatelli, Cragg, and Cavaye (1997) found that management support has significant indirect on system usage, mainly through perceived usefulness. Similarly, Anakwe, Simmers, and Anandarajan (2002) found that management support was significantly related to the three indicators of Internet usage i.e. daily use of the Internet, frequency of use, and business activities (marketing and communications). The study was carried out in Nigeria where data were gathered from 224 employees who have access to the Internet in 33 organizations.

Generally, it can be concluded that information quality delivery is facilitated by continuous support and assistance from top management to Internet application users. In the absence of the support, quality in sharing information among SCM partners is unlikely. Thus, it can be concluded that management support has a very important role in delivering quality information and improving SC performance.

2.7.1.8 Technical Support (TS)

As discussed earlier, technical support is another intra-organizational factor that affect quality information delivery (Anakwe, Simmers, & Anandarajan, 2002; Igbaria, 1993; Venkatesh & Davis, 2000; Wagner & Flannery, 2004). Igbaria, Zinatelli, Cragg, and Cavaye (1997) define technical user support as the technical support provided by individuals (or group) with computer knowledge within the organizations. Therefore, technical user support deals with technical support and helps the suppliers and users in terms of operating Internet and specific supply chain systems (Dyer, Cho, & Chu, 1988; Masrek, Abdul Karim, & Hussein, 2007).

A substantial number of studies (e.g. Daugherty, Dale, & Theodore, 1995; Dyer, Cho, & Chu, 1988; Li & Lin, 2006; Madlberger, 2008; Moyaux, Chaib-draa, & D'Amour, 2006) have identified that technical user support improves SC by advancing the level of sharing information between Internet applications users.

Terplan (2000) states that managing Internet inside a firm requires management of processes which include fault, configuration, performance, security and management accounting; management of tools; and management of team which involves human resources who would offer their network management experiences and skills. They added that SC implementations requires cost reduction, increases profitability, productivity, and increases technology innovation to improve organizational competitiveness. Moreover, success of these implementations depends on education on supply chain practices, operation team, the basic infrastructure-computers, warehouse space, and third party service (Daugherty, Dale, & Theodore, 1995).

It has been shown that SC practices could improve firm performance when SC is implemented in a good way. According to Auer (1998), IT enhances user's job efficiency and enables accurate control of the company. He added that when the user has high skill in IS he/she can serve the company's customers better. Similarly, Raymond (1990) mentioned that IS function will provide high level of computing support which increases acceptance of end-user computing in the organization.

Information center is one of basic information system that increases sellers' knowledge about the market consumption, and partners of supply chain (Jonsson, 2000). Moyaux, Chaib-draa, and D'Amour (2006) highlighted the types of support of information techniques by e-Hubs such as information center, Vendor Management

Inventory (VMI), and Collaborative Replenishment Planning (CRP) or Collaborative Planning, and Forecasting Replenishment (CPFR). These support systems will increase information streams and make precise the level of Information sharing with low cost of communication in the context of supply chain. Moyaux and his colleagues distinguish information centralization from information sharing. While information centralization is multicasting in real time and instantaneous of the market consumption information, information sharing depends on demand information between companies.

In other quantitative survey among Austrian retailers and manufacturers in the fast moving consumer goods sector, Madlberge (2008) found that internal technical readiness has significant relationship in the context of operational information sharing, while no significant impact on strategic information sharing. The result indicates that operational data is usually highly standardized and formatted, whereas strategic data (e.g. plans or marketing strategies) are frequently less structured which reduces the dependence on appropriate interorganizational system and collaboration in SCM.

Hussein, Abdul Karim, and Hasan (2007) carried out a survey among 201 users from electronic government agencies in Malaysia and found that user support under technological factors is positively and significantly associated with IS success dimensions which are systems quality, information quality, perceived usefulness, and user satisfaction.

According to Lim and Paliva (2001), support provided by IT enables the organization to share its information timely, accurately, and reliably. Moreover, a high level of information quality (represented by timely and accurate information exchange) may encourage an organization to increase the level of information sharing with its supply chain partners (Li & Lin, 2006).

Li and Lin (2006) argue that few of studies have considered the impact of intra-organizational factors such as top management and IT enablers on information sharing and information quality in SCM. So, this research bridges this gap by considering management support and technical user support. They cited that without support of IT enablers the quality information sharing is impossible in SCM. Therefore, they found that support by IT enablers significantly distinguish between organization with high level of information sharing and those with low levels of information sharing, but not information quality. They explained that this is because the organizations did not focus on the application of IT on SCM, and did not give more attention to the development of inter-organizational relationships.

Accordingly, Wagner and Flannery (2004) conducted a survey to identify factors that influence leaners' user of a computer-based training supporting system (TSS). They used TAM to demonstrate perceived usefulness and perceived ease from causal linkage to user's intention and actual computer usage behavior. They found that the effect of information support on user acceptance was mediated by attitudes toward use, perceived usefulness, and behavioral intentions in both civilian and military models. Furthermore, the positive relationship between information support and attitudes toward use indicates the application development support which includes the presence of an information center staffed by professionals, who could provide recommendations and assistance to microcomputer users.

Using extended TAM as a theoretical framework to include the perspective of intra- and extra-organization resources that can facilitate student adoption of an online learning system, Lee (2008) confirms that perceived usefulness and perceived ease of use are positively associated with behavioral intention, and perceived resources such internal computing support, internal computing training, and external computing have impact on online learning adoption. Moreover, in UTAUT technical infrastructure support is classified under facilitating conditions (Venkatesh, Morris, Davis, & Davis, 2003). Venkatesh and his colleagues found that facilitating conditions have significant effect on behavioral intention, which consequently has significant relationship to use behaviour.

As a summary, technical Support is very important in delivering or sharing quality information between customers and suppliers (Li & Lin, 2006; Madlberger, 2008). Therefore, technical support is included as a potential antecedent of information quality delivery to improve supply chain performance in the manufacturing sector context.

2.8 CONSEQUENCES OF QUALITY INFORMATION DELIVERY

Besides the antecedent to information quality delivery, another area in information quality studies that generate much interest is the consequences of quality information delivery.

To date, the primary focus of research has centered on the impact of information quality from the prospective of organization, and user as well as supplier or customer. Studies found several positive outcomes of information quality such as competitive advantage, firms performance, financial performance, market share, profit margin on sale, customer satisfaction and purchasing performance (Byrd & Davidson, 2003;

Hemsworth, Sánchez-Rodríguez, & Bidgood, 2005; Leem & Yoon, 2004; Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006; Lin & Tseng , 2006).

From the prospective of the organization, MIS researchers have identified a number of positive outcomes of information quality. For example, Byrd and Davidson (2003), Fawcett, Osterhaus, Mangnan, Brau, and McCarter (2007), Lin and Tseng (2006), Power, Sohal, Rahman, (2001), and Rahman (2004) found firms that have the ability to effectively manage information by using information technology and Internet have more emphasis to perform SC functions than others. To be specific, Lin and Tseng (2006) found evidence that as organizations increase their level of information quality, the competitive advantage and their organizational performance increase as well. The positive outcome of information quality is also demonstrated with high ranking IT executive in large US firms. Byrd and Davidson (2003), investigating the impact of IT in SC on the firm performance, found more advanced IT application lead to increase in the quality and timeliness of production information, which are linked to improved overall firms performance. They measured organization performance by return on equity (ROE) and return on investment (ROI). In addition to financial performance of an organization, quality of information sharing is found to be linked with market performance, usually measured by growth of sales, the growth of market share, and profit margin on sale. (Byrd & Davidson, 2003; Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006). They study the impact of information sharing quality on market performance. In addition to studies undertaken to examine the consequences of information quality at the organizational level, a number of studies have been conducted from the perspective of the customer, in which customer satisfaction is used to indicate quality of information sharing (Leem & Yoon, 2004).

The performance of supply chain is derived from information quality delivered between customers and suppliers. SC's process like planning, arrangement, orientation, production, sales and distribution will not perform very well when there is poor quality sharing of information between suppliers and customers. Ruževičius and Gedminaitė (2007), in their study, asked managers to select important dimensions that reflect high-quality information product, and that match end-user expectation. The dimensions selected are accessibility, completeness, price (cost), timeliness, ease of understanding, value addedness, objectivity, accuracy, relevancy, and believability. Such finding is consistent with the view of Hemsworth, Sánchez-Rodríguez, and Bidgood (2005), who found that quality management practices on purchasing performance are influenced by ability to real-time sharing information between vendors and buyers.

Apart from relationship development, quality information delivery of supply chain is also reported to enhance the quality and SC decision. To achieve this, managers should have technology ability, connectivity, and willingness to share information. Indeed Fawcett, Osterhaus, Mangnan, Brau, and McCarte (2007), who argue that SC managers collaborate in decision making not just to provide honestly and frequently information to them, they should deal with relevant, accurate and timely information when they make decisions. They further assert that the more capable managers are in dealing with such information, the higher is the organization performance level, which is reflected in the form of unique products and services, faster R & D cycle times, shorter order cycles, flexible customer response, better asset management, increased cash-to-cash velocity lead to increase.

Pervious studies have shown that information quality that depends on software have a positive effect on SC practices. Zhou and Benton (2007), for example, found that information quality was the only variable that is significant in affecting delivery performance in supply chain practices, while the remaining variables of information sharing, customer information, and manufacturing information were not significant. They concluded that when there are standardized practices in supply chain processes, companies tend to have high level of information sharing. They further emphasize that when companies use information technology to get information form customers and to share it with their suppliers; this will reduce process uncertainties in SC.

Apart from empirical investigation on the consequences of quality information delivery from the organization and individual perspective, numerous studies have also examined the consequences of quality in sharing form perspective of suppliers and customers in SC management. In general, studies found positive relationship between quality management practices such as quality data reporting and degree of organizational performance and customer satisfaction level (e.g. Zain, Rose, Abdullah, & Masrom, 2005). Similarly, previous works have also found that quality of data has positive relationship to both supplier selection and supplier participations (Lin, Chow, Madu, Kuei, & Yu, 2005; Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006; Wu, Yeniyurt, Kim, & Cavusgil, 2006).

Another group of studies undertaken have extended the growing body of literature by showing that SC companies that share information over the Internet technology in their operations tend to develop long-term relationship, and collaboration between customers and suppliers. This is demonstrated by Vereecke and Muylle (2006) on the influence of quality in sharing information on the relationship between collaboration with suppliers and/or customers among firms operating in manufacturing sector in Europe. However, Zhou and Benton (2007) found that customer information has negative influence on SC practices in particular on delivery performance. They related that with the level of sharing customer information. Thus, the firms which have low level of sharing customer information, effective delivery practices does not improve delivery performance as much as when the level of sharing customer information is high. Therefore, they concluded that higher level of SC dynamism, leads to higher level of information sharing, enhances effective SC practices in order to utilize the information sharing and maintain a high level of performance (Zhou & Benton, 2007),

The literatures, thus far, have shown that the nature of quality information delivery and supply chain information performance is still under research, inconclusive and therefore warrants further research. Since this study involves manufacturing organization as the unit of analysis and together with the fact that supply chain information performance is critical issue in manufacturing sectors (Government Malaysia, 2006), it is therefore imperative that empirical research be conducted on issue regarding information quality and supply chain performance relationship. Further, although most literatures dealing with this topic view that quality information delivery is critical issue in supply chain performance, Forslund and Jonsson (2007) noted that research on information quality in supply chain is scarce. They further emphasize that empirical research be conducted to examine issue regarding information quality and supply chain relationship with consideration on the transition information between suppliers and customers.

2.9 THE MEDIATING EFFECT OF QUALITY INFORMATION DELIVERY

In examining whether knowledge sharing mediates the relationship between trust and firm performance, Yu, Yan, and Cheng (2001) show that knowledge sharing plays a perfect mediating role between trust and firm performance. This result considers the importance of information technology application in enhancing trust, and they concluded that managers should identify trust as a strategic initiative that promotes knowledge sharing to lead effective firm performance. Similarly McDowell and Karrike (2008) investigated information quality as a mediator in a trust-performance relationship in the supply chain context. They found that information quality was a significant mediator of trust-performance relationship. They concluded that quality of information exchange between the firms will further buttress the influence of trust on organizational performance.

Amoroso and Hunsinger (1991) conducted a survey on users' online purchasing behaviors in the United States and Australia. Specifically they examined the influence of external variables such as trust, privacy, and risk with attitude, and behavior intention on actual online purchasing. The researcher found that ease of use does not have direct relationship to behavioral intention; it indicates that the effect is indirect, through attitude. On other hand perceived usefulness have direct relationship to both attitude and behavior intention. These findings confirm the mediating effect of behavioral intention to use the

Internet in the relationship between perceived ease of use and usefulness with actual use of the Internet.

Another empirical study by Jahangir and Begum (2008) examined the role of perceived usefulness, perceived ease of use, security and privacy, and customer attitude to adopt operation of Internet-based e-banking in Bangladesh. Their results confirm customer attitude of bank information as a mediating factor between perceived usefulness, ease of use, and security and privacy toward the customer adaptation.

In 2007 Hsu, Chen, Chiu, and Ju conduct a study to exploring the antecedents of team performance in collaborative learning of computer software. Their study discussed the relationships among computer collective efficacy, outcome expectations and team performance in the context of collective learning. However, the outcome expectations represent the evaluate of performance expectation, and have associated with the accurate team decision making (Sniezek, & Henry, 1989; Hsu, Chen, Chiu, & Ju, 2007). Hsu, Chen, Chiu, and Ju (2007) found that General computer collective efficacy has a strong indirect influence on final team performance. Thus, a particular outcome expectation can be viewed as a mediator between efficacy beliefs and actions. A team who perceives a high level of collective efficacy would active more positive process, which results in positive outcome expectations, which in turn guides to better performance (Hsu, Chen, Chiu, & Ju, 2007). Other research supported that Collective efficacy playing completely a mediating role in the relationship between performance feedback and the groups later performance (Prussia, & Kinicki, 1996).

Hemsworth, Sánchez-Rodríguez, and Bidgood (2005) investigated the implementation of quality management practices and information system to improve organization performance. The study found that quality management practices (supplier quality management, personnel management, cross-functional coordination, management commitment, and benchmarking) have indirect impact on purchase behavior mediated through IS practices. This means supply chain managers can increase supply chain performance by using information systems efficiently.

A research by Large (2005) examined the impact of oral communication capability on communication behavior and on both information quality and relationship quality. The result supports a positive influence of individual communication behavior on quality communication and supplier management performance. Again, their study confirms the proposition that information quality mediates the relationship.

Eng (2006) also investigated the role of cross-functional coordination the on linkage between organizational norms and SCM performance. While organization norms are related to individual's values and beliefs (Sherif, 1936), cross-functional coordination in SCM refers to coordination of supply chain activities and information flows across business functions and between firms. Eng found that five organizational norms (cooperative norms, cross-functional, information sharing, intra organizational knowledge sharing, participative culture, and mutual trust) and SCM performance are mediated by cross-functional coordination. The reason is that knowledge sharing across different function in SCM context provides managers with flexibility and ease in combining views in various circumstances (Zack & McKenney, 1995). However, whether or not the Internet technology in the organization will be accepted depends much on management support and technical support. Only when such support is available, supply chain information performance will be enhanced.

So based on the findings, it is reasonable to propose that quality information delivery mediates supply chain information performance (Eng, 2006). And the present study intends to do just that.

2.10 THEORETICAL FRAMEWORK

From the beginning of 1990, the advancement of e-business and supply chain management has been made possible due to information technology. Some programming applications have allowed suppliers to connect with point-of-sales (POS) data such as Vendor Managed Inventory (VMI) (Pikkarainen, Pikkarainen, Karjaloto, & Pahnila, 2004) and advance inventory turnover (Stalk, Evans, & Shamulan, 1992).While these schemes focus on improving SC performance through sharing information between partners, and enable new coordination structure by increasing flow of physical product and electronic information, they fail to provide sufficient approaching into the underlying principle necessary for theory development (Sahin, & Robinson, 2002). Furthermore, in these recent times companies offer various types of software applications such as different types of email packages, graphic packages, and web browsers. These lead MIS researchers to develop models of software utilizations that provide a great value to the organizations (Dishaw, Strong, & Bandy, 2002).

According to Lancioni, Schau and Smith (2003), SCM is growing body of theory that involves testable models and empirical research. In the present study, three models are integrated to explain the effect of Internet technology on SCI performance through information quality delivery: Li and Lin (2006), who develop the framework of the factors impacting information sharing and information quality in SCM; Moberg, Culter, Gross, and Speh (2002), who develop model of antecedents of information exchange within supply chains; and Mentzer's (2000) model, which examines the antecedent and consequences of SCM. These diverse models, and United Theory of Acceptance and Use of Technology (UTAUT) were all used as the benchmark upon which this current study developed its theoretical formwork.

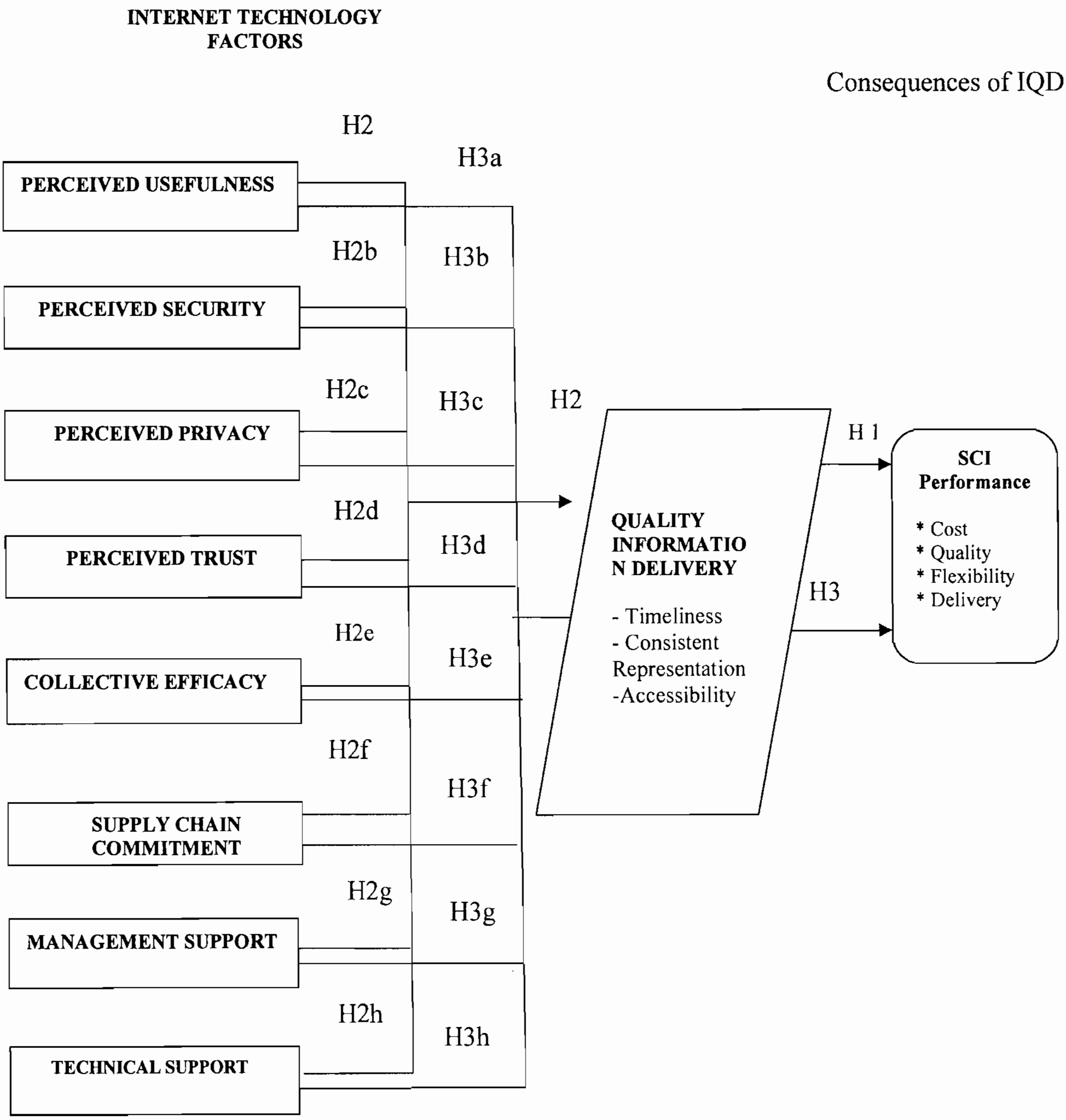


Figure 2.3 Theoretical Framework

2.11 THEORY DERIVED

2.11.1 Theoretical development

2.11.1.1 Technology Acceptance Model (TAM)

The most used theories for modeling user adopting of new technology are Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM).TRA and TPB are generally used in the studies of social psychology to study the behavior of people. Researchers of system usage and information technology adoption have also extensively adopted them. TRA is in fact the ancestor or antecedents of both TPB and TAM.

Technology Acceptance Model is an information system theory, which is adopted from TRA. It is widely used for the purpose of predicting, explaining and enhancing common understanding of user acceptance of information technology in various areas.

Several extensions of TAM have been proposed and empirically validated also in studies conducted in the area of Internet use in organization. Overall, Internet technology-commerce and other information technology and information system adoption have been increasingly popular topics among researchers. This has been the trend over the last decade. In addition to Technology Acceptance Model, other theoretical approaches have been used to increase general understanding. As mentioned before, the theories very much each other. Regardless of theory used the researches support each other in terms of factors and determinants identified.

Technology Acceptance Model (TAM) was initially suggested by Fred Davis 1989. It is one of the most considered in the studied and used models in the investigations of user acceptance of information technology. The model is adapted from Theory of

Reasoned Action (TRA), which was originally proposed by Fishbein and Ajzen in 1975 (Fishbein & Ajzen, 1975).

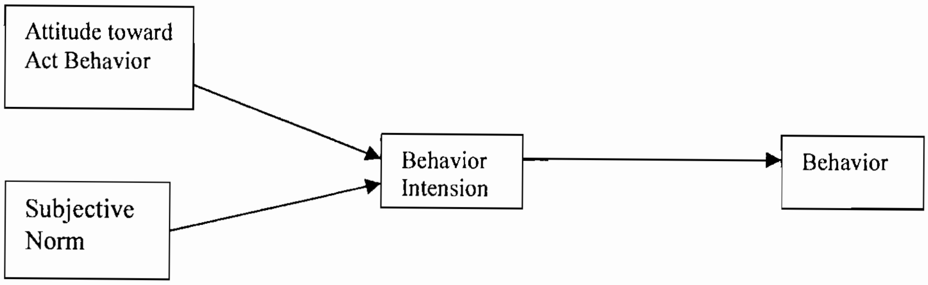


Figure 2.4 Describe Theory of Reason Action Fishbein and Ajzen (adapted from Fishbein and Ajzen (1975).

Attitude toward Behavior defined by Fishbein and Ajzen (1975, p.216) and Lee and Truban (2001) as: an individual's positive or negative (evaluative affect) about performing the target behavior. And they defined Subjectiv"the person's perception that most people who are important to him think he should or should not perform the behavior in question (Fishbein & Ajzen, 1975, p.216).

Davis applied TRA to individual acceptance of technology and found that the a variety of explained was largely consistent with studies that had employed TRA in the context other behavior. Technology Acceptance Model is an information system theory, which purpose is simply to predict and explain the user acceptance of information technology. This theory represented the psychology, it is one of the most fundamental and an influential theory of human behavior and it has to predict a wide range of behavior (Davis, 1989).

The model addresses the reasons why users either accept or reject particular piece of information technology. The revised model by Davis et al. (1989) is constructed from external variables (external stimulus), perceived usefulness and perceived ease of use (cognitive response), behavioral intention, and actual usage (behaviour) Venkatesh & Davis, (1996) (Sheppard, Hartwick, & Warshaw, 1988) as it's appear in figure 2.5.

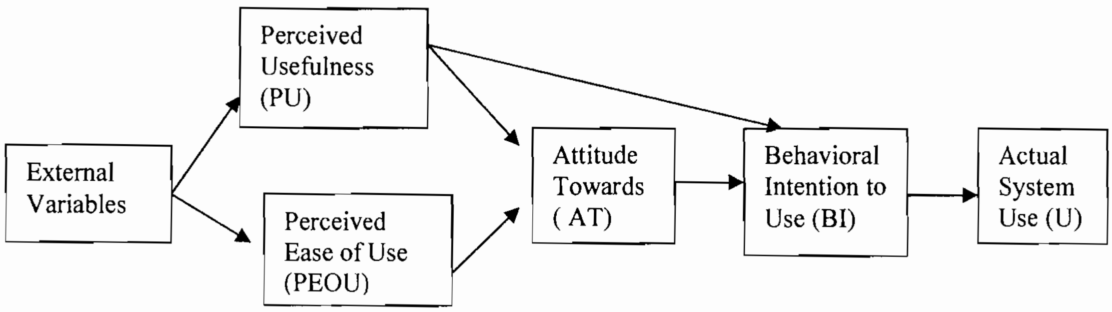


Figure2.5 Describe Original Technology Acceptance Model (Adopted from Davis et al.1989)

The fundamental idea of the theory is that perceived usefulness and perceived ease of use influence the users' intention to use information technology either direct or via attitude towards the behavior, leading to actual usage of the system. Attitude Toward (AT) and Behavioral Intention (BI) are common with the Theory of Reasoned Action. Perceived ease of use (PEOU) has strong influence on AT through perceived usefulness, but also directly. Perceived Usefulness (PU) has strong direct influence via both AT and BI. The original TAM was received by leaving attitude from the model, as empirical validation proved that intention to use is only partly mediated by attitude (Venkatesh & Davis, 1996).

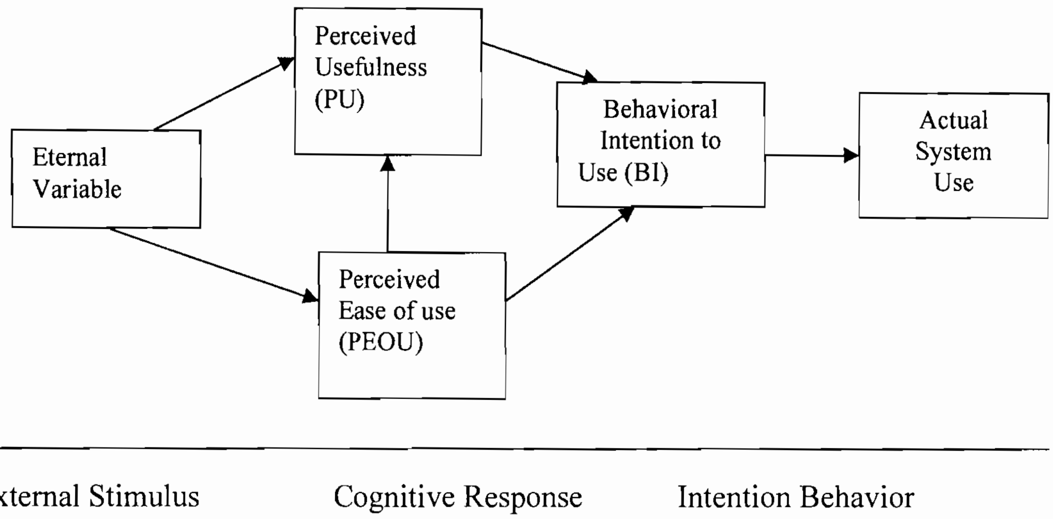


Figure 2.6 Revised Technology Acceptance Model (Adapted from: Davis and Venkatesh, 1996).

In Davis and Venkatesh extended theory and created TAM2. "TAM2" incorporates additional theoretical constructions ranging social influence processes (subjective norm, voluntariness and image) and cognitive instrumental processes (job relevance, output quality, performance demonstrability, and the perceived ease of use (Davis et al, 2000),

Legris, Ingham, and Colleret (2003) TAM critically reviewed by the use of 22 articles 1980 to 2001. The articles were empirical studies using TAM protect its integrity. Only a few studies used all of the original variables, mostly they left out AT, Which in consistency with the revised TAM. The conclusion was that the critical review of TAM is a useful theoretical model, but it should be incorporated into a model including variables from the human and social change processes, and adoption of innovation model. TAM explains normally around 40 percent of the variability in its intention to use and use behavior, which further strengthens the perception of TAM fittingness in this kind of research (Legris et al., 2003; Pikkarainen et al., 2004).

So the used Technology Acceptance Model (TAM) and extending with other findings from other research was using in this research so the following hypothesis are set as assumption of the model. Technology acceptance model based on the Theory of Reasoned Action (TRA) wide spread using in the different applications during acceptance and use information technology (McFarland & Hamilton, 2004).

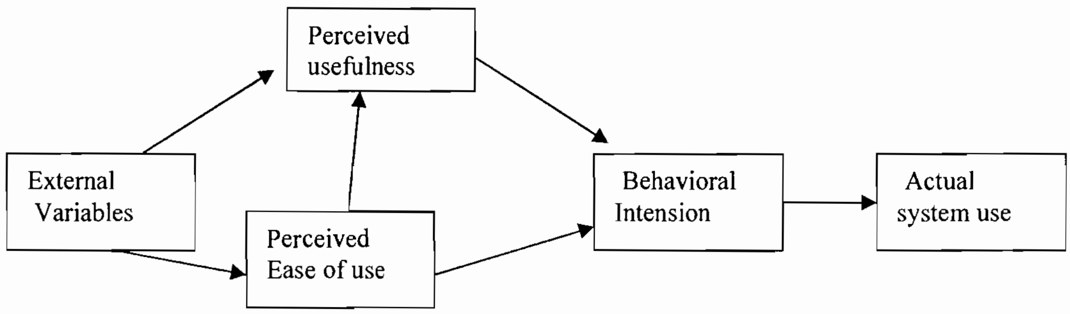


Figure 2.7 This the final technology acceptance model without the attitude construct required in (adapted from Dais 1986, and. Davis, 1993)

There are researchers found that the positive influence of behavior intention on actual system use (Davis, 1989). In figure 2.7 this is the final model which not include attitude construct compulsory in Davis (Kim & Malhotra, 2005; Moon & Kim, 2001; Yu, Yan, & Cheng, 2001). Actually the external variables will include system characteristics, user involvement in design, training and the nature of the implementation process.

Researchers noted TAM has weakness in the constructs (Davis, 1989). The theoretical needed to extend and incorporate different technologies, users and organizational context (Agarwal & Prasad, 1997; Zain, Rose, Abdullah, & Masrom, 2005). Based on that there are extended the original TAM by adding new variables such as self efficiency by Hong et al.(2001), cultural social influences by Malhotra and Galetta (2005), trust by Gefen et al. (2003) and Ha and Stoel (2005), experience by Pikkarainen et al.(2004) commitment to system use by Malhotra and Galletta (2005), self-efficacy by (Igbaria and Iivari, 1995)technical support and management support by Igbaria et al. (1997) and privacy and security by Pikkarainen et al.(2004). In this study these variables extended the model in the context of Internet technology.

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

Unified Theory of Acceptance and Use of Technology (UTAUT) introduced in more explanation in the following sections in order to make clear the foundation for this research. Venkatesh, Morris, Davis, and Davis (2003) create a uniform model called the unified theory of acceptance and use of technology (UTAUT). As a comparison of eight experimental models reviewed are the theory of reason action, the technology acceptance model, the motivational model, the theory of planned behaviour, a model combining the technology acceptance model and theory of planned behaviour, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory, the eight individual models (adjust $R^2 = 0.69$).

UTAUT consider to understanding the organization outcomes associated with new technology use. Main objective of Venkatesh et al. (2003) in United Theory of Acceptance and Use of Technology (UTAUT) to understand usage as dependent variable. Moreover, the role of intention as a predictor of behavior is critical and has been well established in (Information system) IS and the reference disciplines as appear in following figure.

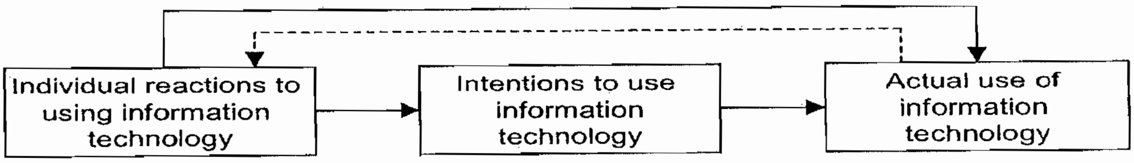


Figure.2.8 Basic Concepts Underlying User Acceptance Model (Adapted from Venkatesh, Morris, Davis, and Davis, 2003)

This research considers on the intention as a quality of sharing information between the suppliers and customers. Those sharing have to lead to successful using actual system or actual behavior which is Supply chain information performance. Consequently, UTAUT theorize that four constructs that plays a significant role as direct determinants of user acceptance and usage behavior, performance expectancy, effort expectancy, social influence, and facilitating conditions. They indicate to the role some moderators which are gender, age, voluntariness, and experience as appear in the next figure (Venkatesh, Morris, Davis, & Davis, 2003).

Initially, Venkatesh, Morris, Davis, and Davis, (2003) stated that perceived usefulness ore related with performance expectancy, and perceived ease of use is more related to effort expectancy. According to Lee and Lin (2008) performance expectancy and effort expectancy in UTAUT closely similar with perceived usefulness (PU) and perceived ease of use constructs (PEOU) in TAM.

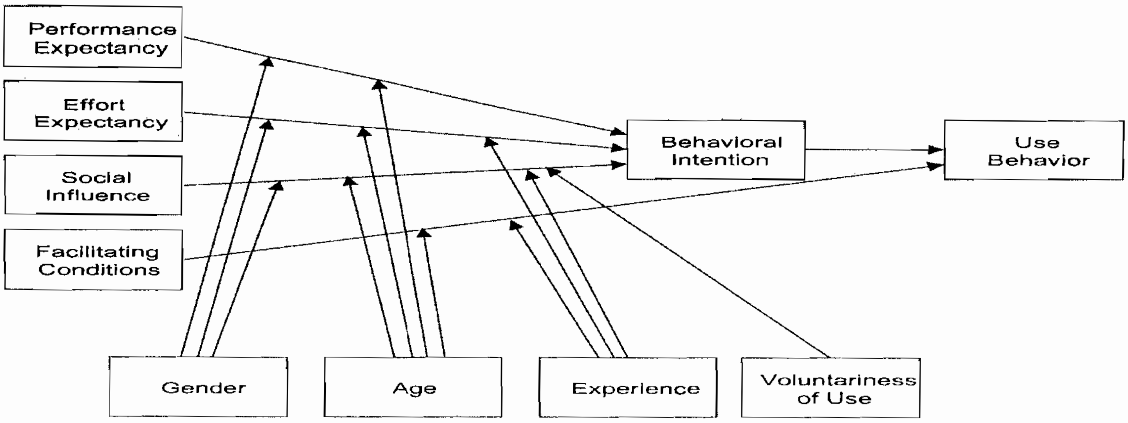


Figure.2.9 Researsh model of United Theory of Acceptance and Use of Technology (UTAUT) (Adapted from Venkatesh, Morris, Davis, and Davis, 2003).

Developed and validated UTAUT such as Social Cognitive Theory (SCT) which depend on individual's ability, and construct from efficacy, affect, and anxity (Compeau & Higgins, 1995). Process of social Influence which depends on commitment based on affective commitment and continuance commitments. The relevant construct introduction to the UTAUT was An i-pod owner's willingness to invest and familiarize with new technology, which is from escalation of commitment theory (Staw, 1976). Therefore, this research contributed theoretical by adopted organizational commitment theory to UTAUT.

In 2008 Lee and Lin, in their finding suggest that technical support under facilitating factors that have positive and significant related with Performance Expectancy (PE) or Perceived usefulness (PU) and behaviour intension. Other research adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) to investigate organizational influences on the adoption of e-commerce, the result indicate that organization size, management support, communications and information availability contribute positively to the adoption of e-commerce (Uzoka. 2008).

Shin , Coller, and Wilson (2000) used theory of acceptance and use of technology (UTAUT) model in their empirical research with constructs of security, trust, social influence, and self-efficacy. He concealed that that users' attitudes and intentions are influenced also by perceived security and trust behind perceived ease of use and usefulness. In addition to that, by using Unified Theory of Acceptance and Use of Technology (UTAUT) in 'Location-Commerce' by using Location-Based Services (LBS) as mobile device's Xu, Gupta, and Shi (2009) found that the privacy concern significant influence intension to use LBS in case push based LBS, where as privacy concern impact on influence performance expectancy in case of pull-based LBS. In this research theory of acceptance and use of technology (UTAUT) model is used in order to be the base for the theoretical framework of this study since it fits to all variables in the proposal theoretical framework.

2.12 HYPOTHESIS DEVELOPMENT

2.12.1 The Relationship between quality information Delivery and Supply Chain Management Performance

Boyer and Olason (2002) mentioned that accuracy one of the important factors that associated with organization performance and very essential to achieve online transaction such as purchasing. Borrowing from Moberg et al. (2002) there is positive relationship between information quality and operational. Tan and Teo (1998) argued that accessibility of the internet will be facilitator to allowing the user adoption and perceived the technology more favorably, and need to use it. Forinstance, behavioral intention (BI) is a major determinant of use behavior; and that behavior can be predicted by measuring BI

(Fishbein & Ajzen, 1975). Additionaly, the quality of system usage to ward implementation success impact by: attitude, and knowledge regarding system usage (actual ability) (Autzen, 2007).

Hemsworth, Sánchez-Rodríguez, and Bidgood, (2005) results shows that quality management practices such as quality information have direct positive impact on organization performance in term of purchasing. Other studies indicate the positive related between information quality as a factor of information systems and operation performance (Gunasekaran & Ngai, 2004; Lin & Tseng, 2006; Palanisamy, 2005). over This result supported by previous research by Li, Ragu-Nathan, Ragu-Nathan, and Rao (2006) and Lin, Chow, Madu, Kuei, and Yu (2005) who found that high level of SCM practices as information quality lead to high level of organization performance. Hence, the following hypothesis is proposed:

H1: *quality Information delivery is positively related to Supply chain information performance. (SCIP)*

2.12.2 The Relationship between Internet Technology factors and quality information Delivery

Previous studies suggested that perceived usefulness is driven from person believe using particular application will improve his job performance by reducing accomplish task time and timely in provide the information (Soliman & Janz, 2004).

In Technology Acceptance Model (TAM) Venkatesh and Davis (1996) proposed that Perceived usefulness have direct affect both user's attitude and user's intension behavior, contacting with actual usage of the system. As well as, Venkatesh, , Morris, Davis, and Davis, (2003) found that in UTAUT performance expectancy which represent perceived usefulness have a significant positive influence on behaviour intension. During intension behavior level of sharing information between suppliers and customer should be more efficiency and accurate in same time.

According to Cheng and Wang (2009) that Perceived Usefulness of AVLS will increase acceptance of this system, and affect on the behavior intension by providing real time information. That's lead to enhance logistic corporation which is part of SC process. Armstrong, Fogarty, Dingsdag, and Dimbleby (1977) and Seddon and Kiew (1994) hypothesize that there is positive and significant relationship between perceived usefulness and the information quality.

Empirical evidence indicates that is reasonable to expect that perceived usefulness play a significant role in quality of sharing information among supplier and customer in SCM. In this case, although manufacturing sectors need to provide the essential infrastructures which lead to make actual system more useful, and improve quality of information delivery. Thus, this study hypothesized the following.

H2a: *Perceived Usefulness positively influence Quality Information Delivery.*

The effect of perceived security on behavior intension has been confirmed in previous researches, specially by reducing risk and real time of sharing information behavior in SCM (Faisal, Banwet, & Shankar, 2007) , reducing risk and internet shopping behavior (Bhatnagar, Misra, & Rao, 2000; Li & Huang, 2009) ,increasing perceived security and intension to purchasing products online (Ha & Stoel, 2005), increasing perceived security and online behavior intension (Goode & Harris, 2007), increasing perceived security and behavior motivated on mobile/online banking adoption (Salisbury, Pearson, Pearson, & Miller, 2001), and by increasing perceived security on intention to purchase by using World Wide Web (Salisbury, Pearson, Pearson, & Miller, 2001). Theses finding occur with argument that perceived security is critical in the behavior intension. As such, the current research propose perceived security a another main antecedent for information quality delivery. This shows that perceived security can ensure the quality of sharing information online by deliver the information to the users in timely, truly, consistency, and accessibility over internet applications. Thus, this study hypothesized that:

H2b: *Perceived security is positively related with Quality Information Delivery.*

perceived privacy is a term that include reliability and credibility of Internet application during sharing information between suppliers and customers (Yousafzai, Pallister, & Foxall, 2003). Pervious research found that there positive and significant relationship between privacy and behavioral intension by extended in TAM in mobile commerce (Sun, Wang, & Cao, 2009), in internet banking systems (Wang, Wang, Lin, & Tang, 2003), and in internet purchasing (Jun, 2002).

As mentioned by Ranganathan and Ganapathy (2002) security and privacy had greater effect on purchasing intension by web site. Correspondingly, Udo (2001) found that perceived privacy as the most important variable that increases the percentage of the online purchase decision. By using Unified Theory of Acceptance and Use of Technology (UTAUT) privacy concern significant influence intension to use LBS in case push system as mobile devices in location commerce (Xu, Gupta, & Shi, 2009) . The quality of sharing information by e-grocery sector influenced by privacy strategy between retailers (Kervenoael, Soopramanien, Hallsworth, & Elms, 2007). Because greater access to data and move internal secondary data uses, all that need high coordination between managerial and technical user to protect user information (Liu, Marchewka, Lu, & Yu ; 2005; Liu & Arnett, 2002). Accordingly, the following hypothesis is proposed:

H2c: *Perceived privacy is positively related with Quality Information Delivery.*

Behavioral intension consists of mouth communication, purchase intention and continued interaction (Morgan & Hunt, 1994). Previous research found there positive and significant relationship between initial trust and online behavior by purchasing online in online bookstores (Yu, Yan, & Cheng, 2001), degree of trust and behavioral intentions in an online business activity (Liu & Arnett, 2002), trust and behavior intention by interaction between retailer and buyer on online retailing context (Mukherjee & Nath, 2007), trusting beliefs, and trusting intentions in e-commerce transactions (McKnight, Choudhury, & Kacmar, 2002).

Furthermore, perceived trust have positive and significant positive relationship within SC context with operation information (Moberg, Cutler, Gross, & Speh, 2002), trust and both information sharing and information quality (Li & Lin, 2006). Supply chain coordination which depend on level of the trust between SC partners and both strategies : JIT strategy and commitment to quality strategy, and with sharing information between suppliers and customers (Kannana & Tanb, 2005). The following hypothesis is advanced:

H2d: *perceived trust is positively related with Quality Information Delivery.*

The hypothesis of collective efficacy in Cognitive Theory suggests that tem or organization are high in collective efficacy are high in outcomes expectation behavior (Bandura, 1977; Bandura, 1986; Bandura & Locke, 2004; Compeau & Higgins, 1995). This appear in some research that found level of efficacy have positive related with outcomes expected behavior by increasing desire outcomes expected from students (Hsu, Chen, Chiu, & Ju, 2007).

Collective efficacy perception has various relations with various behaviors. Some researchers found collective efficacy have positive relation with knowledge sharing (Endress, Endres, Chowdhury, & Alam, 2007; Pang & Cai, 2008), and other found have positive and significant relationship with behavior adoption (Law, 2009), with the accurate team decision making (Sniezek, & Henry, 1989).

Studies that conducted and applied TAM have shown that there are direct and significant effect of level of efficacy on behavior intention on online shopping (Viayasarathy, 2004), to open the source community (Endress, Endres, Chowdhury, & Alam, 2007), to use online learning course website (Chang & Tung, 2008; Liu & Arnett, 2002) . On hand, other studies found that efficacy have positive and significant related with behavior usage such as (Jegede, 2008) with Nigerian teachers, (Compeau & Higgins, 1995) with professional and managerial people from various organization in Canada, (Sam, Othman, & Nordin, 2005; Yi & Hwang, 2003). These allow internet users to in organization improve their collective efficacy to be qualified in delivering the right information at the right time by the right method over the internet applications. Thus, this study hypothesized that:

H2e: *Collective efficacy positively influence in Quality Information Delivery.*

Malhotra and Galletta (2005) used self-commitment which developed by Kelman as one of social influence variables to extend TAM theory by predict the intension behavior. They found that affective commitment positively influence on user's behavioral tension to use the volitional system (Meyer, & Allen, 1997). In affective commitment which reflects Individuals identified with organizations have positively related with organization citizenship behaviour (Organ, & Ryan, 1995)

Past research has investigated the role of self-commitment in various types of behavior .There is a positive relationship between self-commitment factor and intension behavior. For example lack of user commitment lead to reduce systems for self-directed knowledge use, sharing, creation, and renewal (malhotra & galletta, 2005; Malhotra & Galletta, 1999), while high organizational commitment improve the knowledge system management usage the organizations (Alavi & Leidner, 2001), and significant and positive influence of commitment on the behavior intension which was conceptualized as word of mouth communication, purchase intention and continued interaction (Mukherjee & Nath, 2007).

In the context of SCM, SC partner commitment have positive and significant influence on communication and process of IT (Ryssel, Ritter, Gemu¨nden, & Georg, 2004), the strategic commitment to quality has positive significant correlated with both supply coordination and development, and positive correlated with both SCM information sharing and SC integration (Kannana & Tanb, 2005), and finally, information technology commitment has positive relationship with both strategic information exchange and operation information exchange (Mobering, Cutler, Gross, & Speh, 2002). Hence, it is anticipated that:

H2f: *Supply Chain commitment (Affective) will have a direct positive influence on Quality Information Delivery.*

Several articles (Li & Lin, 2006; Venkatesh & Davis, 2000; Wu, Chiag, Wu, & Tu, 2004) in the literature illustrate improve level of information sharing and information quality in SCM context depend on the top management support. In specific, management support is refereed to understanding the specific benefit from supporting quality information to the supply chain partners. Past research has confirmed that the positive and significant relationship between management support and both behavior intension and system adoption. Fore example, management support significant and positive related with internet adoption (Tan & Teo, 1998), toward EDI adoption (Seyal, Rahman, & Hj Awg Mohammad, 2005), on behavior intension on use a Computer-based training (CBT) system (Wagner & Flannery, 2004), on the implementation of higher levels of IT adoption and supply chain integration (Wang, Chang, & Heng, 2004), and in earlier adopters decision to accept Internet technology (Mirani & King, 1994).

Beside that, other studied by Tarofder, Marthandan, and Haque (2010), Auer (1998), and Macharia and Nyakwende (2010) concluded that increase top management support will influence significantly on adoption and diffusion process of particular system in various context such SCM. Also, Auer (1998) and Igbaria, .Zinatelli, Cragg, and Cavaye, (1997) found that organization support variables have a positive relation to IS usage. Similarly, Anakwe, Simmers, and Anandarajan (2002) shown that management support was significantly related to the three indicators of internet usage daily use of the internet, frequently of use , and with business activities (marketing and communications). Furthermore, top management support as IT acceptance (usage) has direct and significant effect on the firm ability to be an agile competitor (Zain, Rose, Abdullah, & Masrom, 2005).Therefore, the related hypothesis is proposed that:

H2g: *Management support will have a direct positive influence on Quality Information Delivery.*

Past research has confirmed the positive relationship between user technical support quality information deliveries. For example, perceived usefulness is found to positively related to behavioral intentions in both civilians and military models (Wagner & Flannery, 2004), acceptance of end-user computing inside the organizations context (Raymond, 1990), on online learning adoption (Lee, 2008), influence leaners' user of a computer-based training supporting system (TSS) (Wagner & Flannery, 2004).

Other quantitative survey found that user technical support have significant relationship with operation information sharing among retailers and manufacturers sectors in context of SCM in Austrian (Madlberger, 2008), with information quality government agencies in Malaysia (Masrek, Abdul Karim, & Hussein, 2007), share their information timely, accurately, and reliably in the organizations system in USA (Lim & Paliva, 2001), and with high level of information sharing among organization and those with low levels of information sharing also in USA (Li & Lin, 2006). Thus, the internet support or information system support by present Information Center staff, whom more professionalization and specialization in information technology systems could provide recommendations and assistance to microcomputer users when they need that, and that required from them to be more kindness, and their service to provided less cost and to get high level of quality during sharing information among internet application users inside the companies. Thus, from here, the hypothesis was developed as follows.

H2h: *High level of technical Support has direct positive influence on Quality Information Delivery.*

2.12.3 Mediating Effects of Information Quality Delivery

Past research has found that knowledge sharing fully mediating between trust and firm performance (McDowell & Karrike, 2008; Yu, Yan, & Cheng, 2001). Other found outcome expectation is mediating between collective efficacy and team performance (Sniezek, & Henry, 1989; Hsu, Chen, Chiu, & Ju, 2007). In 2005 Hemsworth and Bidgood Found that quality management practices (supplier quality management, personnel management, cross-functional coordination, management commitment, and benchmarking) have indirect impact on purchased behavior mediated through IS practices. Also, Large (2005) confirmed that external communication behavior is mediating between individual and contextual factors, communication quality towards supplier management performance. Eng (2006) found that five organizational norms (cooperative norms, cross-functional, information sharing, intra organizational knowledge sharing, participative culture, and mutual trust) and SCM performance mediated by cross-functional coordination.

Furthermore, it can be argued, from the argument above, that Quality Information Delivery is a missing link between Internet Technology Factors and Supply Chain Information Performance., and thus can play a mediating role on the relationship between Internet Technology Factors and Supply Chain Information Performance.

In other ward, the two construct are not only interrelated, ie associated with each another, but furthermore, Internet Technology Factors proposed to be an antecedent to Quality Information Delivery, namely Quality Information Delivery can play a mediating role on the association between Internet Technology Factors and SCIP.

This argument can be supported via preliminary finding of scholarly work of Yu, Yan, and Cheng (2009), Forman and Lipper (2005), Faisal, Banwet, and Shankar (2007), Clay and Strauss (2000), Li and Lin (2006), Ko, Tseng, Yin, and Huang (2008), Yi and Hwang (2003), Ryssel, Ritter, Gemu¨nden, and Georg (2004), Tarofder, Marthandan, and Haque (2010), Pang and Cai, (2008), Mobering, at el. (2002), Madlberge (2008), Eng (2006) , and Hemsworth, Sa´nchez-Rodrı´guez, and Bidgood, (2005) who either found ITF antecedent to Quality Information Delivery. However, the majority of the scholars work was in supply chain context and between companies and customers. Furthermore, most of these studies support the nation implicitly. In addition, the construct of Internet Technology Factors (ITF) and Quality Information Delivery were oversimplified in these scholarly works. Moreover, the past studies give an evident on the important of quality of sharing information as behavior intension towards acceptance actual system use over internet applications and to advance the performance of SC information system, besides the evident on the effect of antecedent's factors on Quality Information Delivery. Therefore, the present study intends to examine Quality Information Delivery as the mediator in the relationship between the antecedents and the supply chain information performance. Thus, this study hypothesized:

H3: There is a mediating effect of Quality Information Delivery (QID) in the relationship between Internet Technology Factors and SCI performance.

Hypothesis 3a: Quality Information Delivery mediates the relationship between Perceived Usefulness and supply chain information performance.

Hypothesis 3b Quality Information Delivery mediates the relationship between Perceived security and supply chain information performance.

Hypothesis 3c Quality Information Delivery mediates the relationship between Perceived privacy and supply chain information performance.

Hypothesis 3d: Quality Information Delivery mediates the relationship between Perceived of trust and supply chain information performance.

Hypothesis3e: Quality Information Delivery mediates the relationship between Collective efficacy and supply chain information performance.

Hypothesis3f: Quality Information Delivery mediates the relationship between Supply chain commitment and supply chain information performance.

Hypothesis 3g: Quality Information Delivery mediates the relationship between Management support and supply chain information performance.

Hypothesis 3h: Quality Information Delivery mediates the relationship between technical support and supply chain information performance

2.13 SUMMARY

Firstly, research on information quality delivery has focused on the influence of internet technology factors, these factors are represented by perceived usefulness, Perceived Security, Perceived Privacy, Perceived Trust, Collective Efficacy, Supply chain Commitment, Management Support, and Technical Support. In other words, this research investigates the influence of these factors on the behavior intension to deliver the information to others due to quality information sharing in SCM context.

Secondly, similar to antecedents of Information quality Delivery, the impact of the Information quality Delivery, is dependent on the business environment, the choice of measures of performance used and the level of analysis. This research investigates internet applications (Electronic mail, internet phone, video conferencing, chatting, file transfer documents, browser, website, and organization programming system) as tools that measure acceptance internet technology, and SC information performance as the major consequence of Information quality Delivery, in manufacturing sectors in Malaysia. United Theory of Acceptance and Use of Technology (UTAUT) was chosen as a basis for this research. The reason for choosing it is that the model has been successfully used in several previous studies related to attitudes, intention and behaviors of organizations when dealing with online technology.

The reviewed literature works as a good basis for developing a model to reflect the factors that influence behavior of quality Information Delivery, and its impact on SC information performance. The following section introduces the model with the chosen factors for this research. Based on this model, the research hypotheses are then formulated and tested to validate the model

CHAPTER 3

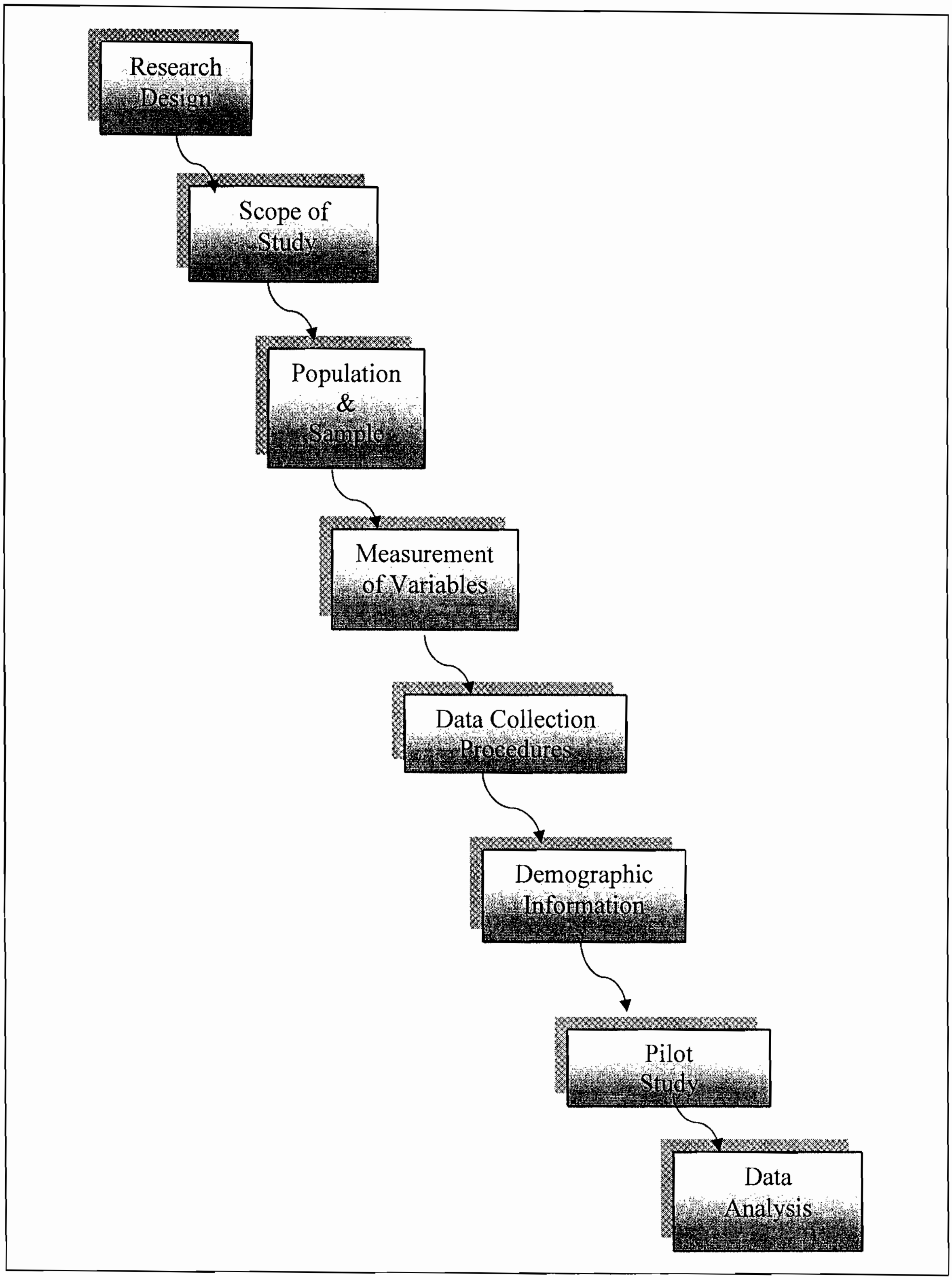
RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter talks about the methodology of this study. Amongst others, this chapter will elaborate on the study's research design, operationalization of variables, the population and sample of study, as well as data collection procedure. Last but not least, this chapter also reports on the pilot test for this study. This chapter ends with a discussion of the statistical techniques used to analyze the data. The overall flowchart of the research methodology is showen in the following figure 3.1.

Figure 3.1

Shows Flowchart of the research methodology



3.2 RESEARCH DESIGN

This study is correlational in nature. The study was conducted with the intension to obtain a good grasp of the quality information delivery among the suppliers and customers over the internet applications in the Malaysian manufacturing sectors Narrowly, the purpose of this research is to investigate relationship between internet technology factors (ITF) and quality information delivery (QID), and explore the mediating effect of the QID in the relationship between ITF relation and supply chain information performance.

This study is cross-sectional where the data was gathered only once. A survey method was employed because it is the most appropriate research design to obtain personal and social facts, beliefs, and attitude on a large scale.

The unit analysis in this study is organization. Each respondent is chosen to represent his or her organization. Therefore, the targeted respondent is someone who is involved in the operation of the organization that uses internet application in its activities and implements SCM. The respondents consist of operation managers, general managers, production managers, MIS managers, engineers and other relevant individuals, who responded on behalf of the firm.

3.3 SCOPE OF STUDY

This study focuses on manufacturing sector because it is an important sector that contributes toward the economic development of Malaysia. The manufacturing sector achieved a growth rate averaging 4.1 percent during the Ninth Malaysian Plan and its share to GDP increased to 31.4 per cent in 2005. The capacity utilization rate in the manufacturing sector remained high averaging 80 per cent per year. Growth was led by resource-based industries, which recorded an average growth of 5.0 per cent per annum. The main contributors to growth were the chemical products, food processing, rubber products and paper products sub sectors. The non-resource-based industries grew at an average rate of 3.5 per cent per annum. Despite recording a moderate growth averaging 3.0 per cent per annum, the electronics subsector remained the largest contributor, accounting for 28.0 per cent of manufacturing value added in 2005 .

During the Eighth Plan Period the manufacturing sector continued significantly to output growth, exports and employment to face the increasing of the international competitive. The average growth of manufacturing was 6.2 per cent during the 9th plan period (Government Malaysia, 2006). Moreover, the sector is predicted to be more dynamic and competitive, reaching an average of 6.7 per cent per annum with growth created by entire value chain.

Furthermore, this sector is aggressively adopting and implementing ICT to boost its competitiveness (National Productivity Corporation, 2003). For example, advanced manufacturing takes account of intelligent software, high technology packaging, automation and nano-processing. In this context, R&D will be increased and application in key areas will be undertaken (Government Malaysia, 2006, p.119).

Malaysia has been chosen as the location of the RosettaNet Asia Engineering Centre, to be located at Bayan Lepas, Penang. In Malaysia E & E sector has moved ahead to integrate into the electronic global supply chain by adopting and implementing RosettaNet standards. This adoption of RosettaNet standards by local manufacturers of components and parts has enabled them to interact with their partners around the world, coordinate business activities and share real time information, beside reducing inventory cost (BusinessDictionary, 2010). Correspondingly, the Government would like to see multinational companies MNCs and their local suppliers adopt the RosettaNet Standards and have provided tax deduction, for MNCs in Malaysia, which assist local SMEs to adopt the RosettaNet Standard.

3.4 POPULATION AND SAMPLE

Based on the above justification manufacturing sector which have supply chain management system and adopt internet applications in their process was chosen. Furthermore, manufacturing companies in Malaysia were more concerned on the issue of the information technology adoption and e- supply chain performance because of the government polices (Hafeez, Keoy, Zairi, Hanneman, Koh, 2010; Tarofder, Marthandan, & Haque, 2010). These polices had been contributed to increase productivity, improve efficiency, protect market share, and increase profitability of Malaysian companies (Zain, Rose, Abdullah, & Masrom, 2005)

The population for this research is chosen from the 2007 year of Federation of Malaysian Manufacturers book which serves a directory of of its, 2107 members of manufactures. (Federation of Malaysian Manufacturers, 2007). A set of structured questionnaire was sent to 650 companies that were randomly selected from FMM Directory 2007. The Directory provides background information on classifying the size and nature of surveyed companies in terms of sales turnover and number of employees. Referring for the sample size for the present study was followed rule of thumb prosed by

Roscoe (1975, cited in Sekaran, 2000), whereby sample size larger than 30 and less than 500 are appropriate and the sample size should be several times (preferably 10 times or more) as large as the number of the variable of the study. The present study consisted of ten variables. Therefore following this rule, the minimum simple size required was 100.

The sample of this study determined using simple random sampling technique. This type of sample is most suitable where every element on in the population has a known and equal chance of being selected as a subject. In other word, each single of element in the list has the same or equal probability of being chosen (Sekaran, 2005, p.270). The other reason is the high generalizability of the finding for the sample random sampling (Sekaran, 2005, p.280).The subject of this study was selected using Excel in order to generate a random subject of the sample (Kervin, 1992; Sekaran, 2005).

Twenty one companies were used for the purpose of questionnaire modification i.e., content validation, which conducted through interview and pilot test. Two in depth interviews were conducted with operation managers and MIS manager from two different companies in both Shah Alam, and Penang Island. The pilot test had been conducted, between months of April and May 2008, and these 21 companies were excluded from the real data collection. On the other hand, in Decembers 2008, the final questionnaires were mailed to the 650 companies that were in the FMM Directory 2007 (total 2017 companies).

Based on Development Composite Index (DCI) the central region which includes Melaka, Negeri Sembilan, Selangor and Wilayah Persekutuan Kuala Lumpur are the most developed regions in 2005 (Ninth Malaysian Plan, 2006b, p.356). Sabah, Sarawak and the states in the eastern region which comprises Kelantan, Pahang and Terengganu are the least developed region, while the northern region which includes Kedah, Perak, Perlis and Pulau Pinang represent, and Sothern region which include Johor the most and moderately developed states (Economic Planning Unit, 2005). Besides DCI, the development gaps between regions and states were identified in terms of the level gross domestic product (GDP), and its growth, household income and incidence of poverty as well as attractiveness to new investment in manufacturing. So as to be more representative, it was decided that the sample comes from northern, central, southern and eastern regions. However, Sabah and Sarawak would be excluded because the geographic scope of study just includes manufacturing companies that locate in Peninsular Malaysia states.

3.5 MEASUREMENT OF VARIABLES

With exception of demographic factors, all other variables included in this study were measured using multiple items drawn from previous research. However, phrasing of the items was modified to suit the sample and local setting.

The dependent variable in this study is supply chain information performance, while the mediating variables is quality information delivery and independent variables are perceived usefulness, perceived security, perceived privacy, perceived trust, collective efficacy, supply chain commitment, management support, and technical support. The following explains how each variable is measured.

3.5.1 Supply Chain Information Performance

Supply chain information performance is operationalized by instruments of competitive capabilities which are: quality, delivery dependability, Price / cost, and flexibility (Dîaz, Gil, & Machuca, 2005). According to Dîaz, Gil, and Machuca (2005) that various competitive priorities in operations such as Cost, quality, delivery and flexibility determined as an indicators to measure the performance of investment in advanced manufacturing technologies (AMT). By sharing various needed data through the application of systems such as internet and electronic data interchange (EDI) along supply chain that allow the organization to enhance its competitive advantage, and organizational performance level (Tracey, Vonderembse,, & Lim, 1999; Zhang, Vonderembse, & Lim, 2006). Dependable delivery means improve level of supply chain integration by introduce products to the market quickly, and by high respond to the customer needs. Price / cost means firm with good financial capabilities can afford to offer low price, which provides a cost advantage over its competitors. Moreover, the organization that offering high quality product can charge premium prices and thus increase its sales profit margin and return in investment. Flexibility means the ability of the organization to provide horizontal information across the values chain to meet a variety of customers' needs.

Supply chain information performance is operationalized based on the thirteen items adopted from (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006; Shepherd, & Gůnter, 2006; Zhang, Vonderembse, & Lim, 2006). Each item was accompanied by five-point response format from "1" strongly disagrees to "5" strongly agree. Li, Ragu-Nathan, Ragu-Nathan, and Rao, (2006) had used the instrument to measure supply chain information performance among USA organizations and they found that the reliability coefficient (Cronbach Alpha) above 0.70 for this instruments. Table 3.1 presents the items asked to measure supply chain information performance.

Table 3.1

Supply Chain Information Performance Measures

Items
1. We are able to compete based on quality.
2. We offer products that are highly reliable.
3. We offer products that are very durable.
4. We offer high quality products to our customer.
5. We have joint production planning and scheduling among suppliers, manufacturing, marketing, distributors.
6. We link information systems so that each member of a supply chain knows others' requirements and status.
7. Information flows quickly along the value chain.
8. Accurate information is usually available for decision making.
9. We offer competitive prices.
10. We are able to offer prices as lower than our competitors.
11. We deliver the kind of products needed.
12. We deliver customer order on time.
13. We provide dependable delivery

Source adopted from Li, Ragu-Nathan, Ragu-Nathan, and Rao, (2006); Zhang, Vonderembse, and Lim (2006), and Shepherd, and Günter, (2006)

3.5.2 Quality Information Delivery

Quality information delivery was operationalized by using three dimensions namely "timeliness", "consistent representation", and "accessibility" (Lee, Strong, Kahn, & Wang, 2002). The information sharing have significant impact on SCM practices depends on the what information is shared, when and with whom it is shared (Russell, 2007). Timeliness means information exchange between our trading partners and us intend to be sufficiently timely to perform the task, and sufficiently up-to-date for our work. Consist representation means information exchange between supply chains partners intend to be consistently presented in the same format. Consistent representation refers to the data or information in consist format, whereas the information accessibility means information exchange between our trading partners and us intend to be easily accessible, retrievable, and obtainable (Lee, Strong, Kahn, & Wang, 2002; Li, Ragu-Nathan, Ragu-Nathan, and Rao, 2006).

Quality information delivery is operationalized based on the ten items adopted from (Lee, Strong, Kahn, & Wang, 2002). These items were modified slightly to match with the exchange information between firm's trading partners. It requires respondents to assess the extent to which they perceive their companies engaged in certain behavior over internet applications related to information quality, on a five-point Likert scale ranging from "1= strongly disagree" to "5= strongly agree".

The scale has been found to be most robust measure of information quality in terms of applications by other researchers (Knight & Burn, 2005). Lee, Strong, Kahn, and Wang (2002) found that the construct reliability coefficient of the information quality dimensions ranged from 0.94 to 0.72, which indicates that measures are reliable. Table 3.2 presents the items asked to measure quality information delivery.

Table 3.2

Quality Information Delivery Measures

	Items
1.	Information exchange between our trading partners and us is sufficient current for our work.
2.	Information exchange between our trading partners and us is sufficient is sufficiently timely.
3.	Information exchange between our trading partners and us is sufficient is sufficiently up-to-data for our work.
4.	Information exchange between our trading partners and us is consistently presented in the same format.
5.	Information exchange between our trading partners and us is presented consistently.
6.	Information exchange between our trading partners and us is represented in consistent format.
7.	Information exchange between our trading partners and us is easily retrievable.
8.	Information exchange between our trading partners and us is easily accessible.
9.	Information exchange between our trading partners and us is easily obtainable.
10.	Information exchange between our trading partners and us is quickly accessible when needed.

Source: adopted from Lee, Strong, Kahn, and Wang (2002)

3.5.3 Perceived Usefulness

Usefulness is defined as the degree to which supply chain partners believe particular system can enhance their supply chain performance. In current study, the instruments used to measure usefulness are: work more quickly, job performance, increase productivity, effectiveness, make job easier, and usefulness, it used six items depend the prior studies (Davis, 1989; Venkatesh and Davis, 2000). Moreover, Perceived usefulness show to what extent managers feeling that using internet application will improve the effectiveness of supply chain information performance. An instrument have been developed by Hwang, Jeong, and Nandkeolyar (2008) to be more relevant to the ERP system, by Kye, Son, and Cho (2008) to be relevant to the RFID, and by Chen, and Huang, (2003) to be more relevant to supply chain information system. The items were modified slightly to match with the supply chain context. Item for each scale were scored on a five-point Liker scale, ranging from "1" (strong agree) to"5" (strong disagree). Researchers such as Davis (1989), Laitenberger and Dreyer (1988), Mellarkod, Appan, Jones, and Sherif (2007), and Yanga and Yoo (2004) have shown that the instrument has a high reliability exceeding 0.80. Table 3.3 shows the items to measure perceived usefulness.

Table 3.3

Perceived Usefulness Measure

Items
1. Using Internet applications improve supply chain performance.
2. Internet applications enable supply chain partners to accomplish their tasks more quickly.
3. Using Internet applications will improve effectiveness of supply chain management.
4. Using Internet applications increase supply chain partners' productivity.
5. Using Internet applications will make supply chain partners' work easier.
6. Over all, the Internet applications are useful for supply chain management information system.

Source: adapted from Davis (1989).

3.5.4 Perceived Security

Perceived security of information system refers to prohibit of disclosure about any of the important information during communication between SCM partnerships. The impacts of the information security/ breakdown risks are critical for overall supply chain operations (Faisal, Banwet, & Shankar, 2007). Two dimensions are used to measure perceived security named decreased environment risk and raising the security. Perceived Security was measured using an adopted instrument developed by Yousafzai, Pallister, and

Foxall, (2003). It involved five items on a five point Likert scale ranging from "1=strongly disagree" to "5=strongly agree". Chen and Barnes (2007) have used this measurement and approve the reliability was 0.947. Table 3.4 shows the items used to measure perceived security

Table 3.4

Perceived Security Measure

	Items
1.	Internet applications present enough online security.
2.	Purchasing on internet applications will not cause financial risks.
3.	Online transaction on internet applications is protected by the latest technology.
4.	Online payment on these internet applications is safe.
5.	Internet applications have the ability to solve problem from hackers.

Source: Adopted from Yousafzai, Pallister, and Foxall (2003)

3.5.5 Perceived Privacy

Perceived privacy was measured using the scale developed by Yousafazi *et al.*, (2003) with minor modification on the wording. The instrument consist of five items that focus on the suppliers and customers information privacy, and to what extent the internet applications provider by firms are concerned about their customers and suppliers privacy. Perceived privacy is operationalized by using two dimension namely credibility, and reliability of the internet applications (Yousafzai, Pallister, & Foxall , 2003). The level of honesty from the buyer to the seller will reduce or increase depending on the credibility of the seller. Moreover, the reliability concerns about protect suppliers and customers information by not used by the firms for other purpose without their permission (Liu & Arnett, 2002). All items were measured on a five-point Likert scale format, ranging from '1' "strongly disagree to '5' "strongly agree". It was adapted from Yousafzai, Pallister, and Foxall (2003). The previous alpha score for this variable is 0.973 by Chen and Barn (2003). The items used to measure perceived privacy are shown in Table 3.5 below.

Table 3.5

Perceived Privacy Measure

	Items
1.	The supplier's information that firm provides on the internet applications is secure.
2.	The monetary information that firm provides on this internet applications is well protected.
3.	These internet applications will not use unsuitable method to collect customer and supplier data.
4.	These internet applications do not ask for irrelevant customer's information.
5.	These internet applications do not apply supplier information for other purpose.

Source: Adapted from Yousafzai, Pallister, and Foxall,(2003)

3.5.6 Perceived Trust

The literature has identified various dimensions of the trust in online companies. Of these dimensions predictability, benevolence, integrity, and ability (Eppler & Muenzenmayer, 2002).Benevolence measure refers to the operation manager believed to want to do good to improve level use of the web site. On other hand, predictability measurement refers to the buyer ability to predict whether supplier has a positive performance or not, it more related to the transacting with this suppliers (Wu, & Chang, 2005). In this study, two dimensions were used to measure perceived trust are: ability and integrity, where both of these dimension have a significant impact on the information flow compare with other dimensions (Wu, & Chang, 2005). Ability measure means the website have good rate, whereas Integrity measurement operation manager set of transaction rules that more acceptance to customers and suppliers (Wu, & Chang, 2005). The instruments developed by Mayer, Davis, and Schoorman (1995).

Perceived Trust is measured by six items. All items were measured on a five-point Likert scale format, ranging from '1' "strongly disagree" to '5' strongly agree." The first dimension is ability which measured by first three items, and the second one is integrity benevolence that was measured by last three items. All questions were adapted from Mayer, Davis, & Schoorman (1995) with slightly modification on the wording to match with domain of supply chain memebers context. The previous alpha score for these construct ranged from 0.7069 to 0.9331 (Wu, Chiag, Wu, & Tu, 2004). Table 3.6 below shows the items used to measure perceived trust.

Table 3.6

Perceived Trust Measure

	Items
1.	Our supply chain partners feel that the Internet applications administrator will update the content of web page any time.
2.	Our supply chain partners feel that the Internet applications' call center will conduct transaction for them.
3.	Our supply chain partners feel that all transactions will be conducted promptly.
4.	Our supply chain partners feel that the internet applications have integrity.
5.	Our supply chain partners feel that the internet applications are reliable.
6.	Our supply chain partners feel that the internet applications are trustworthy.

Source: Adapted from Mayer, Davis, and Schoorman (1995).

3.5.7 Collective Efficacy

Collective efficacy refers to the capabilities and skills of supply chain partners to achieve their organizations goals, and to perform their jobs (Compeau & Higgins, 1995). In other words, collective efficacy of working team has been influenced on the operation and performance of their companies (Law, 2009). Collective efficacy in present study was operationalized by using two dimensions namely magnitude and strength. Magnitude refers to the ability of company's members during using software package to achieve difficult tasks, while strength refers to their abilities to perform difficult task with high level of confidence (Compeau &. Higgins, 1995). The eight items measuring collective efficacy were adapted from Compeau and Higgins (1995), and developed by Hsu, Chen, Chiu, and Ju, (2007) with minor modification on the wording to make them more relevant to the present research.

The organizational managers were asked to judge their organizations' members capabilities to accomplish a task by using internet applications, and they asked to indicate to confidence level for their employees during using internet applications. This procedure closely follows the recommendation Gibson, Randel, and Earley (2000) who extensively reviewed the literature on the measurements of collective efficacy. Respondents were asked to consider all items on five point Likert scale ranging from "1= very disagree" to "5= very agree". The scale has reliability coefficient alpha greater that 0.70 (Hsu, Chen, Chiu, & Ju, 2007). The eight items used to measure collective efficacy shown in Table 3.7 below

Table 3.7

Collective Efficacy Measure

Items
Our company could complete its activities using internet applications ...
1. If there was no one around tell its employees what to do as they do.
2. If most of its employees had never used these types of applications before.
3. If its employees had only the software manuals for reference.
4. If its employees had seen someone else using it before trying it themselves.
5. If someone else had helped them get started.
6. If its employees had a lot of time to complete the company's work.
7. If its employees had just the built – in help facility for assistance.
8. If someone showed its employees how to do it first

Source adapted from Compeau and Higgins (1995).

3.5.8 Supply Chain Commitment

Supply chain commitment is measured using six items developed by O'Reilly and Chatman (1986). The commitment, is divided into two dimensions: (a) an affective and identification, and (b) continuance (cognitive) (Meyer & Allen, 1997). Moreover, Meyer and Allen (1996) propose three dimensions of organizational commitment i.e. affective, normative, and continuous commitment. Even though commitment dimensions have been found to be associated with behavior intentions and system usage behavior, the present study also looks at affective commitment as a supply chain commitment. This is because affective commitment is considered one of the most important factors for employees support for change initiatives, and for the readiness of the organization to change (Armenakis & Bedeian, 1999). In addition to that Malhotra and Galletta (2005) found that affective commitment (internalization and identification) positively influence behavioral intention to use the volitional system. In current study, supply commitment is operationalized by using affective commitment (internalization and identification) dimension However, internalization occurs when system supply chain partners adopt behaviour because of its content that they find matching with their own norms, while identification occurs when system supply chain partners adopt attitudes and behaviors to achieve a satisfying (Malhotra & Galletta, 2005). The instrument adopted from O'Reilly and Chatman (1986) and developed by Malhotra & Galletta (2005) , the instruments has been modified to more relevant with supply chain context such as Wu, Chiag, Wu, and Tu, (2004), and Moberg, Cutler, Gross, and Speh, (2002).Malhotra and Galletta, (1999) found the reliability coefficient of 0.80 for the construct.In this study, respondents were asked to indicate their level of agreement using five Likert scale ranging from " 1=strongly disagree" to " strongly agree". Table 3.8 below shows the item used to measure supply chain commitment.

Table 3.8

Supply chain commitment Measure

Items
1. The reason why our supply chain prefer to use internet applications because what it used stand for
2. Using Internet applications is primarily based on supply chain partner's norms.
3. What the usage of internet application stand for is important for our supply chain partners
4. Our supply chain partners are a proud about our internet applications
5. Our supply chain partners talk up the use of internet applications to their partners as having great Utility for them.
6.* Employees feel sense of ownership for the use of Internet applications

*Employees are refer to the all level of employees involved in SCM

Source: Source: Adapted from O'Reilly and Chatman (1986)

3.5.9 Management Support

Management support operational definition as the perceived level of general support offered by top management in the various types of the firms, and the role of this support to enhance level of quality information sharing within supply chain partners (Li & Lin, 2006; Igbaria, Zinatelli, Cragg, & Cavaye, 1997). Management support was measured by using two dimension i.e management encouragement, and allocation of resources for using internet applications. All five items were adapted from Igberia (1990). Respondents were asked to consider all the items and indicate their level of the agreement using a five-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree" (Becker, Randall, & Riegel, 1995; Mayer, Davis, & Schoorman, 1995; Venkatesh, Morris, Davis, & Davis, 2003). Lin and WU (1990) shown that measurement Management support refers to the perceived level of general support offered by top management in firms. Igberia (1997) has used this measurement and the internal consistency reliability of the scale was found 0.92. Table 3.9 below shows the items used to measure management support.

Table 3.9
Management Support Measure

	Items
1.	Management is aware the benefits that can be achieved with the use internet applications.
2.	Management always supports and encourages the use of internet applications for job- related work.
3.	Management provides most of the necessary help and resources to enable people to use internet applications
4.	Management provides good access to internet applications when people need them.
5.	Management provides good access to various types of internet applications when people need them

Source: Adapted from lgberia (1990)

3.5.9 Technical Support

User technical support is one of the organizational factors that influence on the quality information delivery (Anakwe, Simmers, & Anandarajan, 2002). In present study, technical support was measured using an adopted instrument eloped by Auer (1998) with slight modification on the wording. Technical support is defined as individuals (or groups) that provide technological support to improve level and skills of the SC members (Dyer, Cho, & Chu, 1988). This construct was operationalized using instrument that include items on the support provided by information centers. For instance, other research such as Igbaria (1990), Amoroso and Cheney (1991), and Thompson, Higgins, and Howell, (1991) also used the instruments which include the items of technical support which provided from Information Center. Technical support was measured using six items on as a five-point Likert scale ranging from (1) "strong disagree" to (5) "strong agree". Aure (1998) have used this measurement and proved that the reliability was 0.84. Table 3.16 below shows the items used to measure technical support.

Table 3.10

Technical Support Measure

	Items
1.	Guidance is available to our company in selection of Internet applications.
2.	Information center teaches our company to use Internet applications.
3.	The service quality of Information center is good
4.	Information center is capable of cooperation with our company.
5.	Our company can get assistance to internet applications systems problems rapidly
6.	The service provided by the Information Center is cost – efficiency

Source: adapted from Auer (1998).

3.6 DEMOGRAPHIC INFORMATION

In addition to the above variables, the study also sought structural information of the respondent companies. Questions such as designation and length of designation of the respondent, year of company establishment, number of employees, sales turnover, number of customers and main business of the company were asked. While respondent's designation, length of respondent's designations and the company establishment were asked in an open-ended format, the others were asked on a categorical scale.

In addition, the respondents were also asked about the extent of their use of various types of internet applications listed, based on the works of Fusilier and Durlabhji (2005). The respondents were asked to rate how often they used it on a 5-point scale ranging from "lowly" to "highly". The applications include e-mail, internet phone, video conferencing, chatting, file transfer documents, browsers, and website. Based on the internet applications that they were chosen they can answer the following parts of the questionnaires.

3. 7 DATA COLLECTION PROCEDURES

In this study more than 650 questionnaire were send by mail to the managers of the Manufacturing companies that adopted internet technology in their supply chain activities and listed in Federation of Malaysian Manufacturers, 2007. Since majorities are private limited companies, the researcher decides to delete the public sector.

Hence, in spite of such effort, of the 650 questionnaire sent, 184 of them were returned. Such response rate is similar to that reported by Ha and Stoel (2009) in United States, which had a response rate of 16.4 percent. For this current study, after checking for accuracy, only 151 replies were used as 28 of the completed questionnaires did not have response to the many questions. According to Malhotra (1999), the response rate for a mail survey of randomly selected respondents is typically less than 15 percent.

Table 3.11

Company Selection

Total listed companies in the FMM 2008 directory (N)		2017
Less: public companies		168
less: pilot study		21
Total companies considered as the population for the study		1828
N	2017	
Mailed questionnaire (m)	650	100%
Return questionnaire (q)	184	
Cases not complete	28	
Total	156	
Cases Removed	3	
Effective sample (n)	151	
n/N %		7.40
q/m%		28.30
n/m%		23.23

The questionnaires were addressed to the CEO. The survey was intended to identify internet technology factors, and the roles of quality information delivery to improve supply chin activities in Malaysian manufacturing organizations. The questionnaire was administered in English. As Malaysia is a member of the British Commonwealth, English is a well-understood language, particularly in the business setting, and therefore no translation into the Malay Language was deemed to be necessary.

The first wave of the questionnaire was mailed to the targeted respondents on the 10^{th} of December; the total number of them was sent 300 questionnaires. From that number the total questionnaires were received 78, and from them only 65 questionnaires usable. However, there some activities have been taken in order to encourage the respondents to participate in this research and therefore increase the percentage o the responds rate as the following:

1. Questionnaires were mailed with a cover letter ensuring anonymity and confidentiality, and a stamped reply envelop. The cover letter explained the purpose of the study.
2. To improve the response rate, with enclosed stamped for the answers A self-addressed stamped envelope with ach questionnaire in order to provide more convenience survey to the target respondents.
3. The high response rate is attributed to the follow-up telephone calls to managers in the sample in order to encourage participating and filling up the form of the questionnaire.
4. The researcher sent a reminder letter, to the late respondents, requesting and reminding them to respondents as soon as possible.
5. Other strategies that were used include e-mail, and deliver softcopy to respondents, in order to make it more convenience to them and to increase the response rate.
6. Delivering questionnaires by hand during visiting some respondent firms, and help them to answer the questionnaire in order to increase the response rate.

After that the second wave of the questionnaire was send again to the other chosen companies with the same procedure of the first wave. The total number of the questionnaire send to the second wave was 450 questionnaires and from hat number 106 was returned and 86 questionnaires were usable.

Finally, the total number of collected and usable questionnaires from the two waves was 151 usable questionnaires. However, a tremendous effort was made in order to obtain this number of questionnaires and this is mainly includes the personally administered questionnaires. In fact, this is has taken a places due to many problems arises during the data collections such as most of the respondents were very busy and have no time at all to answer the questionnaires, the ignores of the e-mails and the reminder letter, as well as to reach to them through the phone.

3.8 PILOT STUDY

Before distributing the final questionnaires, a pilot study was carried out to validate the instruments used. The pilot study was conducted among in 21 manufacturing companies. During the pilot study, the researcher was with the respondents while they were completing the questionnaire to identify difficulties in wording and to answer any questions raised about the items asked. In other words, this pilot study was to check on the ease of completion.

Each respondent took approximately 30 minutes to complete the entire questionnaire. As expected, there were some confusions on the sentences in the questionnaire, thus some amendments were made to the final version. The final version of the questionnaire can be seen in Appendix A.

The reliability test for each instrument was calculated using the pilot study data, and the reliability coefficients of the instruments used are shown in Table 3.12

Table 3.12

Reliability Coefficient for Multiple Item in Pilot Study (n = 21)

Variables	Alpha (α)
Supply chain management performance	0.916
Quality information delivery	0.927
Perceived usefulness for organization	0.903
Perceived security	0.831
Perceived privacy	0.920
Perceived trust	0.906
Collective-efficacy	0.845
Information technology commitment	0.911
Management support	0.895
Technical support	0.885

3.9 DATA ANALYSIS

For the purpose of data analysis and hypothesis testing, several statistical tools and methods were employed from SPSS software version 16. These include factor and reliability analysis to test the goodness of measures, descriptive statistics to describe the characteristics of respondents, test of differences to test the non-response bias and to compare the extent of quality information delivery.

Correlational analysis was run to describe the relationship between variables and regression analysis to test the impact of information quality delivery on supply chain management performance as well as the influence of antecedent factors on quality information delivery.

3.9.1 Factor and Reliability Analysis

One important step in data analysis is to understand the dimension of the variables in the proposal model or relationships in empirical research (Nunnally, 1978). In other words, factor analysis was conducted to identify the structure of interrelationship (correlation) among a large number of items. This is done by defining common underlying dimensions, known as factors (Hair, Anderson, Tatham, & Black, 1998). The cut-off point chosen for significant factors loading was 0.45, which is suggested by Hair, Black, Babin and Anderson (2010) for sample of more than 150.

In assessing the appropriate of factor analysis, the minimum sample size should be at least five times the number of variables. The acceptable size would be a ten-to-one ratio. The present study has ten variables, and therefore the minimum sample size needed was 50 (5×10 variables) or preferably 100 (10×10 variables). Tabachnick and Fidell (2007, p. 132) offer a formula for calculating sampling requirement, taking into account the number of independent variables in which $N > 50 + 8m$ (where m = number of independent variables). In this study there are eight independent variables so the sample size required is $50 + (8\times8) = 50 + 72 = 114$.

Another test to determine the appropriateness of factor analysis is the Barlett test of sphericity which examines the presence of sufficient number of significant correlations among the variables. It provides the statistical probability of correlations among the variables. It provides the statistical probability that the correlations matrix has significant correlations among at least some of the variables (Hair et al., 1998). Hair et al. (1998) indicated that the measure can be interpreted with the following guidelines: 0.80 or above, meritorious: 0.70 or above, middling: 0.60 or above, mediocre; and below .50, unaccepted.

To test internal consistency of the measurement, reliability analysis was conducted on the factors extracted using the recommendation from Nunnally (1978). In general, the closer the reliability coefficient gets to 1.0, the better it would be. Sekaran (2005) noted that reliability less than .60 is considered to be poor, those in the .70 range are acceptable, and those over .80 are good.

It should be noted that the entire negative worded item in the questionnaire were first reversed coded before the items were submitted for reliability test. In the case of coefficient alpha was lower than .70, the items with the lowest corrected item-to-total were removed until the.70 level was met (Tabachnick & Fidell, 2007).

3.9.2 Descriptive Statistical

To acquire a feel for the data, descriptive statistics (mean values and standard deviations) for all the variables of interest were obtained.

3.9.3 Test of Differences

Pallant (2001) argued that demographic variables which were not in a categorical format in the questionnaire (Length time of company, period of worker and designation of worker) were convert into categorical variables. Before the test was carried out, it was examined that we have not violated the assumption for chi-square test that is, minimum expected cell frequency in any cell should be five or more for two by two tables (Pallant, 2001).

One way analysis of variance (ANOVA) was used to examine whether there exist any differences in the level of quality information delivery performed by demographic variables with more than two categories(that is number of employee, sales turn over, number of customers, number of suppliers, geographic of companies). ANOVA test assumed equal variances; the Levene's test for homogeneity of variances was first examined in order to ensure that the assumptions of homogeneity of variance have not been violated.

3.9.4 Correlation analysis

Person correlation is used to describe the strength and direction of the relationship between two variables. In this study, the relationship between SCM performance dimension and quality information delivery as well as between antecedent factors and quality information delivery as well as between antecedent factors and quality information delivery were examined using this analysis. A positive correlation indicates that as one variable increases, so does the other. A negative correlation indicates that as one variable increases, the other decreases.

A perfect correlation of +1 or -1 indicates that the value of one variable can be determined exactly by knowing the value of other variable. On the other hand, a correlation of 0 indicates no relationship between the two variables.

3.9.5 Multiple regression analysis

Multiple regression is a more sophisticated extension of correlation and is used to explore the predictive ability of a set of independent variables on one dependent variable (Pallant, 2001).

In order to test the hypothesis developed in the present study, multiple regression analyses were conducted. Besides that, the amount of variance of SCM performance dimensions explained by quality information delivery as well as the quality information delivery explained by the antecedent factors were also examined through this analysis. Before proceeding with the analysis, the basic assumptions of the linearity (represents the degree to which the change in the dependent variable is associated with the independent variable), normality of the error terms distribution and homoscedasticity (constant variance of the error terms) were first examined.

Since multiple regression is very sensitive to outliers, that is standardized residual values above about 3.3 (or less than -3.3) (Pallant, 2001), it was detected by case wise diagnostics in the regression analysis in SPSS package version 16. To minimize the effect of outliers, they were deleted from the data set. Before the regression results are considered valid, the degree of multicolinearity and its effect on the results were examined. Therefore, the variance inflation factor (VIF) and the condition indices for all variables were examined. According to Hair et al. (1998), the VIF close to 1.00 indicates little or no multicollinearity. They further suggested the cutoff value of 10.00 as an acceptable VIF.

3.10 SUMMARY

As a summary, a detailed discussion on how the study was actually carried out has been discussed. Amongst others, this chapter elaborates the study's research design, measurement and operationalization of variables, the population and sample of the study, as well as data collection procedures, and validity of measures. This chapter ends with a description of the data analysis and the rationale for the statistical techniques used to analyze the data.

CHAPTER FOUR

RESULTS AND DATA ANALYSIS

4.1 INTRODUCTION

This chapter presents the result of data analysis. Firstly, this chapter describes overview of the data collection. Secondly, it presents the profile of the respondents. It then follows with analysis on goodness of measures to test the validity and reliability of variables. Finally, the results of hypotheses testing are presented.

4.2 TEST OF NON-RESPONSE BIAS

As is the case in any study relying on voluntary participation, there is always possibility that respondents and non-respondents differ in some significant manner (Pallant, 2001). Due to difficulty associated with the identification of non-respondents' characteristics in anonymous research, an alternative test of non-response bias was conducted.

According to Amstrong and Overton (1977), non-respondents were assumed to have similar characteristics to late respondents. This procedure involves breaking the sample into early responses at the beginning of December 2008 (that returns received within three weeks after distribution), and late responses at the end February 2009 (those returns received after two months of distribution) and then conducting chi-square test on demographic characteristics of the respondents. There were 65 respondents classified as early responses and 86 were late responses. Table 4.1 below displays the result of non-response test. The p values of the analysis revealed no statistically significant difference between two groups ($p < .05$). Thus, we can conclude that non-response bias would not significantly affect the generalizability of the finding of this study. Therefore, the analysis was carried out on the full 151 responses.

Table 4.1

Result of Chi-square Test of Early and Late Responses

Variables	Value of Pearson chi-square
Worker designation	.399
Length of designation	.227
Length of company	.415
No. of employees	.169
Company turnover	.111
Geographic scope	.138
Supplier number	.147
Number of customers	.516

4.3 OVERVIEW OF DATA COLLECTED

4.3.1 Response Rate

For data collection purposes, 650 questionnaires were distributed to different manufacturers in different regions of Malaysia. All of these companies were registered in Federation of Malaysian Manufactures (FMM) 2007. Out of this number, 184 were returned (as appear in Table 4.2), 2.8% of which were excluded because they were not included in Federation Malaysian Manufactures (FMM).

A frequency test was run for every variable to screen and clean the data from any missing responses. Three questionnaires were found to be incomplete for not responding sections A, B, and C. This reduced the number of usable questionnaires to 151, representing a response rate of 23.7 percent. Such response rate is similar to that reported by Ha and Stoel (2009). Furthermore, the sample size obtained for the study was appropriate according to the rules of thumb proposed by Roscoe (1975, as cited in Sekaran, 2005), whereby the sample size larger than 30 and less than 500 are appropriate.

It was tremendous effort, hard work and extra financial cost that this response rate was obtained. As part of the strategy to increase the response rate, a cover letter ensuring anonymity and confidentiality, and a stamped reply envelop were attached together with the mailed questionnaires. The cover letter explained the purpose of the study. Other strategies that were used include e-mail, and delivering questionnaires by visiting some respondent firms. The high response rate is also attributed to follow-up telephone calls to managers in the sample.

4.3.2 Outliers and Normality

The next step after cleaning and screening the data is examining the outlier and normality. Detecting univariate outliers was done by observing each variable (Hair et al., 1998). Six univariate outliers were identified in this research due to their extreme responses on the interval scaled statements i.e. the statements were responded to as either "strongly agree" or "strongly disagree." However, because it is quite conceivable for outliers to occur and that excluding these extreme cases will affect generalizability of the entire population of the study (Hair et al., 1998; Tabachnick, & Fidell, 2001), they were retained.

Subsequent to outlier test, an assessment of normality was performed. To assess normality, skewness and kurtosis are two ways that can be used to validate an assumption (Tabachnick, & Fidell, 2001). The skewness value provides an indication of the symmetry of the distribution, while kurtosis provides information related to the 'peakedness' of the distribution (Pallant, 2001, p. 53). Pallant adds that the distribution will be perfectly normal if the obtained value of skewness and kurtosis is zero. It is noted that there are few clear guidelines about how much non-normality is problematic. Many authors recommended that absolute values of univariate skewness greater than 3.0 seem to be extremely skewed data sets (Chou, & Bentler, 1995; Hu, Bentler, & Kano, 1992). Regarding kurtosis, there appears to be fewer consensus but a conservative compromise seems to be that absolute values of the kurtosis index greater than 10.0 may suggest a problem and values greater than 20.0 will be a more serious one (Kline, 1998).

In this study, all variables were tested using skewness and kurtosis level for normality. It was found that none of them had skewness greater than 3.0 and kurtosis index greater than 5.0. Therefore, the data appeared to have a normal distribution. In addition to these tests, the normal distribution was also checked by looking at the normal probability plots (labelled normal Q-Q plots). In these plots the observed value for each score is plotted against the expected value from normal distribution. A reasonably straight line suggests a normal distribution (Pallant, 2001, p. 59). The detrended normal Q-Q plots displayed in the output are obtained as the actual deviation of the score from the straight line. There should be no real clustering of points, with most collecting around the zero line. In this research, the normal Q-Q plots revealed a reasonably normal distribution.

Table 4.2

Descriptive Statistics

Variables	Min	Max	Mean	SD	Skewness		Kurtosis	
					Statistic	SE	Statistic	SE
Usefulness	1	5	3.96	.741	-.773	.195	.902	.389
Trust	1.17	5	3.39	.601	-.16	.195	.704	.389
security	1	5	3	.738	.033	.195	.438	.389
privacy	1	5	3.02	.732	-.099	.195	.928	.389
Collective efficacy	1	5	3.31	.66	-.387	.195	1.155	.389
SC commitment	2	5	3.75	.65	-.041	.195	-.346	.389
Management support	1.2	5	3.72	.764	-.59	.196	.606	.39
Technical Support	1.5	5	3.4	.633	-.043	.196	.08	.39
QID	2	5	3.59	.559	-.197	.195	-.19	.389
SCI performance	2	5	3.58	.56	.266	.195	-.263	.389

4.4 PROFILE OF THE RESPONDENTS

The responding companies were located in four regions as appear in Table 4.3, in which 44.8% of them are from the central region. It is assumed that the distribution of industries observed is reasonably representative of industries in Peninsular Malaysia. Table 4.3 shows the distribution of the respondent companies.

Table 4.3

Distribution of Sample Companies

Firm's Locations	Number of companies	Percentage of total companies
Central region	77	44.85
Eastern region	2	0.93
Southern region	25	3.73
Northern region	50	50.46
Total	154	100%

Table 4.4 displays the percentage of respondents based on their activities. The companies included in the study came from a wide range of businesses including machinery and equipment, transportation equipment, radio television and communication equipment, and rubber and plastic products. Other manufacturing activities include food product and beverage, electrical machinery basic metal and medical, precision and optical instrument, office, accounting and computing machinery, fabricated metal products, and other non-metallic mineral products.

However, the main reason of including various types of sectors in this study to extend the sample size to be more qualified for factor analysis. Hair et al. (2006, p112) argues that the researcher generally would not factor analyze a sample of fewer than 50 observations, rather the sample size should be 100 or larger. They added that, as a general rule, the minimum is to have at least five times as many observations as the number of variables to be analyzed, and the more acceptable sample size would be have a 10:1 ratio.

While many researchers contended that a homogeneous response sample is acceptable in exploratory studies, the lack of variety in the firms and managers in this sample may explain some of the non-significant results (Moberg, Cutler, Gross, Speh, 2002). Therefore, Moberg, Cutler, Gross, Speh, (2002) expected that the reliability would improve with a large sample size. Other research found that, increasing number of companies selected from automotive, financial services, retail, technology, and transportation sectors in USA would help to greatly enhance the research model of E-SCM initiatives (Lancaster, Yen, & Ku, 2006).

However, this research methodology contradicts past research on selecting the firm from only two closely related industry sectors: manufacturing and engineering, to provide a sampling of specific industries rather than a comprehensive guide to every company within an industry (Igbaria, Zinatelli, Cragg, & Cavaye, 1997).

Table 4.4

Company Activities

Firm's Activities	**Number of companies**	**Valid percentage of total companies**
Machinery equipment	28	18.2
Rubber and plastic products	18	11.7
Office, accounting and computing machinery	8	5.2
Chemicals and chemical products	2	1.3
Radio television and communication equipment	22	14.3
Food product and beverage	12	7.8
Other non-metallic mineral products	6	3.9
Fabricated metal products	7	4.5
Paper and paper products	3	1.9
Coke, refined petroleum product	1	.6
Electrical machinery	8	5.2
Other transportation and equipment	19	12.3
Wood and products of wood	1	.6
Basic metal	8	5.2
Medical, precision and optical instrument	8	5.2

To conclude, the above discussion indicates that the sample of this study does not deviate significantly from the general population of manufacturing industry and the sample is therefore considered representative of the population of interest.

4.4.1 Demographic Profile Respondents

The demographic statistics help assess if the sample was representative of the population. This section will discuss the respondents' profile that includes the respondents' designation, length of designation, company establishment, number of employees, sales turn over, geographic scope, number of customers and suppliers, and type of manufacturing sector. A brief summary of the demographic data of respondents is presented in Table 4.5.

Table 4.5

Demographic Characteristics of Sample Firms

Variables		Frequency	Percentages (%)
Designation of respondents	• Management	73	47.4
	• Marketing	14	9.1
	• Engineering	18	11.7
	• Accounting and finance	16	10.4
	• Technical	12	7.8
	• Operation management	8	5.2
	• Human resource	7	4.5
	• Chemist	3	1.9
Length of Designation	• Less than 5 years	84	54.5
	• Between 5-15 years	54	35.1
	• Between 16-25 years	10	6.5
	• More than 26 years	3	1.9
Length of company Establishment	• Less than 5 years	37	24.0
	• Between 5 -15 years	57	37.0
	• Between 16-25 years	35	22.7
	• More than 26 years	22	14.3
Number of employees	• Lcss than 5 employees	20	13.0
	• Between 5 -50 employees	79	51.3
	• Between 51-150 employees	15	9.7
	• More than 150 employees	37	24.0
Company turn over	• Less than RM 200,0000	28	18.2
	• Between 200,000 RM and less than RM 10 million	80	51.9
	• Between RM 10 million and less than RM 25 million-	17	11.0
	• More than RM 25 million	26	16.9

Geographic Scope	• Local (e.g. Johor, KL, Kedah etc.)	87	56.5
	• Regional (e.g. Asian)	31	20.1
	• World Wide (e.g. China, UK, Australia)	33	21.4
Number of customers	• Less than 50	32	20.8
	• 51-100	32	20.8
	• 101-150	13	8.4
	• More than 150	74	48.1
Number of suppliers	• Less than 50	79	51.3
	• 51-100	33	21.4
	• 101-150	7	4.5
	• More than 150	32	20.8

As shown in Table 4.5, the respondents came from various positions in the company. For example, 47.4% of the respondents were at the level of management, 11.7% represent professional engineers,10.4% were accounting and finance, 9.1% were in marketing, 8.41% engineers, 7.8 % in technical, 5.2% operation management, 4.5% human resource and almost 1.9% chemists. With regard to the length of respondents' designation, more than half (54.5%) had been in their current position less than five years, 35.1% between 5-15 years, 6.5% between 16-25 years, and 1.9% more than 25 years.

Close to half of the respondents said their organizations were established in the last five years, while only 1.9% of the sample companies were established since 1982 and earlier. Moreover 35.1% of manufacturing companies started their since 1993. The remaining companies were established in the period between 1992 and 1981.

Respondents were also asked to indicate the overall number of employees in order to identify the size of the organizations. They were classified into three groups based on the definition given by the Small and Medium Industries Development Corporations (1977). Based on the number of employees, half of the companies have between 5 and 50 employees (52.33%), while 23.36% have more than 150 employees. Another indication of the size of the company is annual sales turnover as specified by the National SME Development Council (2005). The council suggests that a small organization is one that has annual sales turnover between RM 250,000 and less than RM 10 million. This is represented by 51.9% of companies in this study. Micro companies with their annual sales turnover less than RM 250,000 are 18.2% in this research. Large companies are represented by 16.9% of companies, while the remaining companies are considered medium.

Slightly more than half of the companies are local (56.5%), while regional companies represent 20.1% of the respondents. The remaining companies have worldwide operations. With respect to number of customers, near to the half of the responding companies have customers more than 150 (48.1%).

With respect to number of suppliers, slightly half of the responding companies have less than 50 suppliers (51.34%). According to Moore (1995, as cited in Taylor & Todd, 1995), managing large number of supplier for a wide variety of goods and components prevents strategic use of the supplier relationship. He added that there are two main reasons for limited number of suppliers: working with small number of suppliers over long period of time allows a partnership of supply to be developed and hence a degree of security in the relationship. Another reason is for effective and professional management of the suppliers. Furthermore, the organizations that have less number of suppliers can change method of supply more easily.

4.4.2 Internet Technology Application Tools

Table 4.6 presents the various types of Internet applications adopted by the 151 organizations. It shows that the application that is highly adopted is organisation website (29.2%). This is followed by browsers (27.9%), organisation systems (27.3%), electronic mail (22.7%), and file transfer documents (21.4%). Internet applications such as Internet phone, video conferencing, and chatting have low percentage of adoption. This is consistent with the literature that indicates that some firms have actually adopted such Internet applications (Van Hoek, 2001). This finding reflects the current state of the art of the Internet application tools that are used in facilitating information sharing, and integrating it with customers and suppliers (Cagliano, Caniato, & Spina, 2003).

Table 4.6

Internet Technology Applications in the Manufacturing Organizations (n = 151)

Variables		Frequency	Percentages (%)
Electronic mail	• Very low	5	3.2
	• Low	8	5.2
	• Moderately high	22	14.3
	• High	35	22.7
Internet phone	• Very low	54	35.1
	• Low	41	26.6
	• Moderately high	27	17.5
	• High	16	10.4
Video conferencing	• Very low	54	35.1
	• Low	41	26.6
	• Moderately high	27	17.5
	• High	16	10.4

Chatting	• Very low	44	28.6
	• Low	25	16.2
	• Moderately high	34	22.1
	• High	25	16.2
		23	14.9
File transfer documents (FTD)	• Very low	27	17.5
	• Low	19	12.3
	• Moderately high	36	23.4
	• High	33	21.4
Browsers	• Very low	19	12.3
	• Low	15	9.7
	• Moderately high	36	23.4
	• High	43	27.9
Website	• Very low	8	5.2
	• Low	8	5.2
	• Moderately high	29	18.8
	• High	45	29.2
Organization system	• Very low	20	13.0
	• Low	14	9.1
	• Moderately high	32	20.8
	• High	42	27.3

However, many manufacturing managers have recommended net SMS as a critical application that contributes to improving the implementation of supply chain information performance (GOI, 2008).

4.5 GOODNESS OF MEASURES

4.5.1 Reliability and Validity

Reliability and validity analysis on measurement instruments in empirical research is very necessary for several reasons. Firstly, it raises the confidence that the empirical finding accurately reflects the proposed construct (Moore, 1998). Secondly, empirically-validated scales can be used directly in other studies in the field or different populations and for longitudinal studies (Seyal, Rahman, & Hj Awg Mohammad, 2005).

4.5.1.1 Reliability

According to Flynn, Schroeder, and Sakakibara (1994), the reliability of a scale indicates how free it is from random error. One of the ways to measure reliability is test and retest. A high correlation in the test-retest indicates better reliability. The correlation ranges from 0 to 1, with a high value indicating greater reliability between items. Another test to measure reliability is by assessing internal consistency. Cronbach's coefficient alpha determines whether the instrument is internally consistent of otherwise. Nunnally (1978) recommended a minimum level .7 for the instrument to be considered reliable.

4.5.1.2 Validity

Once the reliability of the scale has been established, the construct and criterion related validity of the instrument needs to be established using factor analysis. Factor analysis is a common name given to a class of multivariate statistical method whose primary purpose is to define the underlying structure in data matrix (Hair, Black, Babin, Anderson, & Tatham, 2006, p. 103). They added that the measure of sample adequacy

(MSA) intended to calculate both the entire correlations matrix and each individual variable is used to evaluate the appropriateness of using factor analysis. The measure can be interpreted with the following guidelines: MSA value in the range of .90 is marvellous; .80s meritorious; .70s middling; .60s medicore; .50s miserable; and below .50s unacceptable (Hair Jr., Anderson, Tatham, & Black, 1998; Kaiser, 1970; Nunnally, 1978). Individual variables that have MAS in the unacceptable range (below .50) should be considered for exclusion.

The validity of a scale refers to the degree to which it measures what it is supposed to measure. The main types of validity are content, construct, and criterion validity. Content validity refers to the adequacy with which a measure or scale has sampled from the intended universe or domain of content (Jiang, Shu, & Klein, 2000). To test validity of the instrument, content validity and construct validity were used in this study. However, criterion-related validity was not conducted in this study. Criterion-related validity is an important issue where talent variables are involved (Pallant, 2001, p. 7). No variable in this study can be regarded as truly latent. While several measures involve subject perception on the part of the respondents, it is the actual perception which is the focal variable and not the latent reality behind it. Factor analysis was based on principal component method with Varimax rotation for all components. The result for each factor analysis conducted is summarized in Table 4.6 and Table 4.8.

According to Pallant (2001), content validity refers to the adequacy with which a measure or scale has been sampled from the intended universe or domain of content. In order to ensure of the content validity of the measurement of quality information delivery, the procedure recommended by Murphy and Davidshofe (1998, as cited in

Ungan, 2004) was followed. The procedure has three steps: describing the content domain, determining the areas of the content domain that is measured by each item, and comparing the structure of the test with the structure of content domain. The kinds of evidence in support of content validity involve: (1) the judgment of those who construct the instrument or other experts familiar with the subject area; (2) detailed definition or conceptualization and operationalization of the behavioural domain or universe of interest; and (3) indirect way - high internal consistency reliability.

Since all items included in this study were carefully chosen either from prior empirical research or theoretical guidance, it can be argued that the content of the individual constructs are valid. Additionally, the instrument discussed in depth with several supply chain practitioners and academicians during the pre-testing stage ensured that the instrument items were relevant from their perspective.

As mentioned in the Chapter 3, even though most items used to measure the variables have been borrowed from the literature, it was deemed necessary to re-examine the validity (Gunasekaran, 1999; Walsh, 1995). This is because this study is undertaken in the Malaysian context, which is different from that of America or any other countries.

In order to ascertain whether the measurement used in this study has construct validity, exploratory factor analysis was conducted on all items measuring the constructs of supply chain information performance, quality information delivery, perceived usefulness, perceived privacy, perceived security perceived trust, collective efficacy, supply chain commitment, management support, and technical support.

4.5.2 Result of Exploratory Factor Analysis

Factor analysis is used to identify the latent structure (dimensions) of asset variables. It takes a large set of variables and looks for a way that data way may be reduced or summarized into smaller set of factors or components (Pallant, 2001, p.151). For factor analysis purposes, the items in the questionnaire are grouped into three components. The first component was supply chain information performance consisting of items in section E of the questionnaire, the second component was quality information delivery consisting of items in section D of questionnaire, and the third components comprise all the antecedent variables consisting of items in section C of the questionnaire. Factor analysis is based on principles component method with Varimax rotation for an orthogonal approach (which assumes that the factors are not related).

There are two main issues to consider in the determining whether a particular data set is suitable for factor analyses: sample size and strength of the relationship among variable (or items). Roscoe (1975) and Tabachnick and Fidell (2007) reviewed this issue and mentioned that it is comforting to have at least 300 cases for factor analysis. Other authors indicate that the minimum size of sample in the range between 100 to 200 observation is suitable to conduct factor analysis . Since the sample size of this study is located in this range, it can proceed with the factor analysis. The second issue is factorability of the correlation matrix. To be considered suitable for factor analysis, the correlation matrix should show at least some correlations of r = .3 or greater (Pallant, 2001, p.167). This condition is met in this research where the correlation coefficients are .3 and above.

4.5.2.1 Supply Chain Information performance

The factor analysis conducted on supply chain information performance shows the Kaiser-Meyer-Olkin value of .860, exceeding the recommended value of .5 (Hair et al., 1998) or above .6 (Pallant, 2001), and the Barlett's test of spherically was highly significant ($p = .00$), supporting the factorability of correlation matrix. Furthermore, an examination of the measure of the sampling adequacy (MSA) for each item falls in the acceptable range that is between .749 and .949, as shown in Table 4.7. This indicates that the assumptions of factor analysis were met. Principle component analysis revealed the presence of only one component with an eigenvalue exceeding one. This factor captures 48.30 of the total variance in the items.

Table 4.7

Measures of Sampling Adequacy (MSA) of Supply Chain Information Performance

Anti-image Matrices

	SCIP 1	SCIP 2	SCIP 3	SCIP 4	SCIP 5	SCIP 6	SCIP 7	SCIP 8	SCIP 9	SCIP 10	SCIP 11	SCIP 12	SCIP 13
SCIP 1	.887(a)												
SCIP 2	-.414	.852(a)											
SCIP 3	-.138	-.228	.794(a)										
SCIP 4	.095	-.067	-.377	.831(a)									
SCIP 5	-.132	-.203	-.005	-.179	.827(a)								
SCIP 6	.179	-.202	.063	.049	-.191	.919(a)							
SCIP 7	-.085	-.128	-.063	-.083	-.054	-.040	.949(a)						
SCIP 8	-.077	-.122	-.090	-.068	.225	-.144	-.104	.915(a)					
SCIP 9	.035	.195	-.229	.126	-.194	-.082	-.007	-.084	.837(a)				

SCIP 10	-.103	-.036	.318	-.309	.074	-.187	-.118	-.233	-.428	.816(a)			
SCIP 11	-.056	.190	-.159	.244	-.455	.013	.124	-.225	.072	-.287	.814(a)		
SCIP 12	-.062	-.158	.011	-.070	.173	-.069	-.057	.120	-.085	-.069	-.352	.899(a)	
SCIP 13	-.017	.025	.119	-.269	.108	-.180	-.202	-.084	-.022	.245	-.312	-.308	.851(a)

a Measures of Sampling Adequacy(MSA)
Note SCIP = Supply Chain Information Performance

Table 4.8

Factor and Reliability Analysis on Supply Chain Information Performance

Items	Factor Loading
• We deliver the kind of products needed.	.779
• We deliver customer order on time.	.754
• We are able to offer prices as lower than our competitors.	.751
• Accurate information is usually available for decision making.	.739
• We link information systems so that each member of a supply chain knows others' requirements and status.	.708
• We offer products that are highly reliable.	.706
• We provide dependable delivery.	.703
• Information flows quickly along the value chain.	.686
• We have joint production planning and scheduling among suppliers, manufacturing, marketing, distributors.	.678
• We offer high quality products to our customer.	.669
• We are able to compete based on quality.	.663
• We offer competitive prices.	.603
• We offer products that are very durable.	.565
Eigen value	6.280
% of variance	48.31
Cronbach's alpha	.916
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.860
Bartlett's Test of Sphericity Approx. Chi-Square	701.163
df	78
Sig	.000

As shown in Table 4.8, the factors loadings for supply chain information performance are between .565 and .779. Reliability (Cronbach's alpha) for this factor is .916, indicating high reliability. Item-to-total correlations revealed that removal of any item would not increase the alpha beyond .934, thus supporting the inclusion of all scale items. Since this factor measures the supply chain information performance by using various type of the Internet applications, its original name was retained.

4.5.2.2 Quality Information Delivery

The factor analysis conducted on quality information delivery shows the Kaiser-Meyer-Olkin value of .862, exceeding the recommended value of .50 (Hair et al., 2006). The Barlett's test of spherically was highly significant (p = .00), supporting the factorability of correlation matrix. Furthermore, an examination of the measure of sampling adequacy for each item fell in the acceptable area that is in .794 - .954 (see table 4.9). This indicates that the assumptions of factor analysis were met.

Table 4.9

Measures of Sampling Adequacy (MSA) of Quality information delivery

Anti-image Matrices										
	QID1	QID 2	QID 3	QID 4	QID 5	QID 6	QID 7	QID 8	QID 9	QID 10
QID 1	.866(a)									
QID 2	-.453	.902(a)								
QID 3	-.164	-.143	.922(a)							
QID 4	-.077	-.081	-.123	.954(a)						
QID 5	.106	-.004	-.293	-.234	.794(a)					
QID 6	-.156	-.027	.212	-.093	-.690	.815(a)				
QID 7	.166	-.166	-.185	-.157	-.217	.142	.833(a)			
QID 8	-.137	.066	-.015	.104	.277	-.212	-.672	.811(a)		
QID 9	-.152	.100	.060	-.115	-.004	-.049	-.077	-.071	.894(a)	
QID 10	.097	-.200	-.142	-.025	-.078	.009	.166	-.386	-.567	.861(a)

Note. QID = Quality information delivery

As shown in Table 4.10, the factor loadings are between .691 and .847. Reliability (Cronbach's Alpha) for this factor is .929, which indicates a high reliability. Item-to-total correlations revealed that removal of any item would not increase the alpha beyond .929, thus supporting the inclusion of all scale items. Since this factor measures the quality of information delivered between customers and suppliers by using various type of the Internet applications, its original name was retained.

Table 4.10

Factor Analysis on Quality information delivery

Items	**Factor Loading**
• Information exchange between our trading partners and us is quickly accessible when needed.	.847
• Information exchange between our trading partners and us is easily retrievable.	.820
• Information exchange between our trading partners and us is easily obtainable.	.813
• Information exchange between our trading partners and us is easily accessible.	.808
• Information exchange between our trading partners and us is sufficiently up-to-data for our work	.787
• Information exchange between our trading partners and us is consistently presented in the same format	.779
• Information exchange between our trading partners and us is sufficient is sufficiently timely	.773
• Information exchange between our trading partners and us is easily accessible	.763
• Information exchange between our trading partners and us is represented in consistent format	.745
• Information exchange between our trading partners and us is sufficient current for our work.-	.691
Eigen Value	6.144
% of variance	61.442
Cronbach's alpha	.929
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.862
Bartlett's Test of Sphericity Approx. Chi-Square	989.568
Df	45
Sig	.000

From the output, the principle components analysis revealed the presence of only one component with an Eigenvalue exceeding one. The factor captured 61.442 percent of the total variance.

4.5.2.3 Antecedent Factors

For the antecedent factors, factor analysis based on six items of perceived usefulness, five items of perceived security, five items of perceived privacy, six items of perceived trust, eight items of collective efficacy, six items of supply chain commitment, five items of management support, and five items of technical support, was conducted.

The final determination of the number of factors must wait until the results are rotated and the factors are interoperated (Hair et al., 2006). They recommended that the researcher next employs a rotational method to achieve simpler and theoretically more meaningful factor solution. In most cases rotation of factors improves the interpretation by reducing some of the ambiguities that often accompany initial unrotated factor solution.

Because many components were extracted, it is important to look at the screenplot (refer to Figure 4.1). We need to look for change (or elbow) in the shape of the plot, because only components above this point are retained (in our study it is quite a clear break between the seven and eight components).

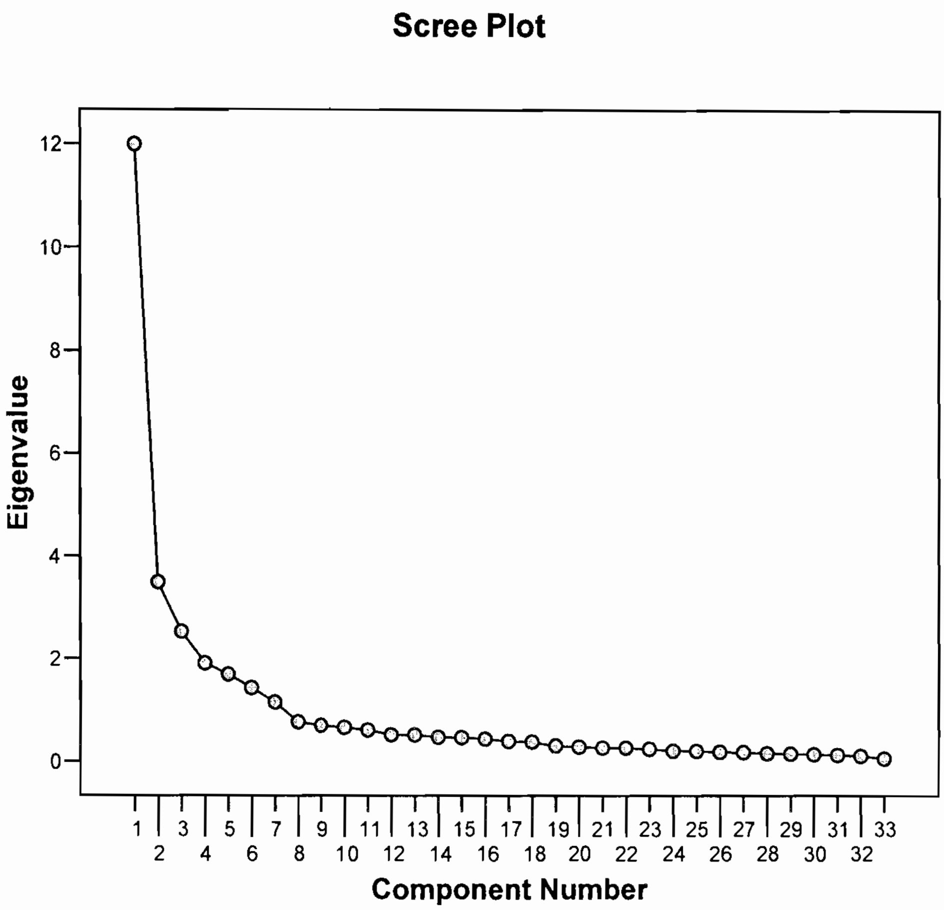


Figure 4.1 Screen plot for antecedent factors

The result of antecedent factors analysis of 33 questions provided seven factors with relative explanatory power (Eigenvalues) of 11.99, 3.45, 2.53, 1.91, 1.69, 1.43, and 1.15, respectively, and it is clear that their Eignvalues exceed one. These seven factors captured a total value of variance of 73.36 percent of the total variance of the items. Furthermore, the loadings were greater than .50 which is a minimum level required for a sample of size 120 and above (Hair et al., 2006, p.128). They further recommend that for a sample size of 50 a loading of .722 can be considered significant, for 100 the loading should be greater than .512, for 200 it should be greater than .364, for 300 it should be greater than .298, for 600 it should be greater than .21, and for 1000 it should be greater than .162.

Table 4.11 below displays the result of factor analysis on antecedent factors. It omitted the items that violated the criterion set by Hair et al. (1998). Items were deleted when they showed either low factor (<.50) or high cross loading (> .35). As a result, the remaining items ranged from .649 to .88, which were acceptable based on the criterion set.

The overall value Kaiser-Meyer-Olkin was found to be .876. A close inspection of individual MSA value shows that all 33 items have values within the acceptable range that is between .714 and .94. Furthermore, the result of the Bartlett's test was highly significant ($p = .00$). This indicates that the assumptions of factor analysis were met.

On the basis of the factor loading, the seven factors remained are named accordingly. Items related to perceived usefulness dominated the first factor, and hence it was named perceived usefulness. The second factor was named management support as it contains all questions related to the perceived level of general support, encouragement, allocation of resources by top management using Internet applications. The third factor was labeled supply chain commitment because it contained all items of SC commitment. The fourth factor is related to items on company's technical support and hence it was named technical support. The fifth factor contained more items related to collective efficacy dimension, and hence named collective efficacy. The sixth factor was labeled perceived privacy. It contained items related to reliability of the Internet applications during the exchange information between SC partners. Finally, factor seventh was labeled perceived security because it dealt with items on security of transmitting credit card information via net, and the strength of the security programming to protect SC partner's infrastructure and disrupt their business operations from any attackers.

The items of perceived trust were omitted because it either possessed low factor loading (below .50) or possessed high cross loading (higher than .35). However, the respective reliability of Cronbach's alpha for seven extracted factors were .933, .919, .897, .874, .872, .802, and .830, respectively, for perceived usefulness, management support, supply chain commitment, technical support , collective efficacy, perceived privacy, and perceived security.

In general, result of the exploratory factor analysis on the main variables proposed in the conceptual framework indicates dimensions that are similar to the original dimensions. Variables such as perceived usefulness, management support, supply chain commitment, and technical support remained as one separate dimension on its own. On the other hand, variables of collective efficacy, perceived privacy, and perceived security lost some items. Table 4.12 shows the comparison between the original dimensions and the final dimensions (after factor analysis).

Table 4.11

Factor Loadings for Antecedent Factors

Items	Components						
	1	2	3	4	5	6	7
• Over all, the Internet applications are useful for supply chain management information system.	.867						
• Using Internet applications will improve effectiveness of supply chain management.	.861						
• Using Internet applications will make supply chain partners' work easier.	.835						
• Using Internet applications increase supply chain partners' productivity.	.809						
• Internet applications enable supply chain partners to accomplish their tasks more quickly.	.785						
• Using Internet applications improve supply chain performance.	.765						
• Management provides good access to Internet applications when people need them.		.836					
• Management provides most of the necessary help and resources to enable people to use Internet applications		.834					
• Management provides good access to various types of Internet applications when people need them		.792					
• Management always supports and encourages the use of Internet applications for job- related work.		.792					
• Management is aware the benefits that can be achieved with the use Internet applications.		.654					
• The reason why our supply chain prefer to use Internet applications because what it used stand for			.750				
• Using Internet applications is primarily based on supply chain partner's norms.			.741				

• What the usage of Internet application stand for is important for our supply chain partners	.739				
• Our supply chain partners talk up the use of Internet applications to their partners as having great Utility for them.	.711				
• Our supply chain partners are a proud about our Internet applications	.675				
• Employees feel sense of ownership for the use of Internet applications	.665				
• The service provided by the Information Center is cost – efficiency		.783			
• Information Center is capable of cooperation with our company.		.780			
• The service quality of Information Center is good		.771			
• Our company can get assistance to Internet applications systems problems rapidly		.702			
• Information Center Learns our company Internet applications		.696			
• Our company could complete its activities using Internet applications …					
• If someone showed its employees how to do it first			.782		
• If someone else had helped them get started.			.773		
• If its employees had a lot of time to complete the company's work.			.766		
• If its employees had just the built – in help facility for assistance.			.679		
• If its employees had seen someone else using it before trying it themselves.			.649		
• These Internet applications do not ask for irrelevant customer's information.				.812	
• These Internet applications will not use unsuitable method to collect customer and supplier data				.759	
• These Internet applications do not apply supplier information for other purpose.				.672	
• Online payment on these Internet applications is safe.					.880
• Internet applications have the ability to solve problem from hackers.					.784
• Online transaction on Internet applications is protected by the latest technology.					.774

Initial Eigenvalues	11.99	3.45	2.53	1.91	1.69	1.43	1.15
% of variance	14.41	11.79	11.65	10.87	10.21	7.23	7.18
Cronbach's Alpha	0.933,	0.919	0.897	0.874	0.872	0.802	0.830
Kaiser-Meyer-Olkin Measure of Sampling Adequacy: .876							
Bartlett's Test of Sphericity: Approx. Chi-Square : 2920.617							
df = 528							
Sig. = .000							

Note. Factor 1 = Perceived usefulness, Factor 2 = Management support, Factor 3 = Supply chain commitment, Factor 4 = Technical support, Factor 5 = Collective efficacy, Factor 6 = Perceived privacy measure, Factor 7 = Perceived security

Table 4.12

Comparing Original Dimensions with Final Dimensions after Factor analysis

Original Dimension	Dimension after factor analysis
Perceived usefulness	Perceived usefulness
Perceived security	Perceived security
Perceived privacy	Perceived privacy
Perceived trust	
Collective efficacy	Collective efficacy
Supply chain commitment	Supply chain commitment
Management support	Management support
Technical support	Technical support

4.5.2.4 Reliability Test

Cronbach's Alpha can be considered as perfectly adequate indication of the internal consistency, and thus of reliability (Sekaran, 2000). It is a most widely used indicator. The generally agreed upon most acceptable value for Cronbach's alpha is.70, although it may decrease to .50 in exploratory research (Hair et al., 2007).

Table 4.13 below summarizes the reliability test of the measures (after taking into consideration of deleted items). As shown, the Cronbach's alphas of the measures were comfortably above the minimum acceptable level of .50. For this reason, all measures were highly reliable and acceptable, and thus providing strong support for all variable components.

Table 4.13

Reliability Coefficient for the Variables in the Study

Variables	Number of items	Reliability
Perceived usefulness	6	.933
Management support	5	.919
Supply chain commitment	6	.897
Technical support	5	.874
Collective efficacy	5	.872
Perceived privacy	3	.802
Perceived security	7	.830

4.6 DESCRIPTIVE ANALYSIS

4.6.1 Major Variables

Descriptive statistics for the final list of variables of the study are shown in Table 4.14. For ease of interpretation, the ranges of five-point Likert scale were categorized into equal size of low, moderate and high. Therefore, scores less than 2.33 [3/4 + lowest value (1)] is considered low; scores of 3.67 [highest value (5-4/3)] is considered high and those in between considered moderate. Furthermore, likert scale is one type of rating scale which extensively used in organisational research since it lends itself to more sophisticated data analysis (Sekaran, 2005, p.196).

From Table 4.12, the mean value of usefulness, management support, and supply chain commitment fall in the range of 4.01 and 3.71. Clearly respondents fully consented that useful Internet applications contribute to improving supply chain effectiveness, performance, increase supply chain partners productivity, and making their job easier and useful. Top management fully encourages the use of Internet applications, and allocates necessary resources for that. The supply chain partners are highly committed in identifying themselves with the organizations that adopt Internet applications.

Respondents responded moderately to other variables such as technical support, collective efficacy, perceived privacy, quality information delivery, security and privacy, and supply chain information performance. The mean values of these variables fall in range of 3.00 and 3.64. Clearly, the respondents exhibit medium level of quality information sharing online between them and their customers and suppliers. Both security of online transaction and the privacy of organisation information are moderate. In addition to that the sampled companies are perceived to provide medium level of technical support and collective efficacy. For performance variable of supply chain information, the respondents felt that their organization has medium level of performance relative to other organizations in similar industry.

Table 4.14

Descriptive Statistics of Variables

Dimension (Variables)	Mean	Std. Deviation
Usefulness	4.01	.76
Management support	3.71	.76
Supply chain commitment	3.75	.65
Technical support	3.41	.66
Collective efficacy	3.38	.71
Perceived privacy	3.04	.74
Perceived security	3.00	.78
Quality information delivery	3.64	.55
Supply chain information performance	3.58	.56

4.6.2 Level of Quality information delivery amongst Manufacturing Companies

In order to answer s the level of quality information delivery amongst manufacturing companies in Malaysia, Table 4.15 shows the mean and standard deviation of the quality information delivery among respondents. It is revealed that the respondents as a group were quite high in quality of sharing information. This is shown by the mean scores of 3.6 on a five-point scale. The standard deviation of .55 indicates that statistically the variations of quality information delivery among respondents are low.

Although it is not stated as the objective of the present study, it is also interesting to explore if the level of quality information delivery differs across respondents. The differences in the level of quality information delivery among manufacturing companies were explored in terms of company length, number of employees; turn over of company; geographic scope; number of customers and number of suppliers. The scores on these variables are grouped into four categories.

One-way analysis of variance (ANOVA) is used to test the differences between these variables. Table 4.15 summarizes the results of the test. It was found the level of quality information delivery performed by firms did not vary by company length ($F = 1.66$; $p = .919$), number of employees ($F = 1.603$, $p = .191$), sales turnover ($F = .291$, $p = .832$), geographic scope ($F = .045$; $p = .956$), number of customers ($F = 1.629$; $p = .185$), and number of suppliers ($F = .696$; $p = .556$).

Table 4.15

Quality information delivery by Length of Establishment, Number of Employees, Company Turnover, Geographic Scope, Number of Customers, and Number of Suppliers (N = 151)

Independent variables	**Categories**	**M**	**F-value**	**p**
Length of establishment	Less than 5 years	3.64	.166	.919
	Between 5 -15 years	3.67		
	Between 16-25 years	3.60		
	More than 26 years	3.59		
Number of employees	Less than 5 employees	3.79	1.603	.191
	Between 5 -50 employees	3.56		
	Between 51-150 employees	3.54		
	More than 150 employees	3.74		
Company turnover	‹ RM 200.000	3.57	.291	.832
	200,000-10,000,000	3.63		
	10,000,000-25,000,000	3.61		
	›25,000,000	3.71		
Geographic scope	Local	3.6506	.045	.956
	Regional	3.6226		
	World wide	3.6222		
Number of customers	‹50	3.5969	1.629	.185
	51-100	3.5292		
	100-150	3.4615		
	›151	3.7351		
Number of suppliers	‹50	3.5840	.696	.556
	51-100	3.6515		
	100-150	3.6714		
	›151	3.7531		

4.7 CORRELATION ANALYSIS

Correlation analysis is used to describe the strength and direction of the linear relations between the variables (Pallant, 2001). The computation of Pearson correlation coefficients was performed to obtain an understanding the relationship between all the variables in the study. The Pearson correlation coefficient (*r*) can only take values from -1 and +1, which indicate a perfect negative or positive correlation among variables (Coakes & Steed, 2007). However, different authors suggest different interpretations of the *r* between 0 and 1. Cohen (1988) suggests the following guidelines:

r = 0.10	to	0.29	or	r = - 0.1 to – 0.29	Small
r = 0.30	to	0.49	or	r = - .30 to - 0.49	Medium
r = 0.50	to	1.0	or	r = - .50 to - 1.0	Large

The value of the correlation coefficient (*r*) given in Table 4.16 indicates the strength relationship between variables. Table 4.16 shows that the overall correlation value of the variables is below .50, which indicates a weak association between variables. The largest and significant correlation coefficient value is between supply chain information and quality information delivery of .658. In addition, almost of other variables are significantly correlated to supply chain information performance within medium to large *r* scores above .30, except perceived security that was significant but weak (r = .267). With regard to quality information delivery and antecedent variables, the majority of the correlations range from a low of .270 to a medium of .498.

Table 4.16

Pearson Correlations of Study Variables

	PUF	MS	SCC	TS	CE	PP	PS	IQD	SCIP
PUF	1								
MS	.447(**)	1							
SCC	.504(**)	.567(**)	1						
TS	.338(**)	.467(**)	.520(**)	1	.				
CE	.403(**)	.448(**)	.507(**)	.473(**)	1				
PP	.281(**)	.330(**)	.288(**)	.333(**)	.492(**)	1			
PS	.084	.142	.123	.300(**)	.342(**)	.508(**)	1		
IQS	.359(**)	.498(**)	.473(**)	.480(**)	.464(**)	.270(**)	.270(**)	1	
SCIP	.435(**)	.574(**)	.562(**)	.510(**)	.478(**)	.439(**)	.267(**)	.658(**)	1

Note. ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
PUF = perceived usefulness, MS = management support, SCC = supply chain commitment, TS = technical support, CE = collective efficacy, PP = perceived privacy, PS = perceived security, QID = quality information delivery, SCIP = supply chain information performance.

4.8 HYPOTHESIS TESTING

4.8.1 Re-statement of Hypotheses

In light of the result of factor analysis, some amendments have to be made to the statements of the hypotheses stated earlier. The amended hypotheses tested in this study are as follows:

(i) Relationship between quality information delivery and supply chain information performance.

Hypothesis 1a: *Quality information delivery is positively related to SCI performance.*

(ii) Relationships between antecedent factors and quality information delivery.

Internet technology acceptance factors:

Hypothesis 2a: *Perceived usefulness positively influences quality information delivery.*

Hypothesis 2b: *Perceived privacy is positively related to quality information delivery*

Hypothesis 2c: *Perceived security is positively related to quality information delivery.*

Hypothesis2d: *Collective efficacy positively influences quality information delivery.*

Hypothesis2e: *Supply chain commitment positively influences quality information delivery*

Hypothesis 2f: *Management support will have a direct positive influence on quality information delivery.*

Hypothesis 2g: *High level of technical support has direct positive influence on quality information delivery.*

(iii) Depending on the above, there are indirect relationships between independent variables and dependent variables via mediating variable. Therefore the relation will be:

Hypothesis 3: *There is mediating effect of quality information delivery on the relationship between Internet technology factors and SCI performance.*

Hypothesis 3a: *Quality information delivery mediates the relationship between perceived usefulness and supply chain information performance.*

Hypothesis 3b: *Quality information delivery mediates the relationship between perceived privacy and supply chain information performance.*

Hypothesis 3c: *Quality information delivery mediates the relationship between perceived security and supply chain information performance.*

Hypothesis 3d: *Quality information delivery mediates the relationship between perceived of collective efficacy and supply chain information performance.*

Hypothesis3e: *Quality information delivery mediates the relationship between supply chain commitment and supply chain information performance.*

Hypothesis 3f: *Quality information delivery mediates the relationship between management support and supply chain information performance.*

Hypothesis 3g: *Quality information delivery mediates the relationship between technical support and supply chain information performance.*

4.9 HYPOTHESES TESTING

In order to answer the second and the third research questions that address the relationship between quality information delivery supply chain information performance as well as the influence of Internet technology factors, regression analyses were conducted. However, before conducting the analysis, the data were first examined to detect whether there is any serious violations from the basic assumption underlying the regression analysis, namely linearity, normality and homosecdasticity (Hair et al., 1988).

The first assumption, linearity is assessed through analysis of partial plots. The plot in appendix H shows the relationship between a single independent variable to dependent variable. A visual examination of the plot indicated no obvious U-shaped or other curvilinear relationship, thus meeting the assumption of linearity for each independent variable.

The next assumption deals with homoscedasticity. As suggested by Hair et al. (2006), the existence of homoscedasticity can be examined by plotting the residual (studentized) against the predicted dependent values and comparing them to the null plot. The scatter plot in appendix H shows no discernible patterns, thus indicating homoscedasticity in the multivariate (the set of independent variables) case.

The final assumption that is normality is examined by normal probability- plot (p-p) of residual from p-p as shown in appendix I. In normal probability the points will lie in reasonable straight diagonal line from bottom left to top right. This can be done by checking the residuals scatterplot and normal probability plot of the regression standard residuals. The scatterplot of the standardized residuals show that the residuals will roughly rectangularly distributed, with most of the scores concentrated in the centre (along the 0 point). The values, which fall along the diagonal with no substantial or systematic departures including the residuals, indicate normal distribution.

Multicollinearity refers to high correlations among independent variables, whereas singularity occurs when perfect correlations exist among independent variables. These problems affect how you interpret any relationships between the predictors (IVs) and dependent variable, and they can be detected by examining the correlation matrix, squared multiple correlations and tolerance, which will appear in regression analysis (Pallant, 2001). The multicollinearity is examined by looking at variance influence factor (VIF), which indicates of the effect the other independent variables have on the standard error of regression coefficient. VIF has direct relation to tolerance value. VIF should be close 1.00 to indicate little or no multicollinearity (Hair, Black, Babin, Anderson, & Tatham, 2006). From the tolerance and VIF values shown in the output, there is no indication of multicollinearity effect among independent variables on the dependent variable (see appendix G). In fact, upon inspection no indication of multicollinearity existed between all variables, whereby there were no high correlations between them (r = .9 and above) (Tabachnick & Fidell, 2007). So, the variables were retained.

The percentage of outlier can also be detected. Tabachnick and Fidell (2001, p. 143) define outliers as cases that have a standardized residual of more than 3.3 and less than -3.3. All outlier cases have been filtered out and this makes the data ready for regression analysis.

Overall, inspection on data revealed that there was no serious violation of the basic assumptions. Therefore, the use of regression for subsequent analysis is appropriate. The interpretation of the regression analysis is based on the standardized coefficient beta (β) and R^2, which provides evidence whether to support or not to support the hypotheses stated earlier in the chapter.

4.9.1 Regression Analysis on the Influence of Quality Information Delivery on Supply Chain Information Performance

In order to answer the second question i.e. "Does quality information delivery of manufacturing impact performance of supply chain information performance?" regression analysis was conducted. In this analysis, quality information delivery is treated as the independent variable, whereas supply chain information performance as the dependent variable.

The R square tells us how much variance in the dependent variables is explained by the independent variables. In this research, the value of R^2 is .433, which means that 43.3 per cent of the variance in supply chain information performance is explained significantly by quality of information delivery (F = 114.013, $p < 0.000$). The adjusted R square that is .430 means that the model is good and we can expect a similar result when the sample is tested in a different setting.

Based on the results, hypothesis1a is supported as we have found evidence that quality information delivery has a direct positive and significant influence on supply chain information performance.

Table 4.17

The Influence of Quality information delivery on Supply Chain Information Performance

Model	***R***	***R* Square**	**Adjusted *R* Square**	**Std. Error of the Estimate**
1	.658	.433	.430	.418

Note. Predictor: Mean quality information delivery
Dependent Variable: Mean supply chain information performance

Model 1	**Sum of Squares**	***df***	**Mean Square**	***F***	**Sig.**
Regression	20.011	1	20.011	114.013	.000
Residual	26.151	149	.176		
Total	46.162	150			

4.9.2 Multiple Regression Analysis on Factors influencing Quality Information Delivery

To answer the third research question of "What are the Internet acceptance factors that influence supply chain information performance based on shared information with suppliers and customers?" regression analysis was undertaken.

Table 4.18 provides evidence of the influence of antecedent factors on quality information delivery. It shows that the relationship between the independent variables and the dependent variable is significant (F = 13.947, Sig = .00). In this research, the value of R^2 is .407, which means that 40.7 per cent of the variance in quality information delivery is explained significantly by a number of independent variables such as perceived usefulness, managerial support, supply chain commitment, technical support, collective efficacy, perceived security and perceived privacy.

Table 4.18

Summary of Multiple Regression Analyses for Factors Influencing Quality Information Delivery (n = 151)

Antecedents	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
(Constant)	1.172	.265		4.415	.000		
Perceived usefulness	.019	.056	.026	.330	.742	.677	1.478
Management support	.145	.061	.199	2.355	.020	.585	1.709
Supply chain commitment	.183	.082	.215	2.229	.027	.448	2.233
Technical support	.084	.071	.099	1.181	.240	.593	1.686
Collective efficacy	.172	.069	.299	2.493	.014	.595	1.681
Perceived privacy	-.042	.062	-.055	-.677	.499	.624	1.602
Perceived security	.141	.057	.188	2.462	.015	.712	1.405

Note: R^2 = .407, F=13.947, Sig = .000
B = Unstandardized Coefficient; *SE B* = Standard error Coefficient; β= Beta Coefficient.

Absolute beta values are used to compare contribution of each independent variable to the dependent variable. The largest beta coefficient is .299, which is for collective efficacy. This is followed by supply chain commitment (β = .215), management support (β = .199), perceived security (β = .188), technical support (β = .099), and perceived privacy (β = .055), and finally usefulness.

According to Pallant (2001, p. 176), the significance column (Sig.) tells us which variable is making statistical significant unique contribution to the equation, and how much overlap there is among the independent variables. He added that if the significance level is less than .05, then the variable is making a significant unique contribution to the prediction of the dependent variable. But if the significance level is greater than .05, then the variable is not making a significant unique contribution to the prediction of the dependent variable. So in this analysis management support, supply chain commitment, collective efficacy, and perceived of security made a unique, and statistically significant contribution to the prediction of quality information delivery. While other antecedent variables i.e. usefulness, technical support, usefulness, and perceived privacy are found to have no significant effects on quality information delivery.

Based on the results, hypotheses, 2c, 2d, 2e and 2f are supported. This leads to conclusion that perceived security, collective efficacy, supply chain commitment, and management support have a direct positive and significant influence on quality information delivery. Other antecedent variables are found to have no significant influence on quality information delivery. Therefore, hypotheses 2a, 2b, and 2g were rejected.

4.9.3 Hierarchical Regression Analysis on the Mediating Effect of Quality Information Delivery

To answer the forth question that is "Is there any mediating effect of quality information delivery (QID) on the relationship between ITF and SCM performance" hierarchical multiple regression analysis was run. The independent variables and the mediating variables were entered into the model in different stages. In the first step, the independent variables were entered into the hierarchical multiple regression model. Then, the mediating variables were entered into the model in the second step. The increase in *R* square corresponding to inclusion of each category of predictor variables and the unique variables were examined by hierarchical multiple regression.

According to Baron and Kenny (1986, p. 117) a variable functions as a mediator when it meets the following conditions: (a) variations in the independent variables significantly account for variations in the presumed mediator (i.e., Path a), (b) variations in the mediator significantly account for variations in the dependent variables (i.e., Path b); (c) when paths *a* and *b* are controlled, the previous significant relation between the independent and dependent variables does no longer exist or it is significantly decreased. Therefore, three equations were formulated to test the linkage of the mediating model as suggested by Baron and Kenny (1986). First, the individual related factors (independent variables) must affect the quality information delivery (mediating variable) in the first equation. Second, the individual related factors (independent variables) must affect the supply chain information performance (the dependent variable). Third, quality information delivery (mediator) must affect supply chain information performance (the dependent variable) in the third equation.

The first equation for testing the mediating effects has been tested in the second research hypothesis. According to Table 4.18, the result show that perceived security, collective efficacy, supply chain commitment, and management support are significantly related to the quality information delivery. The second equation was performed to test the influence of the independent variables on the supply chain information performance (dependent variable). The result is shown in the Table 4.19.

Table 4.19

Influence of Each Independent Variable on Supply Chain Information Performance

Antecedents	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	*t*	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
(Constant)	.888	.244		3.646	.000		
Usefulness	.066	.052	.091	1.259	.210	.682	1.465
Management support	.188	.056	.259	3.343	.001	.590	1.694
Supply chain commitment	.180	.071	.210	2.527	.013	.511	1.956
Mean technical support	.132	.064	.157	2.072	.040	.618	1.619
Mean collective efficacy	.036	.062	.046	.577	.565	.559	1.790
Mean perceived privacy	.125	.057	.168	2.193	.030	.605	1.653
Mean perceived security	.035	.051	.049	.680	.497	.693	1.442

Results in the Table 4.19 shows that the variables found to have significant influence on the supply chain information performance are management support ($p = .000$, $\beta = .259$), supply chain commitment ($p = .000$, $\beta = .210$), technical support ($p = .000$, $\beta = .157$), and perceived of privacy ($p = .000$, $\beta = .168$).

The third equation was performed to test the influence of quality information delivery (mediator) on supply chain information performance (the dependent variable). The result is shown in Table 4.20.

The result from the three regression equation show that three independent variables i.e. supply chain commitment, management support and perceived security met the condition of meditation model as suggested by Baron and Kenny (1986). Figure 4.2 shows the framework.

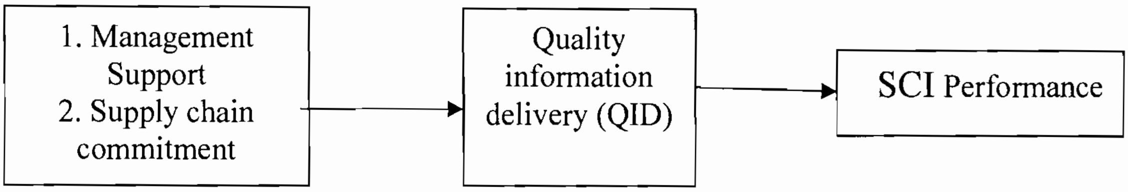


Figure 4.2 Mediation effect of QID

The hierarchical multiple regression analysis was further employed to test the mediating effects of quality information delivery. The independent variables of supply chain commitment, and management support were entered into the model as the first step and the mediator i.e. quality information delivery was entered into the model in the second step. Table 4.20 presents the results of this regression analysis.

Table 4.20 below shows the results of the hierarchical regression testing the mediation effect of quality information delivery on the relationship between supply chain commitment, management support, perceived security and supply chain information performance. The results showed that quality information delivery significantly influenced supply chain information performance in the first step upon the introduction of the mediator variable in the second step.

Furthermore, the mediator variable positively influences supply chain information performance in the second step ($\beta = .405$, $p < .00$), indicating that quality information delivery partially mediates the relationship between perceived SC commitment and supply chain information performance on one hand.

Table 4.20

Hierarchical Multiple Regression Analysis of Supply Chain Information Performance with Quality Information Delivery

Dependent Variable	**Independent Variables**	**Std Beta Step 1**	**Std Beta Step 2**
Supply chain information performance	Management support	.352***	.231***
	Supply chain commitment	.273***	.206***
	Mediator: Quality information delivery		.405***
	R^2	.451	.554
	R^2 Change	.451	.103
	F Change	30.000	33.548
	Sig F change	.000	.000

Note: Significant levels: ***p < .00; **p < .01; *p < .05; Step 1 refers to regression with the independent of two antecedent factors, whilst Step 2 refers to regression with the mediator variable.

The mediator effect of the quality information delivery on the relationship between independent variables and supply chain information performance were examined based on Baron and Kenny's (1986) recommendation. It shows that the beta coefficients in model I are significantly higher than the beta coefficients in model 2. The mediation effects of the quality information delivery are also explained by the increase in *R* square corresponding to the inclusion of the quality information delivery into the model. The increase in *R* square in model 2 explained the increase in the variation in supply chain information performance by the mediation effect of the quality information delivery.

With the reference to above table, the result indicates that the relationship between management support and supply chain information delivery is partially mediated by the quality information delivery (β change from .352*** to .231***), and also the relationship between SC commitment and supply chain information performance is partially mediated by quality information delivery (β change from .273*** to .206***).

4.10 SUMMARY

The test of non-response bias revealed no statistically significant differences between early and late response. Therefore, the issue of non-response bias did not significantly affect the generalizability of the findings in this study.

Descriptive statistics showed that, in general, the respondents demonstrated high level of quality information delivery. Further, the standard deviation demonstrate that statistically the variation of quality information delivery among respondents were moderate.

To examine the relationship between quality information delivery and supply chain information performance as well as the factors influencing quality information delivery, regression analyses were conducted.

This research also investigates the mediating effect of quality information delivery on the relationship between independent factors and supply chain information performance by using hierarchical multiple regression. Table 4.21 presented below is the summary of the hypotheses testing.

Table 4.21

Summary of Results of Hypotheses Testing

Hypotheses	Findings
Hypothesis 1a*: quality Information delivery is positively related to SCI performance.*	Accepted
Hypothesis 2a: *Perceived usefulness positively influences quality information delivery.*	Rejected
Hypothesis 2b*: Perceived privacy is positively related to quality information delivery*	Rejected
Hypothesis 2c: *Perceived security is positively related to quality information delivery.*	Accepted
Hypothesis2d*: Collective efficacy positively influences quality information delivery.*	Accepted
Hypothesis2e: *Supply chain commitment positively influences quality information delivery.*	Accepted
Hypothesis 2f*: Management support will have a direct positive influence on quality information delivery.*	Accepted
Hypothesis 2g*: High level of technical support has direct positive influence on quality information delivery.*	Rejected
Hypothesis 3a: *Quality information delivery mediates the relationship between perceived usefulness and supply chain information performance.*	Rejected
Hypothesis 3b: *Quality information delivery mediates the relationship between perceived privacy and supply chain information performance.*	Rejected
Hypothesis 3c *Quality information delivery mediates the relationship between perceived security and supply chain information performance.*	Rejected
Hypothesis 3d*: Quality information delivery mediates the relationship between collective efficacy and supply chain information performance.*	Rejected
Hypothesis3e*: Quality information delivery mediates the relationship between supply chain commitment and supply chain information performance.*	Accepted

Hypothesis 3f: *Quality information delivery mediates the relationship between management support and supply chain information performance.*	Accepted
Hypothesis 3g: *Quality information delivery mediates the relationship between technical support and supply chain information performance*	Rejected

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter discusses all findings as reported in chapter four. It begins with the summary of the findings, discussion of the findings particularly pertaining to the influence of Internet technology factors on quality information delivery and subsequently on supply chain information performance.

5.2 RECAPITULATION OF THE STUDY'S FINDINGS

Li and Lin (2006) develop a framework of the factors impacting information sharing and information quality in SCM, while Moberg, Culter, Gross, and Speh (2002) propose a model of antecedents of information exchange within supply chains. Mentzer (2000, p. 19) illustrates the supply chain antecedents and consequences of the role of information system with suppliers, customers within the supply chain. Based on related researches this study investigates the Internet technology factors and quality information delivery towards supply chain information performance. Specifically, the first objective of this study is to examine the level of quality information delivery and supply chain information performance amongst manufacturing companies. The second objective is to examine whether quality information delivery by manufacturing companies impact their supply chain information performance. The third objective is to identify the antecedent factors that influence manufacturing sectors to have quality in information sharing in supply chain. Finally the last objective to investigate the mediating effect of quality information delivery on the relationship between Internet technology factors and supply chain information performance.

As noted in Chapter 3, data were gathered from different manufacturers in different regions of Malaysia. Six hundred and fifty questionnaires were distributed, out of which 184 were returned, representing a 28.3% response rate. However, only 151 were used, making the effective response rate of 23.3%.

Exploratory component factor analyses were run to test the factorial validity of measures in this study. The analyses produced various dimensions of the antecedent factors and quality information delivery, which resulted in the reformulation of hypotheses. The internal consistency of the measure was then tested by computing the reliability coefficient. Data was analyzed using regression analysis to test the hypotheses of this study. The .05 significance level was used as the critical level for decision making with respect to assumptions of hypotheses.

Based on first research question, this study has found that Malaysian manufacturing companies demonstrate high level of supply chain information performance, regardless of length of establishment, turnover, geographical scope, and number of customers. Significant differences on the adoption level of quality information delivery, however, are found among companies with different numbers of employees and suppliers.

With respect to the second research question, the findings indicated that quality information has positive association with quality of information delivery and supply chain information performance, indicating that quality information delivery is one important variable to predict the performance of SCI. This shows a significant relationship between quality information delivery and supply chain information performance. However, the positive relationship between quality information delivery and supply chain information performance explains that the positive relationship between quality information delivery and competitive priorities (quality, delivery dependability, Price / cost, and flexibility) which are dimensions of supply chain information performance.

With regards to the third question, regression analysis undertaken out of seven hypotheses tested only four hypotheses were supported. The antecedents that were tested are perceived usefulness, perceived security, perceived privacy, collective efficacy, management support, supply chain commitment, and technical support. To answer the forth research question, hierarchical multiple regression analysis was undertaken to reveal the mediating factor of quality information delivery in relationship between the antecedents of perceived of supply chain commitment, and management support, and supply chain information performance.

5.3 DISCUSSION

The following section discusses the level of quality information delivery, and supply chain information performance amongst manufacturing sectors, and the impact quality information delivery has on supply chain information performance.

5.3.1 Level of Quality Information Delivery amongst Manufacturing Sectors

The first question this thesis aims to address is the level of quality information delivery among manufacturing sectors in Malaysia. The term quality information delivery can be defined in the context of Internet, as it is the media to deliver accurate and rapid information when dealing with different channels and process of supply chain. This behavior of information sharing aims to increase the performance of supply chain.

With respect to the level of quality information delivery, the study found quite high quality of sharing information among the manufacturing companies, regardless of their demographic factors such as the length of establishment, number of employees, number of suppliers, etc. The insignificant effect of demographic or organizational factors in influencing quality information delivery is consistent with the finding by Zain, Rose, Abdullah, and Masrom, (2005), who revealed that external variable such as experience and demographic characteristics (age, organizational level, functional location, number of years was in business and size of firm (number of employees)) are insignificant in the usage of IT in Malaysian manufacturing sectors.

The size of companies was represented by the number of employees and by the turnover of sales (SMIDES, 2006). This study found that level of quality information delivery by manaufauring sectors doess not differs by number of employees. In this study the major sample of employees is ranging from 5 to 51 employees, which shows that our targeted sample is mostly from small companies. In small companies employees still need more training and qualification to increase their skills in using internet technology and enhancing their organization performance. This is in line with Moberg, Cutler, Gross, and Speh, (2002) who found that non significant between organization size (number of employees and annual global sales volume) and information exchange. Moberg, Cutler, Gross, and Speh, (2002) found that mangers still exchange information through more personal communications techniques such as face to face meeting and phone calls, so improvement of internet technologies still not have been impacted their data collection, and that will affect the operations of supply chain partners, sending information to other firms that is timely, accurate, and make decisions based on poor information.

Furthermore, this study also found that level of quality information delivery does not significantly vary by the sales turnover of manufacturing companies. However, this is in contrast with Li, Ragu-Nathan, Ragu-Nathan, and Rao (2006) who found that that level of information quality and organization performance were significantly influenced by the firm size (sales volume, and number of employees) in the context of SCM practices. In present study majority of annual sales turnover for the companies fall in the range between RM 250,000 and less than RM 10 million which represents the small companies (SMIDES, 2006), while medium and large companies represented consequently by 11 percentages and 17 percentage. The results show that small firms either adopt the internet for the procurement or they don't use it at all, while large firms more likely to adopt it in their process. They added that these limited adoption and using is often related to information exchange effectiveness, lead to simply the firms that use the internet are limited (Cagliano, Caniato, & Spina, 2003).

Consequently, in current study the level of quality information delivery does not vary by the number of suppliers. It's consist with previous research which found that manufacturer with key suppliers have poor quality and delivery records will find it very difficult to provide high levels of customer service and will eliminate from participate in the competitive game (Power, Sohal, & Rahman, 2001).There are many types of supplier uncertainties: suppliers' engineering level, supplier lead time, supplier delivery depends on ability and quality of incoming materials product (Lee & Billington, 1992). On the other hand, other research found that level of quality information delivery does significantly vary by the number of suppliers does vary by the number of suppliers. This significant is consist with Lancaster, Yen, and Ku (2006) who found that when web linking of supply chain partners increase, they will provide more efficient operations and that allow them to have greater exchange information through supply chains. Therefore, the research finding may be due manufacturing business to increase communicates within their supply chain through website for the information purpose. In addition to that, strategic supplier's partnership required quality of supplier chosen, where some kinds of companies in present study need spend more times and efforts to choose their suppliers. This is in line with Li, Ragu-Nathan, Ragu-Nathan, and Rao, (2006) the long relationship between organization and its suppliers designed to sharing a benefit among supply chain partners and to improve key strategic area such as technology, product, and markets.

Similarly, in this study the number of customers not significantly related to extent quality information delivery in manufacturing. The insignificant finding is consist with Li and Lin (2006) who found that customer uncertainty do not exist with information sharing and quality information. They added that, the information flow should improve the efficiency and effectiveness of the supply chain and respond to the customer changing needs quickly. One possible reason for this finding may due to use IT increase customers' satisfaction and loyalty by sharing them with timely information. This consist with Li, and Lin (2006) who found that IT will change level of customers confidence, and also will increase their expectations such as increase consumers responsiveness during change hours of business delivery from three day s to become 24 hours by 7 days. In fact, IT will increase number of customers significantly and improve supply chain practices performance by improve the relationship with customers.

This study also found that level of quality information delivery is not different by geographic scope of companies. One reason of our finding are conclude this way, as the majority of companies are local companies and they represent 56.5% percent of the population. It is required that local companies are needed to be more literate in using Internet applications. It is also needed to encourage the small companies with respect to international investments. And it is suggest that the wider scope of instrument should be used and bigger population should be targeted to get more elaborative findings. This effect on the level of quality information delivery can be varied if the geographic scope is changed (Li & Lin, 2006).

Tan, Lyman, and Wisner (2002) reported that SCM practices can be identified by five aspects: supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity, and JIT capability. Furthermore, the main reason our finding are conclude this way, more than half population percentage of present study represented by companies their geographic area within Malaysian, where other percentage distributed outside Malaysia. This finding is similar to Li, Ragu-Nathan, Ragu-Nathan, and Rao, (2006) who found that supply chain practices influence negatively by length of supply chain or distention address which influence on the competitive advantage by increase delivery cost and time to market.

According to Pokharel (2005) that information communication technology concern on companies larger counterpart from outside, moreover large companies are more motivated to adopt ICT than small companies. They added that big companies focus on long-term and higher expected business. However, such ICT may not be simply available in the local market; consequently it is leading to frustration.

With regards to the level of quality information delivery, the present study found that companies in the study demonstrated quite high supply chain information performance. The study further revealed that level of quality information delivery by manufacturing companies does not varied by the company size (number of employees, and sales turnover) and geographic scope. Similar scenario is also found with the number of suppliers, and number of customers in which companies that have more suppliers or customers insignificantly have more level of quality information delivery in context supply chain management.

5.3.2 The Impact of Quality Information Delivery (QID) on Supply Chain Information (SCI) Performance

The second research question is constructed to find the relationship between quality information delivery and supply chain information performance. This study shows that quality information delivery explained supply chain information performance, which is measured by competitive priority performance such as quality, delivery dependability, Price / cost, and flexibility.

In our model quality information delivery explains 43.3 percent of the variance in supply chain information performance. The result indicates that quality information delivery over Internet applications have high explanatory power to predict supply chain information performance, which means that the more quality information delivery, the better supply chain information performance.

Furthermore value of R- square in this result is quite respectable comparing with other results. Fawcett, Osterhaus, Mangnan, Brau, and McCarter (2007) found that information sharing with two dimension – connectivity and willingness- enhance supply chain performance, where R-square value is 3.9 per cent, which means high level of information sharing slightly enhanced organizational performance.

When we look back at the operational definition of quality information delivery as behavioral intention to use towards the actual behavior or actual system use, this finding fully supports Unified Theory of Acceptance and Use of Technology. This finding consistent with Autzen (2007), and Rogers (1995) who shown that firms which have high level of quality usage , will be more successful and have better performance in their actual system such as supply chain Information system.

In addition to that, behavioral intentions can be captured by such measures as repurchase intentions, word of mouth, loyalty, complaining behavior, and price sensitivity (Zeithaml, Berry, and Parasuraman, 1996). The finding of this study that quality of behavioral intentions with information system has impact on the actual behaviour is consisting with research finding in the past. Examples of such past studies are web service quality on behavioral intentions in an e-business environment (Udo, Bagchi, Kirs, 2010), buying intension for customers of apparel (Cannie`re, Pelsmacker, & Geuens, 2010), online behavioral intentions for e-tailers customers of books and CDs (Goode & Harris, 2007), web shopping on intent to purchase products using World Wide Web (Salisbury, Pearson, Pearson, & Mille, 2001), behavioral intention to use Internet banking systems (Wang, Wang, Tang, & Lin, 2003).

The positive relationship between quality information delivery and supply chain information performance is perhaps due to the result of technology investment among Malaysian firms. Therefore, Manufacturing firms whose their management teams emphasize technology investment and choose the appreciate information to share, would be more greater ability to respond to market changes better and quicker than competitors. Plausibly this is based on the developing supply chain capabilities (Lin & Tseng, 2006; Wu, Yeniyurt, Kim, &Cavusgil, 2006). The coordination between supply chain partners leads the firms to produce the products at lowest cost and to be higher speeder to the customers' needs. Besides that, the integration between internal and external information have the main effect on the relationship between supply chain capabilities and firm performance (Wu, Yeniyurt, Kim, & Cavusgil, 2006).

The analysis undertaken demonstrated that quality information delivery has positive relationship with the performance of SC from the prospective of competitive advantage. Past research has proved that quality of information sharing is important factor that drives supply chain partner's behavior, and help them to create a critical management decisions. For example, past study by Li, Ragu-Nathan, Ragu-Nathan, and Rao, (2006) concluded that quality of information sharing in supply chain management practices have significant impact on organization competitive advantage on cost, quality, dependability, flexibility, and time-to-market dimensions. As examined in earlier chapters, by making the data available, undistorted, up-to-date marketing data, and sharing with other parties within the supply chain, information can used as a source of competitive advantage, and correspondingly that will enhanced organizational performance of a firm.

The finding are also congruent with research results by Vereecke and Muylle (2006) who have been shown that the collaborative (information exchange) between suppliers and customers in 374 European firms has improved their organizational performance in respect of cost, flexibility, quality, and procurement. Furthermore, Zhou and Benton, (2007) found that quality of information sharing among supply chain partners enhances effective supply chain practice.

5.3.3 The Effects of Antecedent Factors on Quality information Delivery

The third research question relates to the antecedent factors of quality information delivery. All antecedents have been analyzed by using regressions, and it was found that management support, supply chain commitment, collective efficacy, and perceived of security predict positively and significantly quality information delivery. While other antecedent variables such as technical support, usefulness, and perceived privacy are found to have no significant effects with quality information delivery. The following explains the finding of each antecedent factor.

5.3.3.1 Internet Technology Factors

5.3.3.1.1 Management support

This study found significant relationship between management support and quality information delivery. In other words, we can say that management support influences supply chain partners' intension to share information via internet application. This finding is consistent with that demonstrated by Li and Lin (2006), who found that high level of top management support in IT enables high level of information sharing. The present study's finding is also consistent with that of Zain, Rose, Abdullah, and Masrom (2005), who demonstrated that management support is essential in Malaysia and they should use IT to make timely information, and to increase the competitiveness of manufacturing firms.

This result also supports the study's finding by gberia, (1993) who found that only management support have a direct effect on behaviour intension, explanation for this result that majority of the managers had been given new software and encourage their employees to experiment with on their computers. The finding validates the work of the earlier studies by Guimaras and Igbaria (1997) on the important role of management support through providing the different kinds of financial, personal resources and circulating new values or change (Fox & Amichai-Hamburger, 2001). In addition top management plays an important role to adjust their supportive action during an IS implementation process (Yanga & Yoo, 2004).

It is relatively easy to speculate why management support can enhance quality information delivery is able in the context of e-SCM. When managers are committed to using IT, they will be able to deliver the information in limited time, and to help employees making a better decision. Consequently, different types of support from executive management, encouragement and allocation for resources are very necessary in Malaysian manufacturing companies especially in Tumultuous Environment. In the increase competitiveness of manufacturing firms throughout the world, manufacturing firms in Malaysia must be more competitive and agile. On other words, by providing clear vision, specific guidance, and more orientation and developing to the skills to the organization members form top management, the delivering information to the customers and suppliers will reach without any delay and distortion. Therefore, that will avoid firms from any turbulence in the manufacturing industry makes them success more complicated and difficult to achieve. This finding is also aligned to previous research by Anakwe, Simmers, and Anandarajan (2002) who deduced the significant effect of management support on quality information delivery. However they found that management support has a significant influence on Internet usage i.e. daily use of the Internet, frequency of use, and business activities (marketing and communications).

5.3.3.1.2 Supply chain commitment

In addition to management support, supply chain commitment is also found to influence quality information delivery. This finding is consistent with Moberg, Cutler, Gross, and Speh (2002), who found that top management commitment to SCM is positively and significantly related both strategic information exchange among logistics managers at manufacturing firms in several industries. Supply chain commitment is concerned about trusting supply chain partners with sensitive information (Li & Lin, 2006). When this happens, high level of information sharing between suppliers can take place. These research findings also support a research work done by

Malhotra and Galletta (2005) that that affective commitment (internalization and identification) positively influence behavioral intention to use the volitional system.

Moreover, Kannan and Tan (2005) found that considering commitment to the quality in supplier selection has significant influence on quality information sharing with suppliers and customers. Furthermore, the results of this study also correspond with the findings of Wu, Chiag, Wu, and Tu, (2004), which showed that the affective commitment, continuance commitment, and normative commitment of supply chain partners associated with sharing of sensitive cost and process information and creating unique investments. Our data analysis further revealed that Malaysian manufacturing companies hold positive view about Internet applications because the information flow within supply chain partners can be done speedily, easily, efficiently and effectively.

5.3.3.1.3 Collective efficacy

The study's findings demonstrated that collective efficacy is significantly related to quality information delivery. This indicates that higher level of collective efficacy of supply chain partners leads to higher level of quality information delivery among manufacturing companies in Malaysia. The finding is consistent with Carroll, Rosson, and Zhou's (2005) findings in which community collective efficacy (CCE) having high effect on Internet behaviors, which in turn is associated with higher degree of activism and belonging. Hsu, Chen, Chiu and Ju (2006) also found that team's computer collective efficacy (CCE) is positively related to both outcome expectations and final team performance.

Two plausible explanations for this result may in the nature of collective efficacy that refers to the beliefs about the shared capabilities of organizations members to joint outcomes (Goddard, Hoy, & Hoy, 2004). Therefore, in the manufacturing context collective efficacy of supply chain partners help them to share their capabilities and experiences during Internet applications such e-mail, website, and chatting. Another reason is related to expected behavior from collective efficacy where various types of efforts will make sharing information more accurate and updated, which means high level of data quality during information exchange between SC partners.

5.3.3.1.4 Perceived of security

Finally, the study found that perceived of security is related to quality information delivery, which suggests that the more secure the online information exchange, the better the information sharing performance. In general, online security during exchange the information on the Internet is thus a critical issue. In fact, security online is defined as any factor that influences perceived risk of organizational and financial matters (Grewal & Dharwadkar, 2002). Therefore, this phenomenon leads many companies (such as amazon.com and ebay.com) to spend a lot of money and efforts in protecting their suppliers and customers with information (Goode & Harris, 2007). So, it is possible to argue that the sample companies have well reputation in online context, whereas the online fraud and hackers in their websites are still limited. This is consistent with Laforet and Li (2005), who found that hackers and fraud were the main barriers that prohibited online banking adoption in China.

In Malaysia the general regulation in online trading has improved, reflected in the increase of e-commerce transactions such as online banking, indicating that perceived security over online trading has been diminishing. This finding validates the works of earlier studies by Grewal and Dharwadkar, (2002), Goode and Harris (2007), and Laforet and Li (2005) about the importance of the perceived security as a key antecedents of the behavior intention on the

Internet. They concluded that when the perceived security is high, it accelerates exchange of information between the firms and improve the rate of online trading adoption. On the other hand, technical support, usefulness, and perceived privacy are found to have no significant effect on quality information delivery.

5.3.3.1.5 Perceived Usefulness

This research found no significant relationship between perceived usefulness and quality information delivery. In other words, perceived usefulness is not a predictor of behaviour firms' intention to sharing quality information with their suppliers and customers. This research finding is consist with past research by Infindo (2006) who conducted an empirical analysis using PLS (Partial Lest Squares) to estimate his survey models, and result indicates that in the context of Web-based learning perceived usefulness does not significant effect on continuance intention among University students in a Baltic country. Similarly, other study by Teo, (2009) who using structural equation modeling approach found that Intention to use was not significant predicted by perceived usefulness among students at the National Institute of Education (NIE) in Singapore.

Perceived usefulness and quality information delivery are not significantly related to intention to use because users should be given as much access as possible to technology that they will use in their firms (Teo, 2009). Furthermore, within the organization context and from perceived usefulness definition, Information System adoption depend on the employees believe that this system will help them to perform the organization takes. However, the research recommends that when the system does not help people to perform their jobs is not likely to be received favorably (Nysveen, Pedersen, &Thornbjomsen, 2005, p. 537). Therefore, most firms provide a complex programming which need a lot of times and efforts to be more usefulness and accepted among the users.

Another plausible reason for the expected finding is related to the respondents in this study. Supply chain managers have various duties to assume such as identification, acquisition, and distribution of goods and information through the complete supply chain system. These professional jobs require suppliers to have skills and abilities to network and coordinate events with business partners in a wide variety of manufacturing companies. However, because of the variety of tasks, and complexity of the programs, information system will not contributes to assisting supply chain partners to perform their task perfectly, to exchange information with their customers and suppliers in accurate ways, and to proceeding adoption of IT in their organizations.

However, this research finding contradicts past research by Kye et al. (2008) who shown a positive relationship between usefulness of RFID system and behaviour intention in supply chain network system. The current research result also contradicts Fusilier, and Durlabhji (2005) findings in their study of the antecedent of internet use in India. They found both usefulness and ease of use are statistically significant predictors of intention to use the internet.

5.3.3.1.6 Perceived privacy

This research found no significant relationship between perceived privacy and quality information delivery. In other words, perceived privacy is not related to behavior intention to sharing quality information toward supply chain information performance in the context of internet technology. In this study, Perceived privacy is defined as the right of individuals, groups or institutes and they decide for themselves when, how, and to what kind of information they need to deal with during communication with others. Operationally, the respondents were asked to rate their perceptions of protecting online their suppliers and customers information from any used for any purpose without their permission. Based on the items asked, the respondents did not concern about their privacy online (credibility and reliability), because they had some information technology (IT) knowledge and so had already carried out the appropriate actions to protect their organizational information online (Painea, Reipsb, Stiegerc, Joinsona, & , Buchanan, 2007).

In addition to that, most companies in Malaysia have been used some kind of software or programs that prohibit any abuse for the sensitive data during exchanging between them. The reason for this procedure is the important this kind information such as the information of consumers' concern at transaction or purchasing level. Moreover, the firms aim to protect privacy of the sensitive data to enable effective decision making by supply chain partners, and to yield better forecasting outcome.

Another possible explanation for this result might be that factors of speed and reliability of Internet connections are not considered as important because it has become so common place among the respondents. This finding is consistent with previous study by Pikkarainen, Pikkarainen, Karjaloto, and Pahnila (2004), who found that Internet factors such as privacy and security have a relatively weak relation with online banking usage. Therefore the perceived privacy will not as one of the predicted factors for quality information delivery is fully supported by past research. This research has also confirmed the research work done by Yang and Wang (2009) who found that privacy concern has insignificant influence on transaction intention to reflect online users' information privacy concern in the Chinese context.

However, these research findings contradict past research which found that concerns for perceived security and privacy was positively influence intention to use SMS banking (Amin & Ramayah, 2010; Jahangir, & Begum, 2008). Furthermore other study by Wang, Wang, Lin, and Tang (2003) found that perceived credibility that reflects security and privacy concerns had a significant positive effect on behavioral intention in the of electronic banking.

5.3.3.1.7 Technical support

Finally, this study found that the degree in which technical support provide is insignificantly related to the quality information delivery. Similarly, Igbaria (1997) found that internal support in organization (user computer system, and information center) did not have direct relation with ease of use. A plausible explanation for the insignificant relationship between user technical support and quality information delivery is because the majority of the manufacturing companies in the study are small and they may not be able to outsource technical support service, and this may hinder the effectiveness of information sharing (Igbaria, Zinatelli, Cragg, & Cavaye, 1997). They further added that the resources of these companies may not allow them to share information internally. Syed-Mohamad and Winn (2007) found that technical support is insignificantly related to intention to use web based technology because of the inefficiency of technical support personnel.

5.3.4 The Mediating Effects of Quality Information Delivery on the Relationship between the Internet Technology Factors and Supply Chain Information Performance.

This research also reveals that quality information delivery mediates the relationship between management support and supply chain commitment and supply chain information delivery. The finding of this study indicate that relationship between management support and supply chain information delivery is partially mediated by the quality information delivery, and also the relationship between supply chain commitment and supply chain information performance is partially mediated by quality information delivery.

This finding is consistent with past study by Wu, Yeniyurt, Kim, and Cavusgil (2006) who confirmed fully mediating of supply chain capabilities on the relationship between IT alignment and firm performance. Supply chain capabilities in their studies consider on ability of supply chain partners to exchange information in an effective and efficient manner. In supply chain management IT alignment require fully commitment from all the partners to adopt an adequate technology. As proposed in this study, sharing information in effective and efficient way associated with quality of exchange information among supply chain partners. Consequently, quality of sharing information mediates the relationship between IT alignment and firm performance and this is consistent with Wu, at.el, (2006) study.

Furthermore, this finding is consistent with previous comprehensive study by Ryu, So, and Koo (2009) to understanding the buyer-supplier partnership in South Korea and found that trust-commitment-collaboration model is an important mediation between the antecedents: strategic level and the operational level and supply chain performance. However, the term of collaboration in their study includes the exchange of the accuracy and detailed information about products, activities, problem solving as team information, and the replenishing of scheduling.

When we look at the relationship between management support and supply chain information performance, the result shows that quality information delivery reacts as a partial mediator. This finding is also consistent with resent research by Hemsworth, Sánchez Rodríguez, and Bidgood (2005) who found that information system practices playing a mediating role in the relationship between quality management practices and purchasing performance. The concept of information system practices in their study is similar to the concept of quality information delivery in current study, and management support in their study one of construct for quality management practices.

Logically speaking, when information exchange between supply chain partners intend to be sufficiently to perform the tasks, consistently presented in the same format, easily accessible, retrievable, and obtainable that will facilitate them to making a critical decision and to improve the performance of their organization. Similarly, Li, Ragu-Nathan, Ragu-Nathan, and Rao (2006) in their study found that quality of exchange information among SC partners is the main reason leads to improve both organization competitive advantage and organizational performance.

For example, information quality can react as the dependent variable for some factors and at the same time it can be a predictor factor for other dependent variables. In our research, the role of quality information delivery is as the mediator between internet technology factors and supply chain performance. This logical relationship is normal in supply chain partner's behavior such as Unified Theory of Acceptance and Use Technology (UTAUT) introduced by Venkatesh, Morris, Davis, and Davis (2003)

From theoretical point of view, behavior intention and behavior relationship have been discussed in depth since 1980s by Ajzen and Fishbein (1980), and Fishbein and Ajzen (1975). This relationship model as demonstrated by Bentler and Speckart (1979) readily lends itself to a causal modeling approach and behavior intention is a clear-cut example of a mediator concept in social psychology. This research framework supports the past assumptions by Venkatesh, Morris, Davis, and Davis, (2003) who stressed the role of behavior intention (BI) as the mediator in the relationship between four core determinants of acceptance and actual behavior (B). In this study, quality information delivery is defined as the intention of the firm to share quality information (BI) with other supply chain partners, and the supply chain information performance was defined as actual behavior (B). This means that the theoretical basis for this study lends support to the role of quality information delivery as the mediator.

Moreover, these results are consistent with recent research by Eng (2006) who found that the link between organizational norms and SCM performance is mediating by cross-functional coordination information sharing. The concept of cross-functional coordination information sharing refers to wailing SC partners to exchange key technical, financial, operational and strategic information. Likewise, the present study is consistent with Large results (2005) who confirmed that information quality play a mediating role between external communication behaviour and supplier management performance.

5.4 SUMMARY

This chapter presents in depth discussion of all the significant and non significany related variables. The results of this study have provided insight into some exploratory factors that have postive effects to enhance the quality information delivery. The results have given extensive understading of the mediting role of quality information delivery in the relationship between supply chain commitement and amangement support towards supply chain information performance. In addition to that, this study provided empirical evidence that quality information delivery have direct impact towards supply chain performance depend on particular information quality dimensions such as timeliness, consistent respresntation and accessibility. It is interesting to observe that in the Malaysian manaufcaturing sectors, the main focus on quality of exchange information among the suppliers is valid in the views of these companies. In sum, that data support 7 out of 15 alternative hypotheses formulated for this study. Around-up report of the entire study, include limitation of the study, implications and suggections for the future research will be presented in the next final chapter.

CHAPTER 6

CONCLUSION, CONTRIBUTIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The main findings, their significance of the study and and implication should be highlited. Summary highlights the findings of the study upon which a conclusion is drawn in line with the objectives set. Recommendation describe the area can be explore or research should be extended by other researcher. This chapter provides the 1) contributions to academic and implications to industry practitioners 2) limitations of the study 3) recommendations for future research and 4) the final section concludes the discussion of the study.

6.2 IMPLICATIONS OF RESEARCH

The findings of this have significant implications to theory, method and practice, which will be explained below.

6.2.1 Theoretical Implications/Contributions

This research has offered us understanding on the effects of Internet technology factors on QID and subsequently to supply chain information performance in the Malaysian manufacturing sectors. It specifically attempted to show that Internet applications in the SCI environment can enhance SCI performance as they allow managers to share quality information amongst managers, suppliers and customers. This is because information sharing via Internet applications can be performed in a timely, efficient and accurate manner.

This study was constructed to evaluate the factors of QID as an intention to share information, and SCIP as actual behavior based on theory of acceptance and use of technology

(UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). UTAUT has been chosen because this study involves the usage of Internet technology applications factors as antecedents of quality information delivery, and the influence of quality information delivery on supply chain information performance. Here, quality information delivery has a mediating effect on the relation between antecedent factors and supply chain information performance.

The use of UTAUT was made based on the recommendation by Li and Lin (2006) with suggested that future research should be carried out on the antecedents of information sharing and information quality. Moreover, Moberg, Culter, Gross, and Speh (2002) indicate the importance of information quality and its antecedents. It is also recommended to examine the information dimension of various type of technology especially under to context of SCM.

This study has also highlighted the importance of technological factors such as perceived security, supply chain commitment, collective efficacy, and management support in enhancing quality information delivery between manufacturers and their suppliers and customers in the context of e-SCM. The past research indicated a direct relationship between antecedents and their consequences. However the present study considered of QID as a mediating variable, which is the new contribution in the operation management technology research.

Another significant finding in the current study involves the relationship between QID as behavioral intension with supply chain information performance as actual system use or actual behavior which supports the theoretical relationship between QID and SCIP. This is significant because it extends the knowledge of successful supply chain information by empirically demonstrated the existence of a positive relationship between these two variables.

This study goes one step ahead by providing evidence that QID can influence supply chain information performance over Internet applications by quantitative measures of performance i.e.

competitive priority performance measurement (cost, quality, time, flexibility, and customer responsiveness).

6.2.2 Methodological Implications/Contribution

This study has also contributed from the methodological perspective. Previous literature reviews classified information quality into four categories: Intrinsic Information Quality (IQ), Representational Information Quality (IQ), Accessibility Information Quality (IQ), and Contextual Information Quality (IQ) (Ballou & Pazer, 1985; Cheng, Hailin, & Hongming, 2008; Delone & McLean, 1992; Goodhue, 1995; Jarke & Vassilion, 1997; Kowan & Zmud, 1987; Wand & Wang, 1996). These scholars have proposed a reduced scale and recommended future research to cross validate the revised scale in different industries in order to verify its generalizability. As a result of their recommendation, Lee, Strong, Kahn, and Wang (2002) have developed the scale of quality information delivery, which is an accepted measure in the operations research field. Therefore, the current study chose the manufacturing sectors as the context to improve quality of sharing information between suppliers and customers, and to increase the performance of supply chain information. The positive result of this study offers additional contribution in term of methodology by adding new location and new industry in the same time.

Furthermore, this study has provided evidence that the revised scale of Lee, Strong, Kahn, and Wang (2002) is reliable and valid in other contexts, as a response to their call for cross-validating the scale. The present study shows that the reduction in scale is likely to provide a robust and useful measure for future research. Such a reduction make it possible to involve other information quality constructs in large studies with multiple items scales so that this will influence on supply chain information relations with other variables.

6.2.3 Managerial Implications

Apart from theoretical and methodological contributions of this study, the findings have managerial implications how operational managers in Malaysian manufacturing industries can manage their firms effective and efficiently

Specifically, this study found that supply chain commitment, management support, collective efficacy, and perceived security have significant effects on QID. This means that in order to promote QID among manufacturing sectors, managers should be concerned about enhancing these factors.

Because management support is found to affect QID, it is important that the top management continues to ensure the quality of shared information through SCM. Top management should provide necessary vision, guide and resources toward this end (Mohd.Yusoff, Muhammad, Zahari, Pasah, & Robert, 2009; Li & Lin, 2006). By providing necessary training and resources, managers can be motivated to make timely information and this will increase the competitive advantage of the organization. Operation manager training courses might be developed to teach the skill to enhance the use of Internet application so that high quality in sharing information and improved relations with suppliers and customers can be effected.

When top management set new system, they should communicate their vision to their employees (Mohd.Yusoff, Muhammad, Zahari, Pasah, & Robert, 2009) so that a shared vision with employees of the new system, role and organization structure can help enhance the implementation of organization process in efficient and effective way. As concluded by Zain, Rose, Abdullah,and Masrom (2005), top management should be able to help generate appropriate information to assist mangers make better decision in an unstable environment. The role of top management support is more dsire in medium and small manufacturing companies because the owner or CEO in small and medium manufacturing companies is commonly the key decision maker (Igbaria, Zinatelli, Cragg, & Cavaye, 1997).

The findings also showed that the level of quality information delivery among Malaysian manufacturing companies is affected by perceived security. As noted by Laforet, and Li (2005), supply chain partners tend to have high confidence towards e-commerce when the services and information provided are secure and involve a low rate of risk. This means that operation managers should reduce barriers of hackers and fraud rates by implementing protective security measures such as firewalls, virtual private networks, anti-virus software, vulnerability assessment tools (scanners), intrusion detection systems and security auditing in their SCM systems (Zhang & Li, 2006). In addition to providing safeguards to the networks, applications, and data of manufacturing companies, collaboration and cooperation among partners, customers, suppliers and employees can be enhanced (Shih, & Wen, 2005). Thus, by constructing comprehensive and strong security infrastructure for SCM system will promote trust among partners and facilitate effectiveness and efficiency of quality information sharing in a supply chain.

Because high level of collective efficacy to use Internet applications affects higher quality information delivery, supply chain managers should be more understanding of their partner's capabilities and experiences during Internet applications (Carroll, Rosson, & Zhou, 2005). In addition to that, SC managers need to provide more resources that help Internet application users to become more efficient. One important resource is training for new users to improve their efficacy perception and performance of the new technology.

Finally, the significant relationship between supply chain commitment for Internet applications and quality information delivery among manufacturing companies means that SCM and logistics managers need to enhance SC commitment and IT commitment by encouraging their partners use new Internet technologies in business to business context, and make them more convinced for new change in their organizations (Moberg, Cutler, Gross, & Speh, 2002). Improving management commitment will guide managers to advance their future investments, and practice purchasing performance by using EDI, and Internet applications (Hemsworth, Sánchez-Rodríguez, & Bidgood, 2005). Therefore related purchasing practices such as supplier-buyer integrated ordering, access to supplier's quality information, and access to buyer production scheduling are the result of supply chain commitment to use information system practices.

In addition to that, by adopting manufacturing technology by effectively integrating SCM practices such as quality commitment and quality information delivery, supply chain managers can extend operation strategies for their organizations and increase competitive pressures (Kannan, & Tan, 2005). Manufacturer's managers should also pay more attention to what their partner's need in terms of IT commitment and integration in SCM context (Wu, Chiag, Wu, & Tu, 2004). This may entail providing more detailed information and up to date simple and understandable rules to managers, suppliers and consumers. In other words, information online must be latest with regard to the product specification, prices and relevant links (Wu, Chiag, Wu, & Tu, 2004). This method will encourage operation managers to use organization system effectiveness and to let other customers and suppliers come back and visit the web site. Without a doubt, managers have to come to expect interactive links with banner advertisement and website link that provide access to the depth of information desired with ability to sell or to purchase when they feel the time is right (Levine, Locke, Searls, & Weinberger, 2000; Newman, Stem, & Sportt, 2004). However, managers are advised not to regard quality information delivery as panacea to supply chain information performance because, as indicated by the findings, there may be other factors that contribute more to supply chain performance of manufacturing companies than quality information delivery.

Furthermore, the result supports the contention that QID is significantly related to Supply Chain Information performance measurement (cost, quality, delivery and flexibility) and competitive priority performance measurement. If operation managers are seeking relevant, complete, and timely information during organization function such as deliver, plan, make, and return, then QID is considered a critical dimension.

On the part of FMM, although the findings in the present study showed that manufacturers generally have medium level of QID, they should continue to focus on efforts to educate the manufacturers on how to improve the level of information quality over Internet applications to improve SC partnership to respond to globalization and the presence of more foreign players and independent financial advisers in the industry. In addition to that, continuous training, education, providing qualified users in IT, and orientation of manufacturing companies about the importance of IT applications are undeniably a crucial agenda for FMM to enhance the profession of e-SCM in the manufacturing sectors.

6.3 LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

There are several limitations in this study. The limitations in this study provide the suggestion for the future research. Initially, the sample frame is based on manufacturing companies registered with FMM in year 2007. Future studies should incorporate larger sample size to include companies listed in Inland Revenue Board, or companies listed in Bursa Malaysia. The extended number of companies can increase the generalizability of the results. By doing so, service industry can be included and some comparisons can be made between manufacturing sectors.

Because the study involved 151 manufacturing companies, caution should be exercised when interpreting the results. Furthermore, the questionnaire was pre-tested to ensure no ambiguities and redundancies in the questions.

Even though the study select a sample according to simple random sampling, a random probability error is unavoidable (Zikmund, 2000). Hence, the sample has been biased because existing groups surveyed may have been subsidiaries of same organization, consequently it would be estimated that they would have similar responses.

Another limitation of the research is the relative hetrogenecity of the industries and managers in the response sample. Fifteen different industries were included in the study, but the results were dominated by five industries. The managers that responded to the survey were extremely well-educated and represented the highest levels of management, with 84.7 percent of the respondents acting as managers, directors, or officers in their firms. In addition to that, the approach of factor analysis in the current study is an exploratory factor analysis. However, there are two types of factor analysis exploratory and confirmatory. Exploratory factor analysis is often used in the early stages of research to gather information about the inter-relationships among a set of variables (Pallant, 2001). Confirmatory factor analysis on the other hand, is more complex and sophisticated set of techniques used later in the research process to confirm specific hypothesis concerning the structure underlying a set of variables. Therefore, model analysis by using Structural Equation Model (SEM) could be applied for future research to get confirmatory model in specific industry.

Because this study is concerned about quality information delivery toward supply chain in manufacturing sectors in Malaysia, there is a need to further test the model in this study to other developing countries such as ASEAN countries and Middles East countries to understand the cultural and geographical variations in quality information sharing.

This study examined manufacturing companies at a single period of time. A longitudinal study would therefore provide a significant approach in testing the outcomes of this study. Further research should be done by using qualitative technique to understand the phenomenon of SCI performance, and to approach it from various disciplines such as financial accounting, accounting managerial, strategy and organization management.

From methodological standpoint, the study used multivariate analysis to test the theoretical model. The model established cause and effect relationship. Because some variables were not accepted as antecedents in the model, it is suggested that other antecedents of QID need be considered in the future studies in context of SCM such as organizational size, IT enabler, perceived benefit, trading partners' relative power, trading partners' readiness (Li & Lin, 2006; Madlberger, 2008; Moberg, Cutler, Gross, & Speh, 2002). In addition to that, a natural extension of this study is to use another measurements of Internet technology factors, quality information delivery and supply chain information performance in the future research to solidify our findings.

Furthermore, this study just consider on one type of ICT, which is based on some Internet technology applications and tools such as e-mail, Internet phone, video conferencing, browsing, chatting, web site file transferring documents, and organization system in context of e-SCM. There are other tools of Internet applications such as SMS by net, Internet based platform and XML schema to share documents, Facebook and others (Chou, Tan, Yen, & Ohio, 2004), which should be explored in future research. In addition, other types of ICT system such as EDI, ERP, data warehousing, Groupware (Ryssel, Ritter, Gemu¨nden, & Georg, 2004) need also be examined to see their effects on quality information delivery and supply chain information performance.

6.4 SUMMARY

The findings of the study suggest that QID of manufacturing sectors have positive influence on supply chain information performance, measured by competitive priority performance instruments which are: cost, quality, dependability, flexibility, and Price / cost. This finding provides additional evidence to the growing body of knowledge concerning the importance of achieving the high levels of QID. This finding also gives academicians and managers a much stronger basis than intuition and anecdotes for recommending QID.

With regard to the factors influencing QID, the finding suggests that there are diverse factors that affect QID. Specifically it appears that QID is facilitated by the amount of support of top management on operation management through encouragement to use or to improver quality of sharing information over Internet applications under SC context or with other SC partners, by providing suitable environment or location to use particular system and by allocating various type of recourses such as financial support and important facilities.

Besides management support, perceived security in the context of e-SC is also a critical factor to reduce the risk of transaction information between manufacturing companies. The result also indicated that both collective efficacy and supply chain commitment are significant in improving the sensitive and accurate nature of information exchange between SC partners.

It was further revealed that QID only mediates in relationship between supply chain commitment and management support toward supply chain management information performance. Since not many research works have investigated the mediating role of QID, this research offers some empirical insight into this issue and future researchers are recommended to consider other mediating variables such as service quality (SQ), information product (IP), supply chain collaboration (SCC), and information system practices to understand e-SCM performance.

The findings of the study have shown that perceived security, supply chain commitment, collective efficacy and management support are related to QID and subsequently to supply chain management information (SCMI). Therefore it is recommended to extend the framework to a more distinguished study such as reinventing, cultures and other characteristic, which can influence QID, perceived trust and SCMI. Replication of the study is strongly recommended, the replication carry the ability to strengthen and then to generalize the finding of the study.

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APPENDIXES

APPENDIX A:
RESEARCH QUESTIONNAIRE

Abdullah Yahya Moqbel Ahmed
Block K, Room 207 May Bank College
UNIVERSITI UTARA MALAYSIA
06010 UUM Sintok
Kedah Darul Aman
Hp: 0173121004

Relationship between Quality Information Delivery, Internet Technology Factors towards Supply Chain Information Performance

Dear Respondent,

The aim of this survey is to determine the impact of utilization Internet technology acceptance in the sharing of information quality and its impact on SCM performance. This research is being conducted to fulfill the requirement for a PhD program at College of Business.

INTRODUCTION

Internet technology acceptance (ITS) factors such as usefulness, trust, self commitment and management support affect managers' decision to adopt the Internet technology. On the other hand, having quality information sharing will enhance the relationship between customers and suppliers on supply chain management (SCM). A glossary of key terms is included at the beginning of this survey to guide you in interpreting the questions throughout the survey.

Glossary

Term	Definition
Internet Technology Factors	An important stage that leads to the adoption of the new technology, and it requires organization's employees to use information technology in an efficient and effective way.
Supply Chain Information Performance (SCIP)	It refers to coordination and cooperation between suppliers and customers to fulfill information demand by gathering and interpreting accurate information through network of companies, This process will start from the early stage of raw materials to the final stage of customer demands, in order to produce premium quality at lowest cost.
Quality Information Delivery (QID)	Using the suitable applications of Internet technology to deliver the right information to the right user at the right time.

SECTION A: GENERAL INFORMATION

INSTRUCTIONS:

This questionnaire consists of five main sections. Please read the questions carefully before answering them. Where appropriate, please tick (√) in the box or complete the answer in the space provided. Your honest and sincere response is highly appreciated.

1. Company's name: ______________________________

2. Your designation: ______________________________

3. Length of your designation: ______________________________

4. How long your company established: ______________________________

5. Please indicate the overall number of employees
   □ Less than 5 employees
   □ Between 5 - 50 employees
   □ Between 51- 150 employees
   □ More than 150 employees

6. Please indicate the sale turn over your company in 2007 by check the appropriate answer
   □ Less than RM 200,000
   □ Between than RM 200,000 and less RM 10 million
   □ Between RM 10 million and less than RM 25 million
   □ More than RM 25 million

7. Please indicate the geographic scope of your company's operations?
   a.□ Local (e.g: Johor, Kuala Lumpur, Kedah etc)
   b.□ Regional (e.g: ASEAN)
   c.□ Worldwide (e.g: China, UK, Australia etc).

8. Please indicate the following:

Total number of customers

a.□ < 50	c □ 101-150
b.□ 51-100	d □ >150

Total number of suppliers

a.□ < 50	c □ 101-150
b.□ 51-100	d □ >151

SECTION B: INTERNET APPLICATIONS FACTORS

* Please indicate how often your company uses the Internet applications tools for information sharing by circling the appropriate number against each tool.

Tools	Lowly				Highly
1. Electronic mail	1	2	3	4	5
2. Internet Phone	1	2	3	4	5
3. Video conferencing	1	2	3	4	5
4. Chatting	1	2	3	4	5
5. File transfer protocol or (FTP)	1	2	3	4	5
6. Browser	1	2	3	4	5
7. Website	1	2	3	4	5
8. Organization programming system	1	2	3	4	5

9. Others, please specify --------------------------

SECTION C: INTERNET TECHNOLOGY FACTORS

Note: Your answer should be based on the Internet application that you chose in section B.

Please indicate your degree of agreement on the following statement, by circling the appropriate number against each question using the scale below.

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

1.Internet Technology Acceptance Factors	**Degree of Agreement**
A. Usefulness Of Internet Applications	1 2 3 4 5
1. Using Internet applications improve supply chain performance.	1 2 3 4 5
1 Internet applications enable supply chain partners to accomplish their tasks more quickly.	1 2 3 4 5
2 Using Internet applications will improve effectiveness of supply chain management.	1 2 3 4 5
3 Using Internet applications increase supply chain partners' productivity.	1 2 3 4 5
4 Using Internet applications will make supply chain partners' work easier.	1 2 3 4 5
5 Over all, the Internet applications are useful for supply chain management information system.	1 2 3 4 5

1 **Security** ***Of Internet Applications***	**Degree of Agreement**
1. Internet applications present enough online security.	1 2 3 4 5
1 Purchasing Internet applications will not cause financial risks.	1 2 3 4 5
2 Online transaction on Internet applications is protected by the latest technology.	1 2 3 4 5
3 Online payment on these Internet applications is safe.	1 2 3 4 5
4 Internet applications have the ability to solve problem from hackers.	1 2 3 4 5

C. ***Privacy Of Internet Applications***	**Degree of Agreement**
1. The supplier's information that firm provides on the Internet applications is secure.	1 2 3 4 5
2. The monetary information that firm provides on this Internet applications is well protected.	1 2 3 4 5
3. These Internet applications will not use unsuitable method to collect customer and supplier data.	1 2 3 4 5
4. These Internet applications do not ask for irrelevant customer's information.	1 2 3 4 5
5. These Internet applications do not apply supplier information for other purpose.	1 2 3 4 5

E. *Trust Of Internet Applications*	**Degree of Agreement**
Items	1 2 3 4 5
1. Our supply chain partners feel that the Internet applications administrator will update the content of web page any time.	1 2 3 4 5
2. Our supply chain partners feel that the Internet applications' call center will conduct transaction for them.	1 2 3 4 5
3. Our supply chain partners feel that all transactions will be conducted promptly.	1 2 3 4 5
4. Our supply chain partners feel that the internet applications have integrity.	1 2 3 4 5
5. Our supply chain partners feel that the internet applications are reliable.	1 2 3 4 5
6. Our supply chain partners feel that the internet applications are trustworthy.	1 2 3 4 5

F. Collective efficacy *Of Internet Applications*	**Degree of Agreement**				
Our company could complete its activities using Internet applications …					
1. If there was no one around to tell its employees what to do as they do.	1	2	3	4	5
2. If most of its employees had never used these types of applications before.	1	2	3	4	5
3. If its employees had only the software manuals for reference.	1	2	3	4	5
4. If its employees had seen someone else using it before trying it themselves.	1	2	3	4	5
5. If someone else had helped them get started.	1	2	3	4	5
6. If its employees had a lot of time to complete the company's work.	1	2	3	4	5
7. If its employees had just the built – in help facility for assistance.	1	2	3	4	5
8. If someone showed its employees how to do it first	1	2	3	4	5

G. *Supply Chain Commitment Of Internet Applications*	**Degree of Agreement**				
1. The reason why our supply chain partners prefer to use Internet applications because of what they for.	1	2	3	4	5
2. Using Internet applications is primarily based on supply chain partner's norms.	1	2	3	4	5
3. What the usage of Internet application stand for is important for our supply chain partners	1	2	3	4	5
4. Our supply chain partners are a proud about our Internet applications.	1	2	3	4	5
5. Our supply chain partners talk up the use of Internet applications to their partners as having great utility for them. *Employees refer to the all levels of employees involved in SCM	1	2	3	4	5

H. Management Support		Degree of Agreement				
1.	Management is aware the benefits that can be achieved with the use Internet application.	1	2	3	4	5
2.	Management always supports and encourages the usage of Internet applications for job-related work.	1	2	3	4	5
3.	Management provides most of the necessary help and resources to enable people to use Internet applications.	1	2	3	4	5
4.	Management provides good access to Internet applications when people need them.	1	2	3	4	5
5.	Management provides good access to various types of Internet applications when people need them.	1	2	3	4	5

I. Technical Support		Degree of Agreement				
1.	Guidance is available to our company in selection of Internet applications.	1	2	3	4	5
2.	Information center teaches our company to use Internet applications.	1	2	3	4	5
3.	The service quality of Information center is good	1	2	3	4	5
4.	Information center is capable of cooperation with our company.	1	2	3	4	5
5.	Our company can get assistance in Internet applications, systems problems rapidly	1	2	3	4	5
6.	The service provided by the Information center is cost-efficient.	1	2	3	4	5

SECTION D: QUALITY INFORMATION DELIVERY

This section measures your company intention to deliver information to others due to quality information sharing.

Please indicate your degree of agreement on the following statement, by circling the appropriate number against each question using the scale below.

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

Degree of Agreement

1.Information exchange between our trading partners and us is sufficient current for our work	1 2 3 4 5
2. Information exchange between our trading partners and us is sufficiently timely.	1 2 3 4 5
3Information exchange between our trading partners and us sufficiently up-to-date for our work.	1 2 3 4 5
4. Information exchange between our trading partners and us is consistently presented in the same format.	1 2 3 4 5
5. Information exchange between our trading partners and us is presented consistently.	1 2 3 4 5
6. Information exchange between our trading partners and us is represented in a consistent format.	1 2 3 4 5
7. Information exchange between our trading partners and us is easily retrievable.	1 2 3 4 5
8. Information exchange between our trading partners and us is easily accessible.	1 2 3 4 5
9. Information exchange between our trading partners and us is easily obtainable.	1 2 3 4 5
10. Information exchange between our trading partners and us is quickly accessible when needed.	1 2 3 4 5

SECTION E: SUPPLY CHAIN INFORMATION PERFORMANCE

To what extent do you agree to each of the following statement in respect your supply chain information performance?

Please indicate your degree of agreement on the following statement, by circling the appropriate number against each question using the scale below.

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

	Degree of Agreement
1. We are able to compete based on quality.	1 2 3 4 5
2. We offer products that are highly reliable.	1 2 3 4 5
3. We offer products that are very durable.	1 2 3 4 5
4. We offer high quality products to our customer.	1 2 3 4 5
5. We have joint production planning and scheduling among suppliers, manufacturing, marketing, distributors.	1 2 3 4 5
6. We link information systems so that each member of a supply chain knows others' requirements and status.	1 2 3 4 5
7. Information flows quickly along the value chain.	1 2 3 4 5
8. Accurate information is usually available for decision making.	1 2 3 4 5
9. We offer competitive prices.	1 2 3 4 5
10. We are able to offer prices as lower than our competitors.	1 2 3 4 5
11. We deliver the kind of products needed.	1 2 3 4 5
12. We deliver customer order on time.	1 2 3 4 5
13. We provide dependable delivery	1 2 3 4 5

Your time and cooperation are highly valued, thank you.

APPENDEX B

CHI-SQUARE TEST

(NON RESPONSE BIAS)

Chi Square test on Destination of Respondents, Length of Designation, Company establishment, Employee Number, Company Turn over, Geographic Scope, Customers Number, and Suppliers Number.

DESTINATION OF RESPONDENTS

Destination Of Respondents * Response Crosstabulation

			Response		Total
			early response	Late response	
Destination Of Respondents	Management	Count	30	43	73
		Expected Count	30.5	42.5	73.0
		% within Destination Of Respondents	41.1%	58.9%	100.0%
		% within Response	47.6%	48.9%	48.3%
		% of Total	19.9%	28.5%	48.3%
	Marketing	Count	6	8	14
		Expected Count	5.8	8.2	14.0
		% within Destination Of Respondents	42.9%	57.1%	100.0%
		% within Response	9.5%	9.1%	9.3%
		% of Total	4.0%	5.3%	9.3%
	Engineering	Count	10	8	18
		Expected Count	7.5	10.5	18.0
		% within Destination Of Respondents	55.6%	44.4%	100.0%
		% within Response	15.9%	9.1%	11.9%
		% of Total	6.6%	5.3%	11.9%
	Accounting and finance	Count	6	10	16
		Expected Count	6.7	9.3	16.0
		% within Destination Of Respondents	37.5%	62.5%	100.0%
		% within Response	9.5%	11.4%	10.6%
		% of Total	4.0%	6.6%	10.6%
	Technical	Count	7	5	12
		Expected Count	5.0	7.0	12.0
		% within Destination Of Respondents	58.3%	41.7%	100.0%
		% within Response	11.1%	5.7%	7.9%
		% of Total	4.6%	3.3%	7.9%
	Operation Management	Count	3	5	8
		Expected Count	3.3	4.7	8.0
		% within Destination Of Respondents	37.5%	62.5%	100.0%

		% within Response	4.8%	5.7%	5.3%
		% of Total	2.0%	3.3%	5.3%
	Human Resource	Count	1	6	7
		Expected Count	2.9	4.1	7.0
		% within Destination Of Respondents	14.3%	85.7%	100.0%
		% within Response	1.6%	6.8%	4.6%
		% of Total	.7%	4.0%	4.6%
	Chemist	Count	0	3	3
		Expected Count	1.3	1.7	3.0
		% within Destination Of Respondents	.0%	100.0%	100.0%
		% within Response	.0%	3.4%	2.0%
		% of Total	.0%	2.0%	2.0%
Total		Count	63	88	151
		Expected Count	63.0	88.0	151.0
		% within Destination Of Respondents	41.7%	58.3%	100.0%
		% within Response	100.0%	100.0%	100.0%
		% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.288(a)	7	.399
Likelihood Ratio	8.651	7	.279
Linear-by-Linear Association	.793	1	.373
N of Valid Cases	151		

a 6 cells (37.5%) have expected count less than 5. The minimum expected count is 1.25.

LENGTH OF DESIGNATION

Length of Designation * Response Crosstabulation

			Response		
			early response	Late response	Total
Length of Designation	less than 5 years	Count	31	53	84
		Expected Count	35.0	49.0	84.0
		% within Length of Designation	36.9%	63.1%	100.0%
		% within Response	49.2%	60.2%	55.6%
		% of Total	20.5%	35.1%	55.6%
	between 5-15 years	Count	24	30	54
		Expected Count	22.5	31.5	54.0
		% within Length of Designation	44.4%	55.6%	100.0%
		% within Response	38.1%	34.1%	35.8%
		% of Total	15.9%	19.9%	35.8%
	between 16-25 years	Count	7	3	10
		Expected Count	4.2	5.8	10.0
		% within Length of Designation	70.0%	30.0%	100.0%
		% within Response	11.1%	3.4%	6.6%
		% of Total	4.6%	2.0%	6.6%
	more than 26 years	Count	1	2	3
		Expected Count	1.3	1.7	3.0
		% within Length of Designation	33.3%	66.7%	100.0%
		% within Response	1.6%	2.3%	2.0%
		% of Total	.7%	1.3%	2.0%
Total		Count	63	88	151
		Expected Count	63.0	88.0	151.0
		% within Length of Designation	41.7%	58.3%	100.0%
		% within Response	100.0%	100.0%	100.0%
		% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.342(a)	3	.227
Likelihood Ratio	4.325	3	.228
Linear-by-Linear Association	2.200	1	.138
N of Valid Cases	151		

a 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.25.

COMPANY ESTABLISHMENT

Company establishment * Response Crosstabulation

			Response		Total
			early response	Late response	
Company establishment	less than 5 years	Count	13	24	37
		Expected Count	15.4	21.6	37.0
		% within Company establishment	35.1%	64.9%	100.0%
		% within Response	20.6%	27.3%	24.5%
		% of Total	8.6%	15.9%	24.5%
	Between 5 -15 years	Count	28	29	57
		Expected Count	23.8	33.2	57.0
		% within Company establishment	49.1%	50.9%	100.0%
		% within Response	44.4%	33.0%	37.7%
		% of Total	18.5%	19.2%	37.7%
	betweeb 16-25 years	Count	15	20	35
		Expected Count	14.6	20.4	35.0
		% within Company establishment	42.9%	57.1%	100.0%
		% within Response	23.8%	22.7%	23.2%
		% of Total	9.9%	13.2%	23.2%
	More than 26 years	Count	7	15	22
		Expected Count	9.2	12.8	22.0
		% within Company establishment	31.8%	68.2%	100.0%
		% within Response	11.1%	17.0%	14.6%
		% of Total	4.6%	9.9%	14.6%
Total		Count	63	88	151
		Expected Count	63.0	88.0	151.0
		% within Company establishment	41.7%	58.3%	100.0%
		% within Response	100.0%	100.0%	100.0%
		% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.850(a)	3	.415
Likelihood Ratio	2.873	3	.412
Linear-by-Linear Association	.064	1	.800
N of Valid Cases	151		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.18.

EMPLOYEES NUMBER

Employees Number * Response Crosstabulation

			Response		Total
			early response	Late response	
Employee Number	less than 5 employees	Count	6	14	20
		Expected Count	8.3	11.7	20.0
		% within Emloyee Number	30.0%	70.0%	100.0%
		% within Response	9.5%	15.9%	13.2%
		% of Total	4.0%	9.3%	13.2%
	Between 5 -50 employees	Count	30	49	79
		Expected Count	33.0	46.0	79.0
		% within Emloyee Number	38.0%	62.0%	100.0%
		% within Response	47.6%	55.7%	52.3%
		% of Total	19.9%	32.5%	52.3%
	betweeb 51-150 employees	Count	6	9	15
		Expected Count	6.3	8.7	15.0
		% within Emloyee Number	40.0%	60.0%	100.0%
		% within Response	9.5%	10.2%	9.9%
		% of Total	4.0%	6.0%	9.9%
	More than 150 employees	Count	21	16	37
		Expected Count	15.4	21.6	37.0
		% within Emloyee Number	56.8%	43.2%	100.0%
		% within Response	33.3%	18.2%	24.5%
		% of Total	13.9%	10.6%	24.5%
Total		Count	63	88	151
		Expected Count	63.0	88.0	151.0
		% within Emloyee Number	41.7%	58.3%	100.0%
		% within Response	100.0%	100.0%	100.0%
		% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.044(a)	3	.169
Likelihood Ratio	5.030	3	.170
Linear-by-Linear Association	4.708	1	.030
N of Valid Cases	151		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.26.

COMPANY TURN OVER

Company Turn over * Response Crosstabulation

			Response		Total
			early response	Late response	
Company Turn over	less than RM 200,0000	Count	7	21	28
		Expected Count	11.7	16.3	28.0
		% within Company Turn over	25.0%	75.0%	100.0%
		% within Response	11.1%	23.9%	18.5%
		% of Total	4.6%	13.9%	18.5%
	Between 200,000 RM and less than RM 10 million	Count	33	47	80
		Expected Count	33.4	46.6	80.0
		% within Company Turn over	41.3%	58.8%	100.0%
		% within Response	52.4%	53.4%	53.0%
		% of Total	21.9%	31.1%	53.0%
	betweeb RM 10 million and less than RM 25 million-	Count	10	7	17
		Expected Count	7.1	9.9	17.0
		% within Company Turn over	58.8%	41.2%	100.0%
		% within Response	15.9%	8.0%	11.3%
		% of Total	6.6%	4.6%	11.3%
	More than RM 25 million	Count	13	13	26
		Expected Count	10.8	15.2	26.0
		% within Company Turn over	50.0%	50.0%	100.0%
		% within Response	20.6%	14.8%	17.2%
		% of Total	8.6%	8.6%	17.2%
Total		Count	63	88	151
		Expected Count	63.0	88.0	151.0
		% within Company Turn over	41.7%	58.3%	100.0%
		% within Response	100.0%	100.0%	100.0%
		% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.005(a)	3	.111
Likelihood Ratio	6.162	3	.104
Linear-by-Linear Association	4.192	1	.041
N of Valid Cases	151		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.09.

GEOGRAPHIC SCOPE

Geographic Scope * Response Crosstabulation

			Response		Total
			early response	Late response	
Geographic Scope	Local (eg. Johor, Kl, Kedah etc)	Count	36	51	87
		Expected Count	36.3	50.7	87.0
		% within Geographic Scope	41.4%	58.6%	100.0%
		% within Response	57.1%	58.0%	57.6%
		% of Total	23.8%	33.8%	57.6%
	Regional (e.g; Asean)	Count	17	14	31
		Expected Count	12.9	18.1	31.0
		% within Geographic Scope	54.8%	45.2%	100.0%
		% within Response	27.0%	15.9%	20.5%
		% of Total	11.3%	9.3%	20.5%
	Worlf Wide (e.g: China, UK, Astralian)	Count	10	23	33
		Expected Count	13.8	19.2	33.0
		% within Geographic Scope	30.3%	69.7%	100.0%
		% within Response	15.9%	26.1%	21.9%
		% of Total	6.6%	15.2%	21.9%
Total		Count	63	88	151
		Expected Count	63.0	88.0	151.0
		% within Geographic Scope	41.7%	58.3%	100.0%
		% within Response	100.0%	100.0%	100.0%
		% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.967(a)	2	.138
Likelihood Ratio	3.994	2	.136
Linear-by-Linear Association	.489	1	.485
N of Valid Cases	151		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.93.

CUSTOMERS NUMBER

Customer Number * Response Crosstabulation

			Response		Total
			early response	Late response	
Customers Number	More than 50	Count	18	14	32
		Expected Count	13.4	18.6	32.0
		% within Customer Number	56.3%	43.8%	100.0%
		% within Response	28.6%	15.9%	21.2%
		% of Total	11.9%	9.3%	21.2%
	51-100	Count	9	23	32
		Expected Count	13.4	18.6	32.0
		% within Customer Number	28.1%	71.9%	100.0%
		% within Response	14.3%	26.1%	21.2%
		% of Total	6.0%	15.2%	21.2%
	101-150	Count	6	7	13
		Expected Count	5.4	7.6	13.0
		% within Customer Number	46.2%	53.8%	100.0%
		% within Response	9.5%	8.0%	8.6%
		% of Total	4.0%	4.6%	8.6%
	more than 150	Count	30	44	74
		Expected Count	30.9	43.1	74.0
		% within Customer Number	40.5%	59.5%	100.0%
		% within Response	47.6%	50.0%	49.0%
		% of Total	19.9%	29.1%	49.0%
Total		Count	63	88	151
		Expected Count	63.0	88.0	151.0
		% within Customer Number	41.7%	58.3%	100.0%
		% within Response	100.0%	100.0%	100.0%
		% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.358(a)	3	.147
Likelihood Ratio	5.422	3	.143
Linear-by-Linear Association	.600	1	.439
N of Valid Cases	151		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.42.

SUPPLIERS NUMBER

Supplier Number * Response Crosstabulation

			Response		Total
			early response	Late response	
Suppliers Number	More than 50	Count	34	45	79
		Expected Count	33.0	46.0	79.0
		% within Supplier Number	43.0%	57.0%	100.0%
		% within Response	54.0%	51.1%	52.3%
		% of Total	22.5%	29.8%	52.3%
	51-100	Count	14	19	33
		Expected Count	13.8	19.2	33.0
		% within Supplier Number	42.4%	57.6%	100.0%
		% within Response	22.2%	21.6%	21.9%
		% of Total	9.3%	12.6%	21.9%
	101-150	Count	1	6	7
		Expected Count	2.9	4.1	7.0
		% within Supplier Number	14.3%	85.7%	100.0%
		% within Response	1.6%	6.8%	4.6%
		% of Total	.7%	4.0%	4.6%
	more than 150	Count	14	18	32
		Expected Count	13.4	18.6	32.0
		% within Supplier Number	43.8%	56.3%	100.0%
		% within Response	22.2%	20.5%	21.2%
		% of Total	9.3%	11.9%	21.2%
Total		Count	63	88	151

	Expected Count	63.0	88.0	151.0
	% within Supplier Number	41.7%	58.3%	100.0%
	% within Response	100.0%	100.0%	100.0%
	% of Total	41.7%	58.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.284(a)	3	.516
Likelihood Ratio	2.603	3	.457
Linear-by-Linear Association	.053	1	.818
N of Valid Cases	151		

a 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.92.

APPENDEX C:

Factor Analysis

Supply Chain Information Performance

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.860
Bartlett's Test of Sphericity	Approx. Chi-Square	701.163
	df	78
	Sig.	.000

Communalities

	Initial	Extraction
Supply Chain Information Performance 1	1.000	.440
Supply Chain Information Performance 2	1.000	.498
Supply Chain Information Performance 3	1.000	.320
Supply Chain Information Performance 4	1.000	.448
Supply Chain Information Performance 5	1.000	.460
Supply Chain Information Performance 6	1.000	.501
Supply Chain Information Performance 7	1.000	.471
Supply Chain Information Performance 8	1.000	.546
Supply Chain Information Performance 9	1.000	.364
Supply Chain Information Performance 10	1.000	.564
Supply Chain Information Performance 11	1.000	.606
Supply Chain Information Performance 12	1.000	.568
Supply Chain Information Performance 13	1.000	.495

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.280	48.308	48.308	6.280	48.308	48.308
2	1.314	10.105	58.414			
3	.884	6.803	65.217			
4	.779	5.993	71.210			
5	.691	5.316	76.527			
6	.611	4.699	81.226			
7	.520	3.998	85.224			
8	.474	3.649	88.873			
9	.441	3.391	92.264			
10	.340	2.616	94.880			
11	.282	2.167	97.047			
12	.227	1.742	98.790			
13	.157	1.210	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
Supply Chain Information Performance 11	.779
Supply Chain Information Performance 12	.754
Supply Chain Information Performance 10	.751
Supply Chain Information Performance 8	.739
Supply Chain Information Performance 6	.708
Supply Chain Information Performance 2	.706
Supply Chain Information Performance 13	.703
Supply Chain Information Performance 7	.686
Supply Chain Information Performance 5	.678
Supply Chain Information Performance 4	.669
Supply Chain Information Performance 1	.663
Supply Chain Information Performance 9	.603
Supply Chain Information Performance 3	.565

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Quality Information Delivery

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.862
Bartlett's Test of Sphericity	Approx. Chi-Square	989.568
	df	45
	Sig.	.000

Communalities

	Initial	Extraction
Quality Information Deliverd 1	1.000	.477
Quality Information Deliverd 2	1.000	.598
Quality Information Deliverd 3	1.000	.619
Quality Information Deliverd 4	1.000	.608
Quality Information Deliverd 5	1.000	.582
Quality Information Deliverd 6	1.000	.556
Quality Information Deliverd 7	1.000	.673
Quality Information Deliverd 8	1.000	.653
Quality Information Deliverd 9	1.000	.661
Quality Information Deliverd 10	1.000	.718

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.144	61.442	61.442	6.144	61.442	61.442
2	1.016	10.161	71.604			
3	.764	7.642	79.245			
4	.562	5.621	84.866			
5	.410	4.097	88.963			
6	.353	3.527	92.490			
7	.316	3.164	95.654			
8	.187	1.870	97.524			
9	.148	1.476	99.000			
10	.100	1.000	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
Quality Information Deliverd 10	.847
Quality Information Deliverd 7	.820
Quality Information Deliverd 9	.813
Quality Information Deliverd 8	.808
Quality Information Deliverd 3	.787
Quality Information Deliverd 4	.779
Quality Information Deliverd 2	.773
Quality Information Deliverd 5	.763
Quality Information Deliverd 6	.745
Quality Information Deliverd 1	.691

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Factor analysis for antecedent factor

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.876
Bartlett's Test of Sphericity	Approx. Chi-Square	2920.617
	df	528
	Sig.	.000

Communalities

	Initial	Extraction
Perceived Usefulness 2	1.000	.678
Perceived Usefulness 1	1.000	.707
Perceived Usefulness 4	1.000	.813
Perceived Usefulness 3	1.000	.739
Perceived Usefulness5	1.000	.872
Perceived Usefulness 6	1.000	.826
Percieved Security 3	1.000	.747
Percieved Security 4	1.000	.815
Percieved Security 5	1.000	.757
Percievd Privacy 3	1.000	.721
Percievd Privacy 4	1.000	.772
Percievd Privacy 5	1.000	.620
Collective Efficacy 4	1.000	.622
Collective Efficacy 5	1.000	.694
Collective Efficacy 6	1.000	.751
Collective Efficacy 7	1.000	.711
Collective Efficacy 8	1.000	.744
Supply Chain Commitment 1	1.000	.695
Supply Chain Commitment 2	1.000	.775
Supply Chain Commitment 3	1.000	.745
Supply Chain Commitment 4	1.000	.701
Supply Chain Commitment 5	1.000	.678
Supply Chain Commitment 6	1.000	.679
Managment Support 1	1.000	.677
Managment Support 2	1.000	.753
Managment Support 3	1.000	.829
Managment Support 4	1.000	.829

Managment Support 5	1.000	.769
Use Technical Support 1	1.000	.683
Use Technical Support 2	1.000	.758
Use Technical Support 3	1.000	.723
Use Technical Support 4	1.000	.617
Use Technical Support 5	1.000	.712

Extraction Method: Principal Component Analysis.

Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.996	36.352	36.352	11.996	36.352	36.352	4.757	14.414	14.414
2	3.489	10.573	46.925	3.489	10.573	46.925	3.892	11.795	26.209
3	2.527	7.658	54.583	2.527	7.658	54.583	3.844	11.647	37.856
4	1.912	5.795	60.378	1.912	5.795	60.378	3.587	10.870	48.726
5	1.697	5.142	65.520	1.697	5.142	65.520	3.371	10.216	58.943
6	1.435	4.349	69.869	1.435	4.349	69.869	2.386	7.230	66.172
7	1.153	3.493	73.361	1.153	3.493	73.361	2.372	7.189	73.361
8	.770	2.333	75.694						
9	.700	2.121	77.816						
10	.662	2.006	79.821						
11	.610	1.849	81.670						
12	.519	1.571	83.241						
13	.515	1.560	84.802						
14	.472	1.429	86.231						
15	.466	1.413	87.644						
16	.437	1.325	88.970						
17	.394	1.193	90.163						
18	.379	1.148	91.311						
19	.305	.925	92.236						
20	.283	.857	93.093						
21	.267	.808	93.901						
22	.264	.800	94.701						
23	.242	.733	95.434						
24	.206	.623	96.057						
25	.201	.609	96.666						
26	.184	.558	97.224						
27	.179	.543	97.767						

28	.158	.479	98.247						
29	.150	.454	98.701						
30	.139	.422	99.123						
31	.125	.379	99.502						
32	.107	.324	99.826						
33	.057	.174	100.000						

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component						
	1	2	3	4	5	6	7
Perceived Usefulness 5	.725	-.388	.388		.106		.171
Supply Chain Commitment 2	.714	-.178	-.180	-.255	-.177	.291	.142
Collective Efficacy 7	.710	.137			-.365	-.221	
Managment Support 1	.708	-.139	-.223	.314			
Supply Chain Commitment 4	.701		-.205	-.171		.319	-.175
Supply Chain Commitment 5	.688		-.164	-.137	-.130	.371	
Managment Support 3	.686		-.269	.477	.125	-.132	.130
Managment Support 4	.681	-.107	-.270	.505			.134
Managment Support 5	.674		-.282	.446			.134
Supply Chain Commitment 6	.670		-.113			.419	-.190
Supply Chain Commitment 3	.661	-.314	-.300	-.110	-.125	.302	
Perceived Usefulness 6	.638	-.383	.486		.166		
Perceived Usefulness 4	.632	-.381	.500		.108		
Collective Efficacy 6	.629	.198		-.125	-.501	-.201	
Use Technical Support 1	.629	.249	-.216	-.311	.111	-.169	-.203
Managment Support 2	.627	-.186	-.230	.488	.118	-.138	
Collective Efficacy 4	.617	.246		-.204	-.265	-.236	
Perceived Usefulness 1	.611	-.370	.435				
Collective Efficacy 8	.605	.219			-.487	-.226	.198
Use Technical Support 3	.601	.164	-.269	-.221	.394	-.224	
Perceived Usefulness 3	.600	-.369	.435	-.186	.106		
Use Technical Support 1	.596	.120	-.337	-.349	.321	-.202	
Use Technical Support 5	.595	.207	-.191	-.313	.351	-.184	-.155
Use Technical Support 4	.590	.228	-.217	-.259	.270	-.138	-.102
Perceived Usefulness 2	.583	-.324	.463				-.110
Supply Chain Commitment 1	.560	-.327	-.195	-.169	-.163	.381	.191
Collective Efficacy 5	.545	.342			-.440	-.275	
Percievd Privacy 3	.490	.438	.242	.266		.158	-.365
Percieved Security 5	.217	.714	.230	-.104	.117	.180	.300
Percieved Security 4	.233	.613	262	.128	.205	.227	.453
Percieved Security 3	.424	.565	.193		.276	.202	.300
Percievd Privacy 4	.443	.490	.222	.287		.171	-.417
Percievd Privacy 5	.398	.470	.360	.139		.113	-.278

Extraction Method: Principal Component Analysis.
a 7 components extracted.

Rotated Component Matrix(a)

	Component						
	1	2	3	4	5	6	7
Perceived Usefulness 6	.867	.174	.127	.123			
Perceived Usefulness 4	.861	.143	.155		.110		
Perceived Usefulness 5	.835	.233	.260	.127	.158		.104
Perceived Usefulness 3	.809		.202	.153	.124		
Perceived Usefulness 1	.785	.167	.170		.131	.108	
Perceived Usefulness 2	.765	.134	.134		.116	.192	
Management Support 4	.157	.836	.222	.121	.183		
Management Support 3	.177	.834	.167	.199	.160		
Management Support 5	.147	.792	.243	.171	.142		
Management Support 2	.215	.792	.140	.165		.128	
Management Support 1	.224	.654	.307	.230	.147	.167	
Supply Chain Commitment 1	.236	.182	.750		.122	-.164	
Supply Chain Commitment 2	.258	.159	.741	.217	.278		
Supply Chain Commitment 3	.205	.291	.739	.193	.128		-.135
Supply Chain Commitment 5	.185	.190	.711	.192	.200	.119	.101
Supply Chain Commitment 4	.185	.179	.675	.338	.123	.222	
Supply Chain Commitment 6	.171	.202	.665	.186	.105	.346	
Use Technical Support 5	.151	.120	.144	.783	.118	.135	
Use Technical Support 3	.128	.251	.119	.780			
Use Technical Support 2	.104	.197	.219	.771	.159	-.141	.145
Use Technical Support 4		.153	.185	.702	.163	.128	.122
Use Technical Support 1			.225	.696	.305	.200	
Collective Efficacy 8		.245	.194		.782		.132
Collective Efficacy 5		.115		.163	.773	.161	.138
Collective Efficacy 6	.182		.224	.161	.766	.225	
Collective Efficacy 7	.250	.295	.187	.155	.679	.195	
Collective Efficacy 4	.214		.150	.306	.649		.166
Percievd Privacy 4		.156			.174	.812	.207
Percievd Privacy 3	.113	.170			.203	.759	.214
Percievd Privacy 5	.172			.116	.173	.672	.307
Percieved Security 4						.165	.880
Percieved Security 5		-.143		.166	.192	.227	.784
Percieved Security 3		.126		.224		.248	.774

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 7 iterations.

Appendix D: Cronbach's Alpha Reliability

Supply Chain Information Performance

Reliability Statistics

Cronbach's Alpha	N of Items
.916	13

Item Statistics

	Mean	Std. Deviation	N
Supply Chain Information Performance 1	3.47	.738	151
Supply Chain Information Performance 2	3.50	.747	151
Supply Chain Information Performance 3	3.58	.752	151
Supply Chain Information Performance 4	3.60	.732	151
Supply Chain Information Performance 5	3.66	.692	151
Supply Chain Information Performance 6	3.63	.708	151
Supply Chain Information Performance 7	3.56	.736	151
Supply Chain Information Performance 8	3.55	.781	151
Supply Chain Information Performance 9	3.62	.814	151
Supply Chain Information Performance 12	3.64	.735	151
Supply Chain Information Performance 13	3.58	.724	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Supply Chain Information Performance 1	35.92	30.287	.673	.909
Supply Chain Information Performance 2	35.89	29.989	.702	.907
Supply Chain Information Performance 3	35.81	30.730	.600	.912
Supply Chain Information Performance 4	35.79	30.178	.694	.908
Supply Chain Information Performance 5	35.73	30.826	.649	.910
Supply Chain Information Performance 6	35.76	30.396	.691	.908
Supply Chain Information Performance 7	35.83	30.197	.687	.908
Supply Chain Information Performance 8	35.84	29.388	.744	.905
Supply Chain Information Performance 9	35.77	30.246	.601	.913
Supply Chain Information Performance 12	35.75	29.893	.729	.906
Supply Chain Information Performance 13	35.81	30.570	.649	.910

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
39.39	36.293	6.024	13

Information Quality Delivery

Reliability Statistics

Cronbach's Alpha	N of Items
.929	10

Item Statistics

	Mean	Std. Deviation	N
Quality Information Deliverd1	3.58	.697	151
Quality Information Deliverd 2	3.64	.657	151
Quality Information Deliverd 3	3.66	.720	151
Quality Information Deliverd 4	3.50	.774	151
Quality Information Deliverd 5	3.54	.719	151
Quality Information Deliverd 6	3.56	.745	151
Quality Information Deliverd 7	3.70	.681	151
Quality Information Deliverd 8	3.75	.653	151
Quality Information Deliverd 9	3.69	.741	151
Quality Information Deliverd 10	3.69	.785	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Quality Information Deliverd 1	32.74	26.433	.637	.926
Quality Information Deliverd 2	32.68	26.341	.699	.923
Quality Information Deliverd 3	32.66	25.707	.720	.922
Quality Information Deliverd 4	32.81	25.245	.726	.922
Quality Information Deliverd 5	32.78	25.745	.716	.922
Quality Information Deliverd 6	32.75	25.680	.696	.923
Quality Information Deliverd 7	32.62	25.825	.751	.920
Quality Information Deliverd 8	32.56	26.114	.741	.921
Quality Information Deliverd 9	32.63	25.288	.758	.920
Quality Information Deliverd 10	32.63	24.662	.796	.918

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
36.32	31.485	5.611	10

Reliability of Perceived Usefulness

Reliability Statistics

Cronbach's Alpha	N of Items
.933	6

Item Statistics

	Mean	Std. Deviation	N
Perceived Usefulness 2	4.06	.874	151
Perceived Usefulness 1	4.01	.920	151
Perceived Usefulness 4	4.00	.872	151
Perceived Usefulness 3	3.90	.922	151
Perceived Usefulness 5	4.02	.868	151
Perceived Usefulness 6	4.10	.839	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Perceived Usefulness 2	20.03	15.239	.735	.929
Perceived Usefulness 1	20.08	14.820	.755	.927
Perceived Usefulness 4	20.09	14.586	.851	.914
Perceived Usefulness 3	20.19	14.672	.777	.924
Perceived Usefulness 5	20.07	14.609	.852	.914
Perceived Usefulness 6	19.99	14.800	.854	.914

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
24.09	21.013	4.584	6

Reliability of Management Support

Reliability Statistics

Cronbach's Alpha	N of Items
.919	5

Item Statistics

	Mean	Std. Deviation	N
Managment Support 1	3.75	.824	151
Managment Support 2	3.76	.943	151
Managment Support 3	3.70	.887	151
Managment Support 4	3.70	.833	151
Managment Support 5	3.66	.895	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Managment Support 1	14.81	10.103	.715	.915
Managment Support 2	14.80	9.267	.761	.907
Managment Support 3	14.87	9.196	.845	.889
Managment Support 4	14.87	9.502	.844	.890
Managment Support 5	14.91	9.365	.797	.899

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
18.56	14.528	3.812	5

Reliability of Supply Chain Commitment

Reliability Statistics

Cronbach's Alpha	N of Items
.897	6

Item Statistics

	Mean	Std. Deviation	N
Supply Chain Commitment 1	3.85	.885	151
Supply Chain Commitment 2	3.70	.790	151
Supply Chain Commitment 3	3.82	.731	151
Supply Chain Commitment 4	3.78	.791	151
Supply Chain Commitment 5	3.74	.814	151
Supply Chain Commitment 6	3.66	.825	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Supply Chain Commitment 1	18.70	10.827	.664	.889
Supply Chain Commitment 2	18.84	10.775	.786	.869
Supply Chain Commitment 3	18.72	11.202	.764	.873
Supply Chain Commitment 4	18.76	11.036	.726	.878
Supply Chain Commitment 5	18.81	10.876	.733	.877
Supply Chain Commitment 6	18.89	11.101	.672	.886

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
22.54	15.476	3.934	6

Reliability of Technical Support

Reliability Statistics

Cronbach's Alpha	N of Items
.874	5

Item Statistics

	Mean	Std. Deviation	N
Use Technical Support 1	3.38	.814	151
Use Technical Support 2	3.39	.816	151
Use Technical Support 3	3.47	.798	151
Use Technical Support 4	3.39	.808	151
Use Technical Support 5	3.40	.810	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Use Technical Support 1	13.66	7.321	.658	.858
Use Technical Support 2	13.64	7.045	.733	.839
Use Technical Support 3	13.56	7.141	.728	.841
Use Technical Support 4	13.64	7.285	.676	.853
Use Technical Support 5	13.63	7.142	.714	.844

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
17.03	10.886	3.299	5

Reliability of Collective Efficacy

Reliability Statistics

Cronbach's Alpha	N of Items
.872	5

Item Statistics

	Mean	Std. Deviation	N
Collective Efficacy 4	3.26	.922	151
Collective Efficacy 5	3.23	.955	151
Collective Efficacy 6	3.42	.897	151
Collective Efficacy 7	3.45	.814	151
Collective Efficacy 8	3.54	.815	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Collective Efficacy 4	13.64	8.606	.633	.862
Collective Efficacy 5	13.67	8.223	.683	.850
Collective Efficacy 6	13.48	8.278	.735	.836
Collective Efficacy 7	13.45	8.743	.721	.841
Collective Efficacy 8	13.36	8.673	.738	.837

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.90	12.877	3.588	5

Reliability of Perceived Privacy

Reliability Statistics

Cronbach's Alpha	N of Items
.802	3

Item Statistics

	Mean	Std. Deviation	N
Percievd Privacy 3	3.05	.878	151
Percievd Privacy 4	3.07	.857	151
Percievd Privacy 5	3.01	.898	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Percievd Privacy 3	6.08	2.407	.658	.719
Percievd Privacy 4	6.06	2.390	.696	.680
Percievd Privacy 5	6.13	2.484	.593	.788

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
9.13	4.969	2.229	3

Reliability of Perceived Security

Re'iability Statistics

Cronbach's Alpha	N of Items
.830	3

Item Statistics

	Mean	Std. Deviation	N
Percieved Security 3	3.11	.829	151
Percieved Security 4	3.01	.913	151
Percieved Security 5	2.87	.978	151

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Percieved Security 3	5.87	2.937	.676	.782
Percieved Security 4	5.98	2.566	.734	.720
Percieved Security 5	6.12	2.519	.668	.793

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
8.99	5.546	2.355	3

APPENDIX E: PERSON CORRELATION

Correlations

		Usefulness	Management Support	Supply Chain Commitment	technical Support	Collective Efficacy	Perceived Privacy	Perceived Security	Information Quality Delivery	Supply Chain Information Performance
Mean Usefulness	Pearson Correlation	1	.447(**)	.504(**)	.338(**)	.403(**)	.281(**)	.084	.359(**)	.435(**)
	Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.304	.000	.000
	N	151	151	151	151	151	151	151	151	151
Management Support	Pearson Correlation	.447(**)	1	.567(**)	.467(**)	.448(**)	.330(**)	.142	.498(**)	.574(**)
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.082	.000	.000
	N	151	151	151	151	151	151	151	151	151
Supply Chain Commitment	Pearson Correlation	.504(**)	.567(**)	1	.520(**)	.507(**)	.288(**)	.123	.473(**)	.562(**)
	Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.133	.000	.000
	N	151	151	151	151	151	151	151	151	151
technical Support	Pearson Correlation	.338(**)	.467(**)	.520(**)	1	.473(**)	.333(**)	.300(**)	.480(**)	.510(**)
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	151	151	151	151	151	151	151	151	151
Collective Efficacy	Pearson Correlation	.403(**)	.448(**)	.507(**)	.473(**)	1	.492(**)	.342(**)	.464(**)	.478(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000	.000
	N	151	151	151	151	151	151	151	151	151
Perceived Privacy	Pearson Correlation	.281(**)	.330(**)	.288(**)	.333(**)	.492(**)	1	.508(**)	.270(**)	.439(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.001	.000
	N	151	151	151	151	151	151	151	151	151
Perceived Security	Pearson Correlation	.084	.142	.123	.300(**)	.342(**)	.508(**)	1	.270(**)	.267(**)
	Sig. (2-tailed)	.304	.082	.133	.000	.000	.000	.	.001	.001

	N	151	151	151	151	151	151	151	151	151
Information Quality Delivery	Pearson Correlation	.359(**)	.498(**)	.473(**)	.480(**)	.464(**)	.270(**)	.270(**)	1	.658(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.001	.001	.	.000
	N	151	151	151	151	151	151	151	151	151
Supply Chain Information Performance	Pearson Correlation	.435(**)	.574(**)	.562(**)	.510(**)	.478(**)	.439(**)	.267(**)	.658(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.001	.000	.
	N	151	151	151	151	151	151	151	151	151

** Correlation is significant at the 0.01 level (2-tailed).

APPENDIX F: ANOVA

Information Quality delivery by company established, Employee Number, Company Turn over, Geographic scope, Customers Number and Suppliers of Number

Length of company

Descriptives

Mean Information Quality Delivery

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
less than 5 years	37	3.6495	.55370	.09103	3.4649	3.8342	2.80	5.00
Between 5 -15 years	57	3.6719	.53176	.07043	3.5308	3.8130	2.60	4.60
betweeb 16-25 years	35	3.6000	.61787	.10444	3.3878	3.8122	2.10	4.80
More than 26 years	22	3.5955	.60669	.12935	3.3265	3.8644	2.00	4.50
Total	151	3.6386	.56417	.04591	3.5479	3.7293	2.00	5.00

ANOVA

Mean Information Quality Delivery

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.161	3	.054	.166	.919
Within Groups	47.582	147	.324		
Total	47.742	150			

Multiple Comparisons

Dependent Variable: Mean Information Quality Delivery
Tukey HSD

(I) Company establishment	(J) Company establishment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
less than 5 years	Between 5 -15 years	-.02238	.12011	.998	-.3345	.2898
	betweeb 16-25 years	.04955	.13415	.983	-.2991	.3982
	More than 26 years	.05410	.15317	.985	-.3439	.4521
Between 5 -15 years	less than 5 years	.02238	.12011	.998	-.2898	.3345
	betweeb 16-25 years	.07193	.12218	.935	-.2456	.3894
	More than 26 years	.07648	.14280	.950	-.2946	.4476
betweeb 16-25 years	less than 5 years	-.04955	.13415	.983	-.3982	.2991
	Between 5 -15 years	-.07193	.12218	.935	-.3894	.2456
	More than 26 years	.00455	.15479	1.000	-.3977	.4068
More than 26 years	less than 5 years	-.05410	.15317	.985	-.4521	.3439
	Between 5 -15 years	-.07648	.14280	.950	-.4476	.2946
	betweeb 16-25 years	-.00455	.15479	1.000	-.4068	.3977

Employee Number

Descriptives

Mean Information Quality Delivery

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
less than 5 employees	20	3.7967	.60281	.13479	3.5145	4.0788	2.80	5.00
Between 5 -50 employees	79	3.5658	.57443	.06463	3.4372	3.6945	2.00	4.80
betweeb 51-150 employees	15	3.5400	.59618	.15393	3.2098	3.8702	2.60	4.40
More than 150 employees	37	3.7486	.48912	.08041	3.5856	3.9117	2.90	4.60
Total	151	3.6386	.56417	.04591	3.5479	3.7293	2.00	5.00

ANOVA

Mean Information Quality Delivery

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.512	3	.504	1.603	.191
Within Groups	46.230	147	.314		
Total	47.742	150			

Multiple Comparisons

Dependent Variable: Mean Information Quality Delivery
Tukey HSD

(I) Emloyee Number	(J) Emloyee Number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 5 employees	Between 5 -50 employees	.23084	.14038	.357	-.1339	.5956
	betweeb 51-150 employees	.25667	.19155	.539	-.2411	.7544
	More than 150 employees	.04802	.15564	.990	-.3564	.4525
Between 5 -50 employees	less than 5 employees	-.23084	.14038	.357	-.5956	.1339
	betweeb 51-150 employees	.02582	.15795	.998	-.3846	.4363
	More than 150 employees	-.18283	.11172	.361	-.4731	.1075
betweeb 51-150 employees	less than 5 employees	-.25667	.19155	.539	-.7544	.2411
	Between 5 -50 employees	-.02582	.15795	.998	-.4363	.3846
	More than 150 employees	-.20865	.17166	.618	-.6547	.2374
More than 150 employees	less than 5 employees	-.04802	.15564	.990	-.4525	.3564
	Between 5 -50 employees	.18283	.11172	.361	-.1075	.4731
	betweeb 51-150 employees	.20865	.17166	.618	-.2374	.6547

Company Turn over

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
less than RM 200,0000	28	3.5786	.64023	.12099	3.3303	3.8268	2.00	5.00
Between 200,000 RM and less than RM 10 million	80	3.6392	.56496	.06316	3.5134	3.7649	2.10	4.80
betweeb RM 10 million and less than RM 25 million-	17	3.6118	.63628	.15432	3.2846	3.9389	2.90	4.60
More than RM 25 million	26	3.7192	.43361	.08504	3.5441	3.8944	3.00	4.40
Total	151	3.6386	.56417	.04591	3.5479	3.7293	2.00	5.00

Mean Information Quality Delivery

ANOVA

Mean Information Quality Delivery

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.282	3	.094	.291	.832
Within Groups	47.460	147	.323		
Total	47.742	150			

Multiple Comparisons

Dependent Variable: Mean Information Quality Delivery
Tukey HSD

(I) Company Turn over	(J) Company Turn over	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than RM 200,0000	Between 200,000 RM and less than RM 10 million	-.06060	.12477	.962	-.3848	.2636
	betweeb RM 10 million and less than RM 25 million-	-.03319	.17471	.998	-.4872	.4208
	More than RM 25 million	-.14066	.15475	.800	-.5428	.2615
Between 200,000 RM and less than RM 10 million	less than RM 200,0000	.06060	.12477	.962	-.2636	.3848
	betweeb RM 10 million and less than RM 25 million-	.02740	.15175	.998	-.3669	.4217
	More than RM 25 million	-.08006	.12827	.924	-.4134	.2533
betweeb RM 10 million and less than RM 25 million-	less than RM 200,0000	.03319	.17471	.998	-.4208	.4872
	Between 200,000 RM and less than RM 10 million	-.02740	.15175	.998	-.4217	.3669
	More than RM 25 million	-.10747	.17723	.930	-.5680	.3531
More than RM 25 million	less than RM 200,0000	.14066	.15475	.800	-.2615	.5428
	Between 200,000 RM and less than RM 10 million	.08006	.12827	.924	-.2533	.4134
	betweeb RM 10 million and less than RM 25 million-	.10747	.17723	.930	-.3531	.5680

Geographic scope

Descriptives

Mean Information Quality Delivery

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Local (eg. Johor, Kl, Kedah etc)	87	3.6506	.59119	.06338	3.5246	3.7766	2.10	5.00
Regional (e.g; Asean)	31	3.6226	.47167	.08471	3.4496	3.7956	2.60	4.50
Worlf Wide (e.g: China, UK, Astralian)	33	3.6222	.58581	.10198	3.4145	3.8299	2.00	4.70
Total	151	3.6386	.56417	.04591	3.5479	3.7293	2.00	5.00

ANOVA

Mean Information Quality Delivery

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.029	2	.015	.045	.956
Within Groups	47.713	148	.322		
Total	47.742	150			

Multiple Comparisons

Dependent Variable: Mean Information Quality Delivery
Tukey HSD

(I) Geographic Scope	(J) Geographic Scope	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Local (eg. Johor, Kl, Kedah etc)	Regional (e.g; Asean)	.02799	.11877	.970	-.2532	.3092
	Worlf Wide (e.g: China, UK, Astralian)	.02835	.11608	.968	-.2465	.3032
Regional (e.g; Asean)	Local (eg. Johor, Kl, Kedah etc)	-.02799	.11877	.970	-.3092	.2532
	Worlf Wide (e.g: China, UK, Astralian)	.00036	.14202	1.000	-.3359	.3366
Worlf Wide (e.g: China, UK, Astralian)	Local (eg. Johor, Kl, Kedah etc)	-.02835	.11608	.968	-.3032	.2465
	Regional (e.g; Asean)	-.00036	.14202	1.000	-.3366	.3359

Customers Number

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
More than 50	32	3.5969	.65574	.11592	3.3605	3.8333	2.00	4.80
51-100	32	3.5292	.67291	.11896	3.2866	3.7718	2.10	5.00
101-150	13	3.4615	.41541	.11521	3.2105	3.7126	2.80	4.00
more than 150	74	3.7351	.47928	.05571	3.6241	3.8462	2.60	4.70
Total	151	3.6386	.56417	.04591	3.5479	3.7293	2.00	5.00

Mean Information Quality Delivery

ANOVA

Mean Information Quality Delivery

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.536	3	.512	1.629	.185
Within Groups	46.206	147	.314		
Total	47.742	150			

Multiple Comparisons

Dependent Variable: Mean Information Quality Delivery
Tukey HSD

(I) Customer Number	(J) Customer Number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
More than 50	51-100	.06771	.14016	.963	-.2965	.4319
	101-150	.13534	.18440	.883	-.3438	.6145
	more than 150	-.13826	.11862	.649	-.4465	.1700
51-100	More than 50	-.06771	.14016	.963	-.4319	.2965
	101-150	.06763	.18440	.983	-.4116	.5468
	more than 150	-.20597	.11862	.309	-.5142	.1023
101-150	More than 50	-.13534	.18440	.883	-.6145	.3438
	51-100	-.06763	.18440	.983	-.5468	.4116
	more than 150	-.27360	.16860	.369	-.7117	.1645
more than 150	More than 50	.13826	.11862	.649	-.1700	.4465
	51-100	.20597	.11862	.309	-.1023	.5142
	101-150	.27360	.16860	.369	-.1645	.7117

Suppliers of Number

Descriptives

Mean Information Quality Delivery

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
More than 50	79	3.5840	.61266	.06893	3.4467	3.7212	2.00	5.00
51-100	33	3.6515	.49188	.08563	3.4771	3.8259	2.90	4.40
101-150	7	3.6714	.53452	.20203	3.1771	4.1658	3.10	4.60
more than 150	32	3.7531	.51867	.09169	3.5661	3.9401	2.90	4.70
Total	151	3.6386	.56417	.04591	3.5479	3.7293	2.00	5.00

ANOVA

Mean Information Quality Delivery

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.669	3	.223	.696	.556
Within Groups	47.074	147	.320		
Total	47.742	150			

Multiple Comparisons

Dependent Variable: Mean Information Quality Delivery
Tukey HSD

(I) Supplier Number	(J) Supplier Number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
More than 50	51-100	-.06755	.11729	.939	-.3724	.2373
	101-150	-.08746	.22316	.979	-.6674	.4925
	more than 150	-.16916	.11858	.485	-.4773	.1390
51-100	More than 50	.06755	.11729	.939	-.2373	.3724
	101-150	-.01991	.23548	1.000	-.6318	.5920
	more than 150	-.10161	.14040	.887	-.4665	.2632
101-150	More than 50	.08746	.22316	.979	-.4925	.6674
	51-100	.01991	.23548	1.000	-.5920	.6318
	more than 150	-.08170	.23612	.986	-.6953	.5319
more than 150	More than 50	.16916	.11858	.485	-.1390	.4773
	51-100	.10161	.14040	.887	-.2632	.4665
	101-150	.08170	.23612	.986	-.5319	.6953

APPENDIX G: REGRESSION ANALYSES.

Regression Analysis Information Quality delivery with Supply Chain Information Performance

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Mean Information Quality Delivery(a)	.	Enter

a All requested variables entered.
b Dependent Variable: Mean Supply Chain Information Performance

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.658(a)	.433	.430	.41894

a Predictors: (Constant), Mean Information Quality Delivery
b Dependent Variable: Mean Supply Chain Information Performance

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.011	1	20.011	114.013	.000(a)
	Residual	26.151	149	.176		
	Total	46.162	150			

a Predictors: (Constant), Mean Information Quality Delivery
b Dependent Variable: Mean Supply Chain Information Performance

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.224	.223		5.481	.000		
	Mean Information Quality Delivery	.648	.061	.658	10.678	.000	1.000	1.000

a Dependent Variable: Mean Supply Chain Information Performance

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5211	4.4666	3.5807	.36525	151
Std. Predicted Value	-2.901	2.425	.000	1.000	151
Standard Error of Predicted Value	.034	.105	.046	.013	151
Adjusted Predicted Value	2.5560	4.4410	3.5802	.36511	151
Residual	-1.02024	1.83040	.00000	.41754	151
Std. Residual	-2.435	4.369	.000	.997	151
Stud. Residual	-2.443	4.402	.001	1.004	151
Deleted Residual	-1.02706	1.85840	.00056	.42338	151
Stud. Deleted Residual	-2.485	4.704	.003	1.017	151
Mahal. Distance	.004	8.417	.993	1.342	151
Cook's Distance	.000	.148	.007	.015	151
Centered Leverage Value	.000	.056	.007	.009	151

a Dependent Variable: Mean Supply Chain Information Performance

Regression Analysis Information Quality delivery and Antecedent Factors

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Mean Percied Security, Mean Usefulness , Mean technical Support, Mean Mnagement Support, Mean Collective Efficacy, Mean Percived Privacy, Mean Supply Chain Commitement(a)	.	Enter

a All requested variables entered.
b Dependent Variable: Mean Information Quality Delivery

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.638(a)	.407	.378	.43285

a Predictors: (Constant), Mean Percied Security, Mean Usefulness , Mean technical Support, Mean Mnagement Support, Mean Collective Efficacy, Mean Percived Privacy, Mean Supply Chain Commitement
b Dependent Variable: Mean Information Quality Delivery

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.291	7	2.613	13.947	.000(a)
	Residual	26.605	142	.187		
	Total	44.896	149			

a Predictors: (Constant), Mean Percied Security, Mean Usefulness , Mean technical Support, Mean Mnagement Support, Mean Collective Efficacy, Mean Percived Privacy, Mean Supply Chain Commitement
b Dependent Variable: Mean Information Quality Delivery

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.172	.265		4.415	.000		
	Mean Usefulness	.019	.056	.026	.330	.742	.677	1.478
	Mean Mnagement Support	.145	.061	.199	2.355	.020	.585	1.709
	Mean Supply Chain Commitement	.183	.082	.215	2.229	.027	.448	2.233
	Mean technical Support	.084	.071	.099	1.181	.240	.593	1.686
	Mean Collective Efficacy	.172	.069	.209	2.493	.014	.595	1.681
	Mean Percived Privacy	-.042	.062	-.055	-.677	.499	.624	1.602
	Mean Percied Security	.141	.057	.188	2.462	.015	.712	1.405

a Dependent Variable: Mean Information Quality Delivery

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.6274	4.6782	3.6449	.35037	150
Std. Predicted Value	-2.904	2.949	.000	1.000	150
Standard Error of Predicted Value	.039	.185	.095	.030	150
Adjusted Predicted Value	2.5734	4.6469	3.6445	.35337	150
Residual	-1.19692	1.01235	.00000	.42256	150
Std. Residual	-2.765	2.339	.000	.976	150
Stud. Residual	-2.814	2.364	.000	1.007	150
Deleted Residual	-1.23962	1.03407	.00034	.44961	150
Stud. Deleted Residual	-2.886	2.403	.000	1.013	150
Mahal. Distance	.240	26.096	6.953	5.097	150
Cook's Distance	.000	.130	.008	.017	150
Centered Leverage Value	.002	.175	.047	.034	150

a Dependent Variable: Mean Information Quality Delivery

Hierarchical Multiple Regression Analysis for Mediating Effect of Information Quality Delivery

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Mean Perceived Security, Mean Management Support, Mean Collective Efficacy, Mean Supply Chain Commitment(a)	.	Enter
2	Mean Information Quality Delivery(a)	.	Enter

a All requested variables entered.
b Dependent Variable: Mean Supply Chain Information Performance

Correlations

		Supply Chain Information Performance	Management Support	Mean Supply Chain Commitment	Mean Collective Efficacy	Perceived Security	Mean Information Quality Delivery
Pearson Correlation	Supply Chain Information Performance	1.000	.574	.562	.457	.261	.658
	Management Support	.574	1.000	.567	.417	.104	.498
	Supply Chain Commitment	.562	.567	1.000	.526	.156	.473
	Collective Efficacy	.457	.417	.526	1.000	.281	.473
	Perceived Security	.261	.104	.156	.281	1.000	.274
	Information Quality Delivery	.658	.498	.473	.473	.274	1.000
Sig. (1-tailed)	Supply Chain Information Performance	.	.000	.000	.000	.001	.000
	Management Support	.000	.	.000	.000	.102	.000

	Supply Chain Commitment	.000	.000	.	.000	.028	.000
	Collective Efficacy	.000	.000	.000	.	.000	.000
	Perceived Security	.001	.102	.028	.000	.	.000
	Mean Information Quality Delivery	.000	.000	.000	.000	.000	.
N	Supply Chain Information Performance	151	151	151	151	151	151
	Management Support	151	151	151	151	151	151
	Supply Chain Commitment	151	151	151	151	151	151
	Collective Efficacy	151	151	151	151	151	151
	Perceived Security	151	151	151	151	151	151
	Mean Information Quality Delivery	151	151	151	151	151	151

Model Summary(c)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.672(a)	.451	.436	.41658	.451	30.000	4	146	.000
2	.744(b)	.554	.539	.37670	.103	33.548	1	145	.000

a Predictors: (Constant), Perceived Security, Mean Management Support, Mean Collective Efficacy, Mean Supply Chain Commitment

b Predictors: (Constant), Mean Perceived Security, Mean Management Support, Mean Collective Efficacy, Mean Supply Chain Commitment, Mean Information Quality Delivery

c Dependent Variable: Mean Supply Chain Information Performance

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.825	4	5.206	30.000	.000(a)
	Residual	25.337	146	.174		
	Total	46.162	150			
2	Regression	25.586	5	5.117	36.060	.000(b)
	Residual	20.576	145	.142		
	Total	46.162	150			

a Predictors: (Constant), Mean Perceived Security, Mean Management Support, Mean Collective Efficacy, Mean Supply Chain Commitment
b Predictors: (Constant), Mean Perceived Security, Mean Management Support, Mean Collective Efficacy, Mean Supply Chain Commitment, Mean Information Quality Delivery
c Dependent Variable: Mean Supply Chain Information Performance

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.058	.243		4.362	.000		
	Management Support	.256	.055	.352	4.662	.000	.659	1.518
	Supply Chain Commitment	.233	.069	.273	3.380	.001	.576	1.735
	Collective Efficacy	.105	.063	.125	1.664	.098	.663	1.509
	Mean Perceived Security	.111	.048	.146	2.289	.024	.920	1.087
2	(Constant)	.545	.237		2.305	.023		
	Management Support	.169	.052	.231	3.241	.001	.603	1.660
	Supply Chain Commitment	.177	.063	.206	2.793	.006	.562	1.778
	Collective Efficacy	.031	.058	.037	.525	.601	.631	1.585
	Perceived Security	.063	.045	.083	1.415	.159	.889	1.125
	Information Quality Delivery	.399	.069	.405	5.792	.000	.628	1.593

a Dependent Variable: Mean Supply Chain Information Performance

Excluded Variables(b)

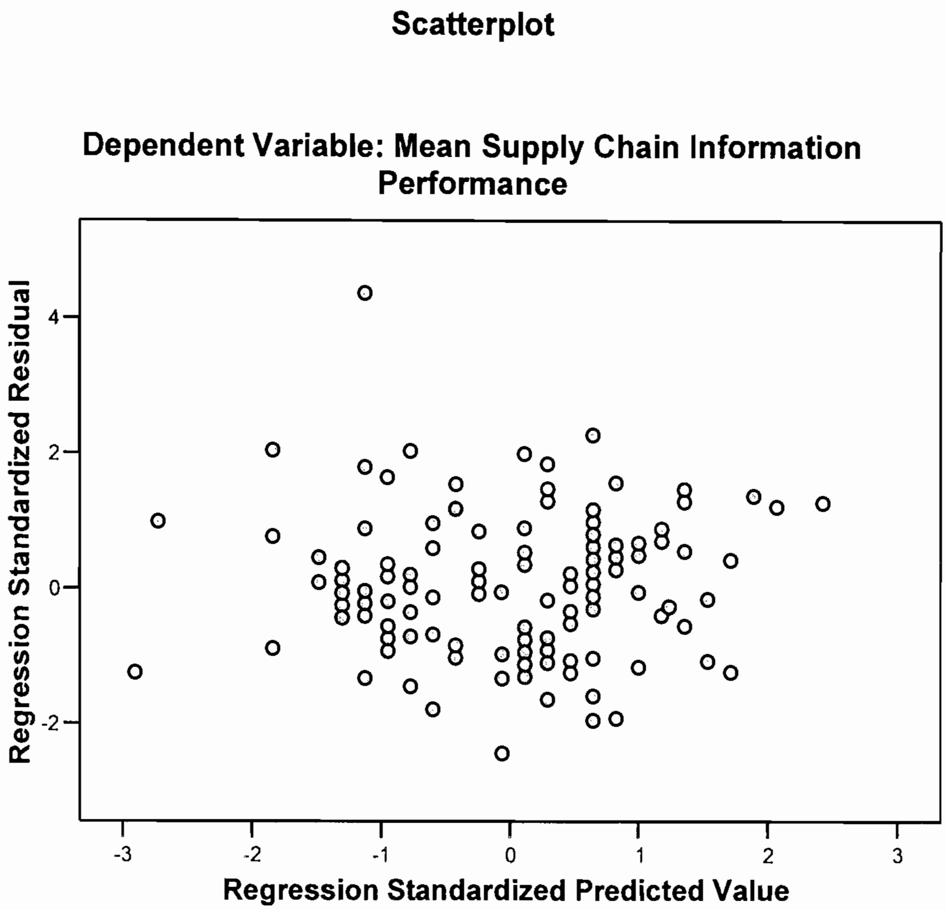
Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	Mean Information Quality Delivery	.405(a)	5.792	.000	.433	.628	1.593	.562

a Predictors in the Model: (Constant), Mean Perceived Security, Mean Management Support, Mean Collective Efficacy, Mean Supply Chain Commitment

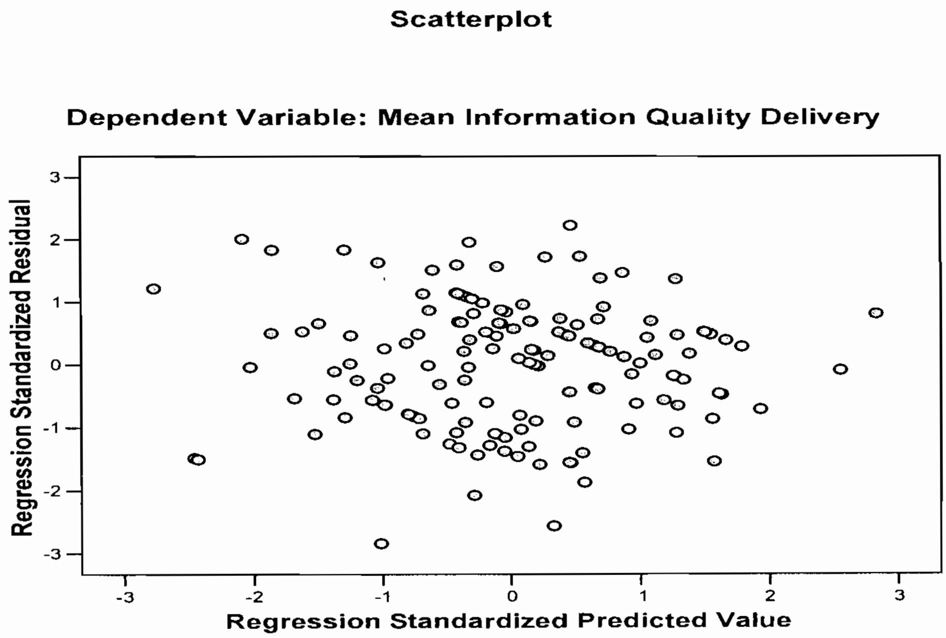
b Dependent Variable: Mean Supply Chain Information Performance

APPENDIX H: SCATTER PLOT

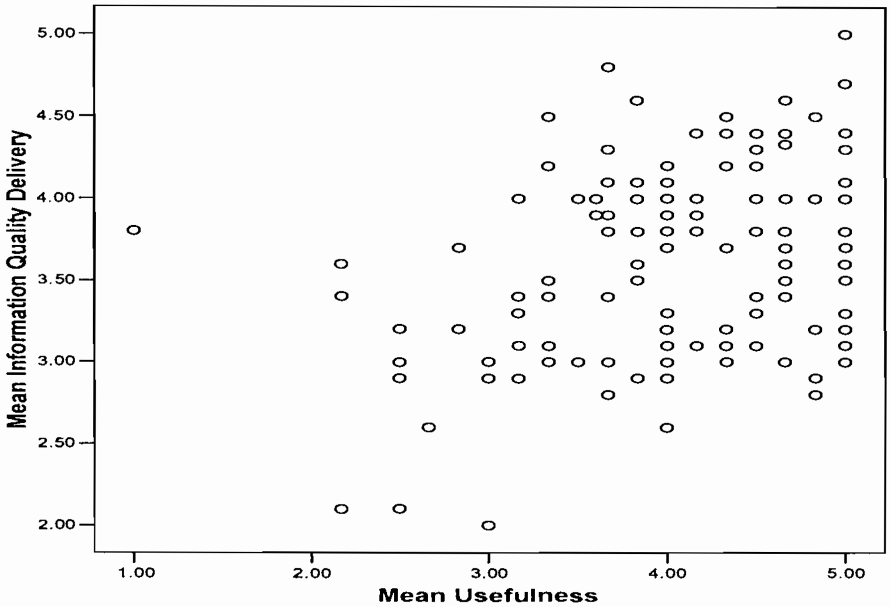
Regression between IQD and SCIP



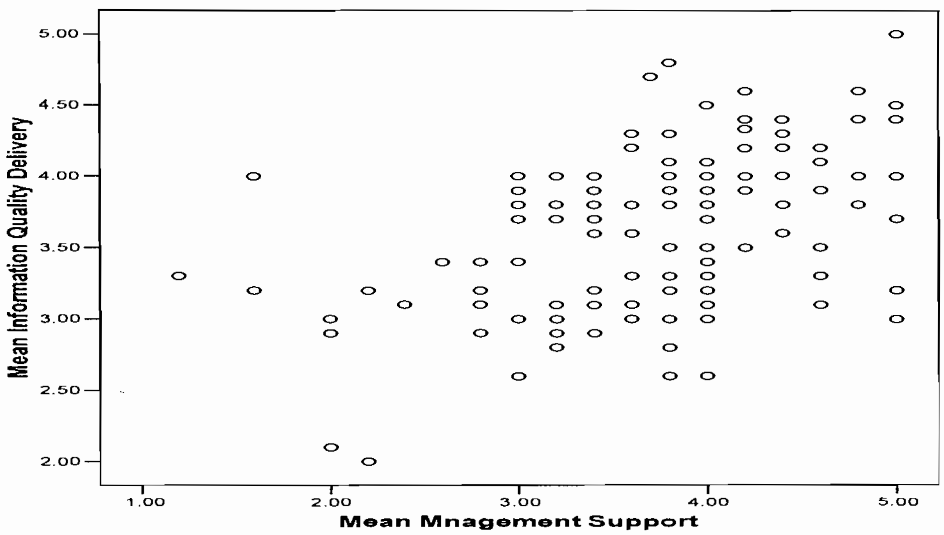
Regression between Antecedent factors and Quality Information Delivery.



Partial Regression Plot



Partial Regression Plot



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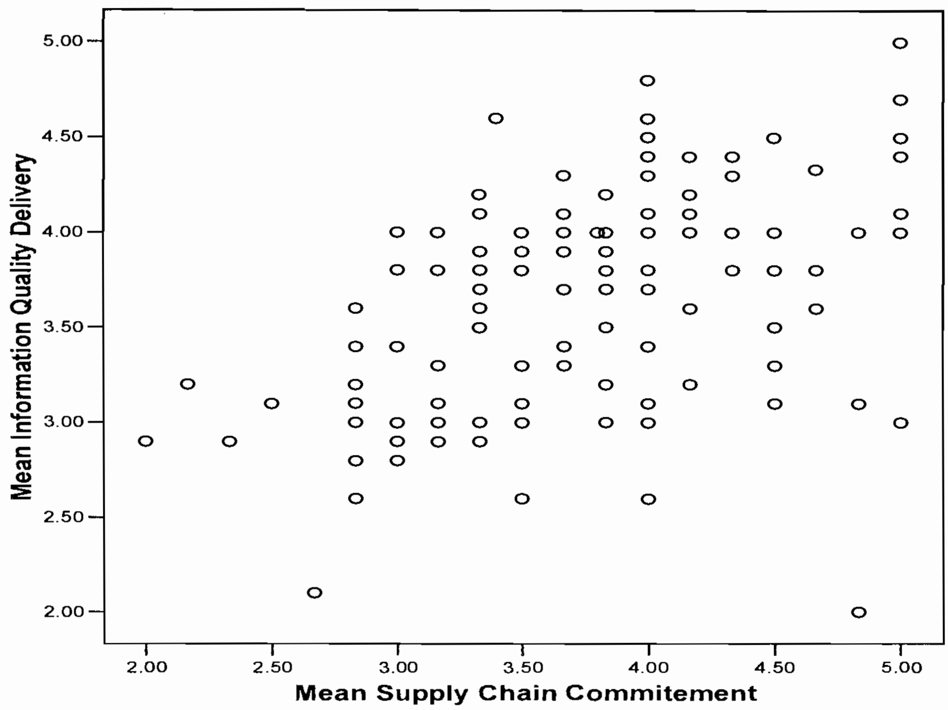
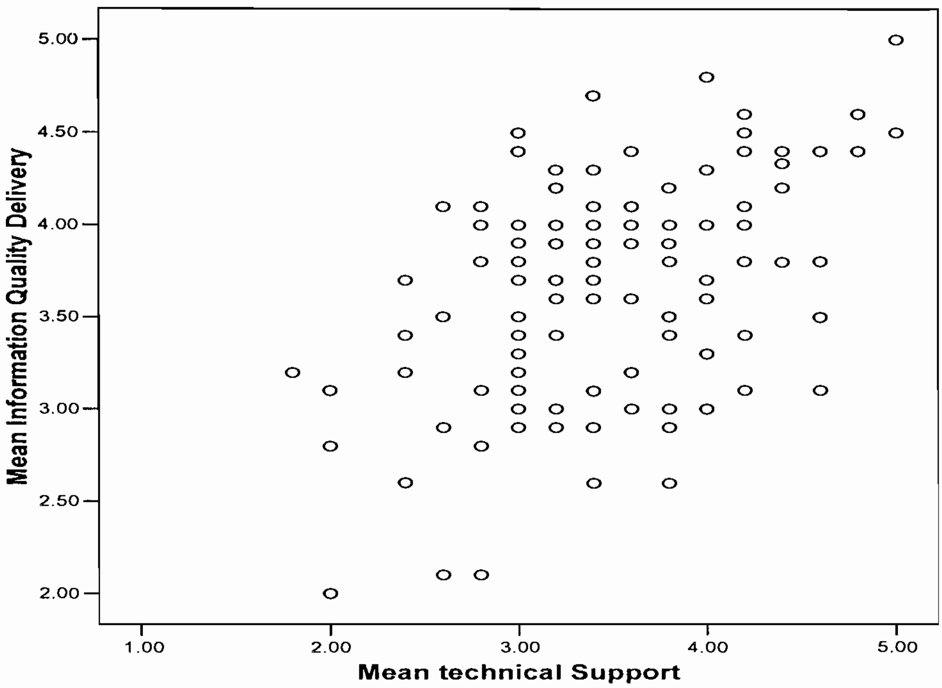
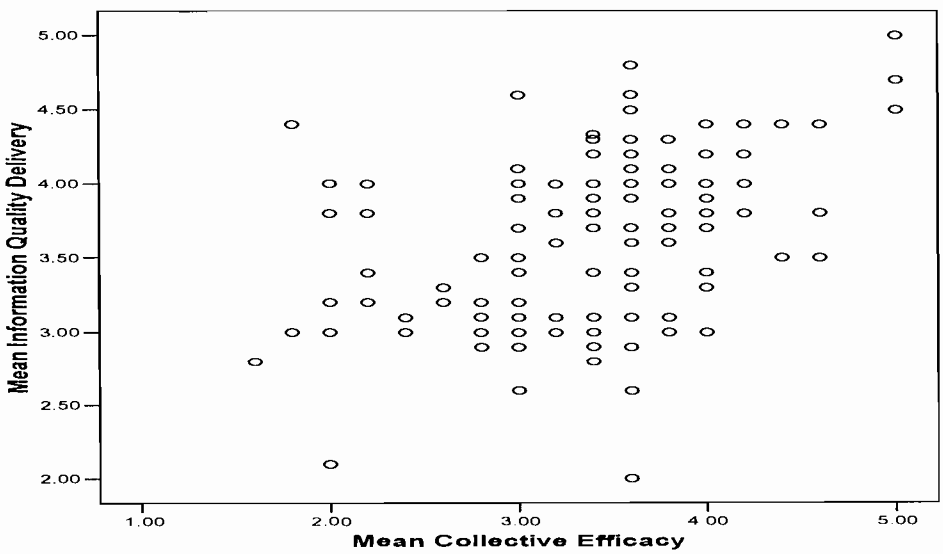


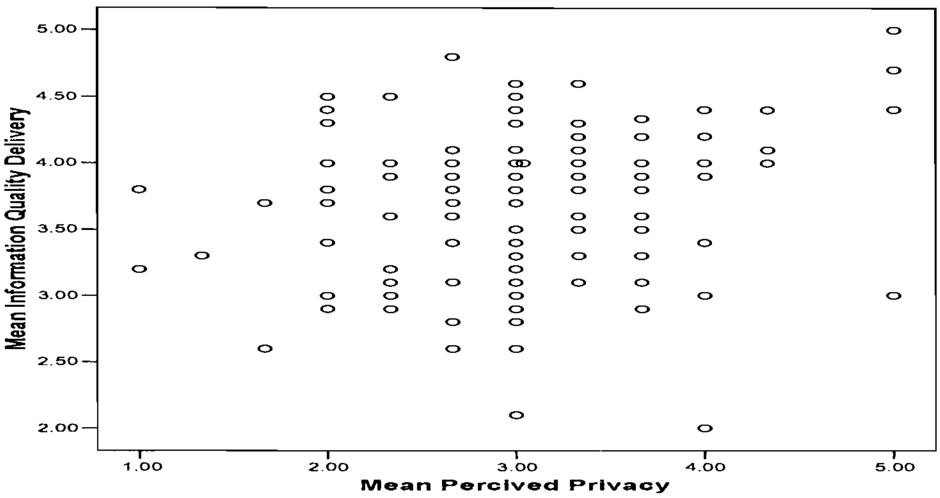
Partial Regression Plot



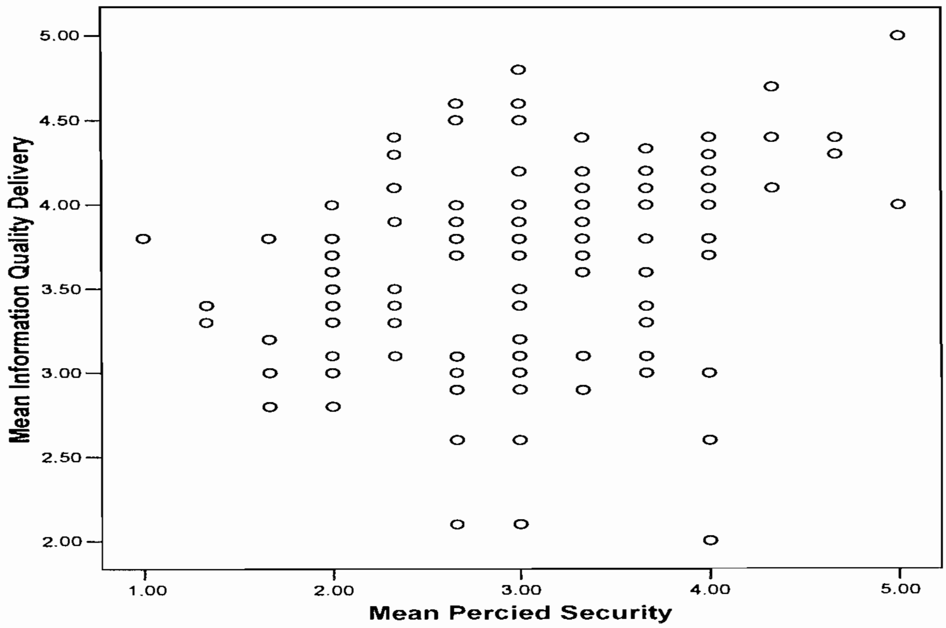
Partial Regression Plot



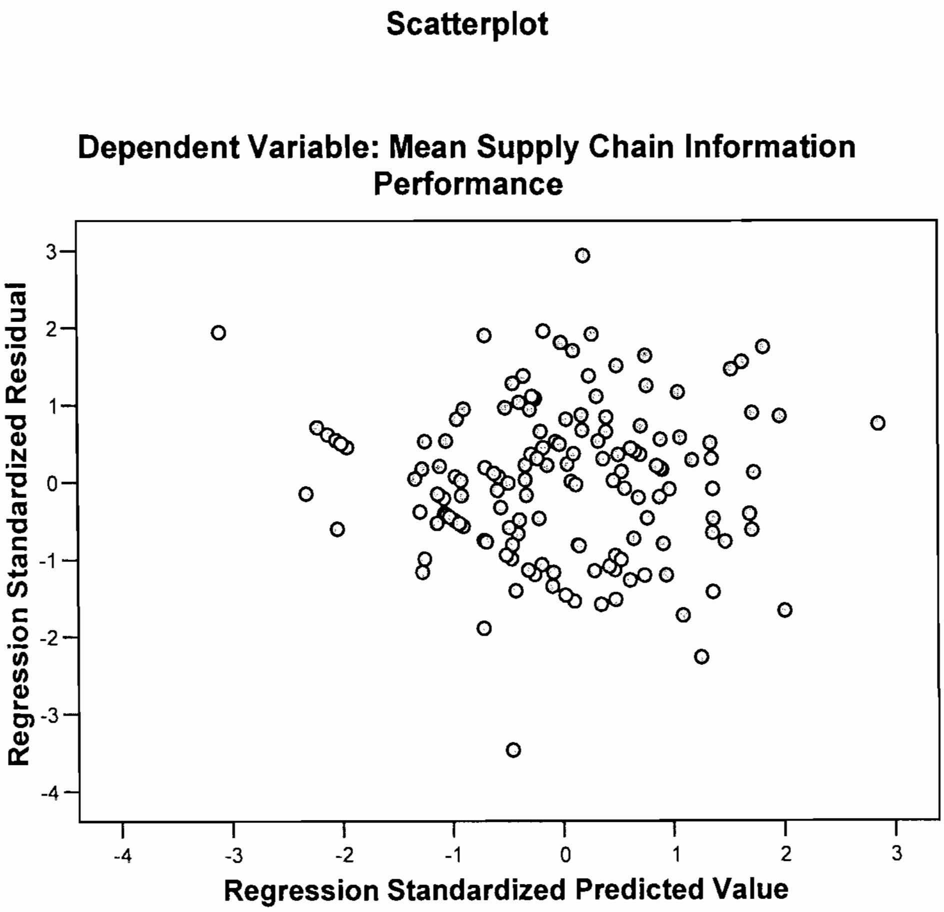
Partial Regression Plot



Partial Regression Plot

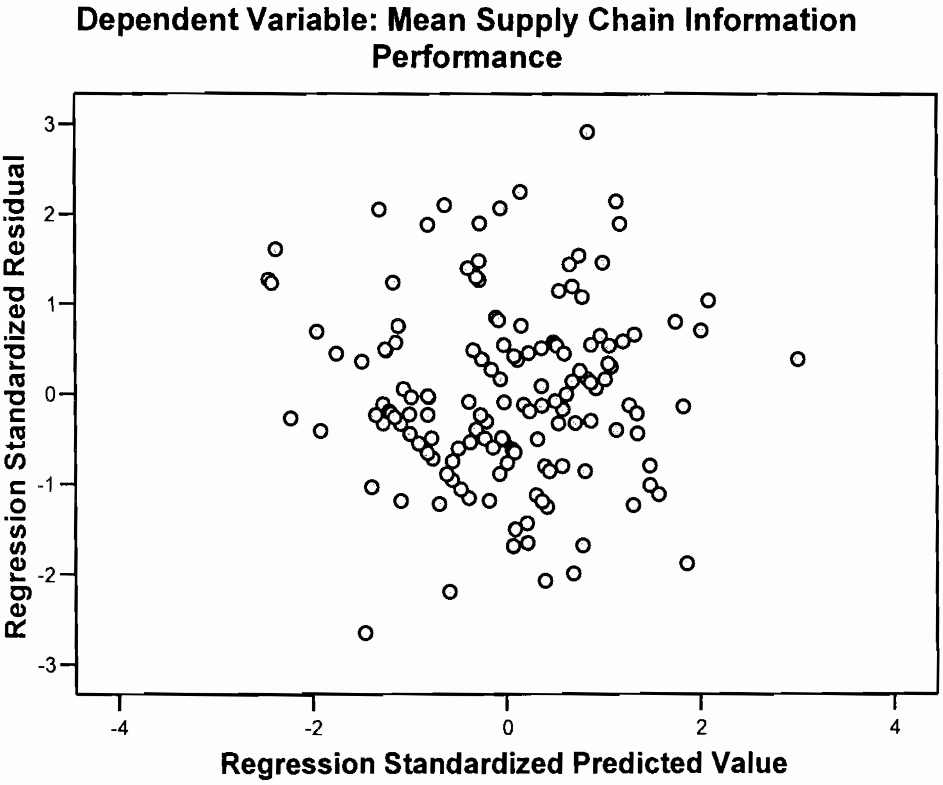


Regression Analysis independent variable on the supply chain information



Hierchical Regression analysis on mediating effect of quality information delivery

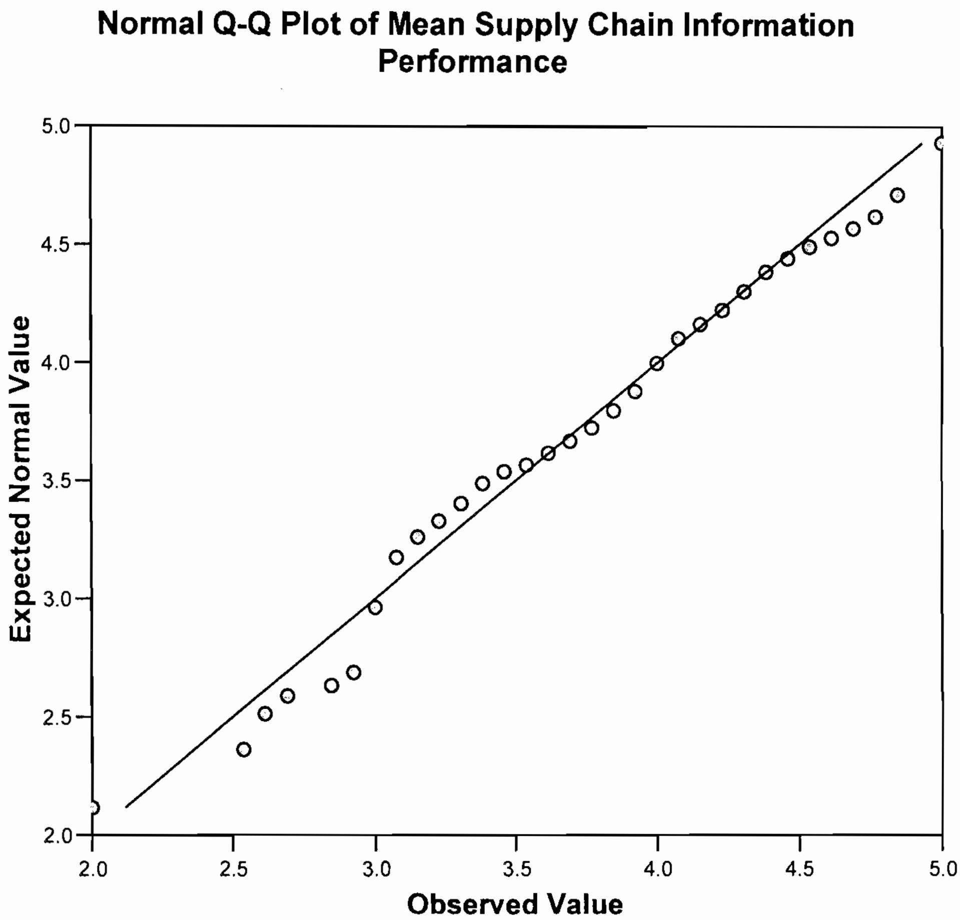
Scatterplot



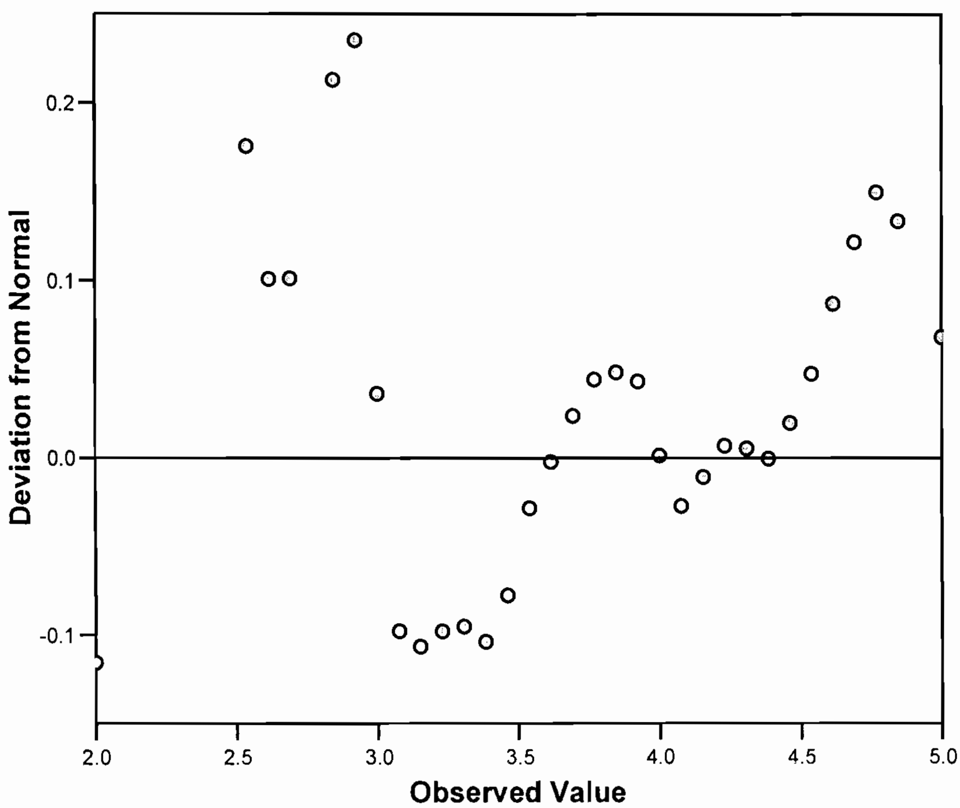
Appendix I:
Normal Q-Q plot
Normal P-P plot

NORMAL PROBABILITY PLOTS

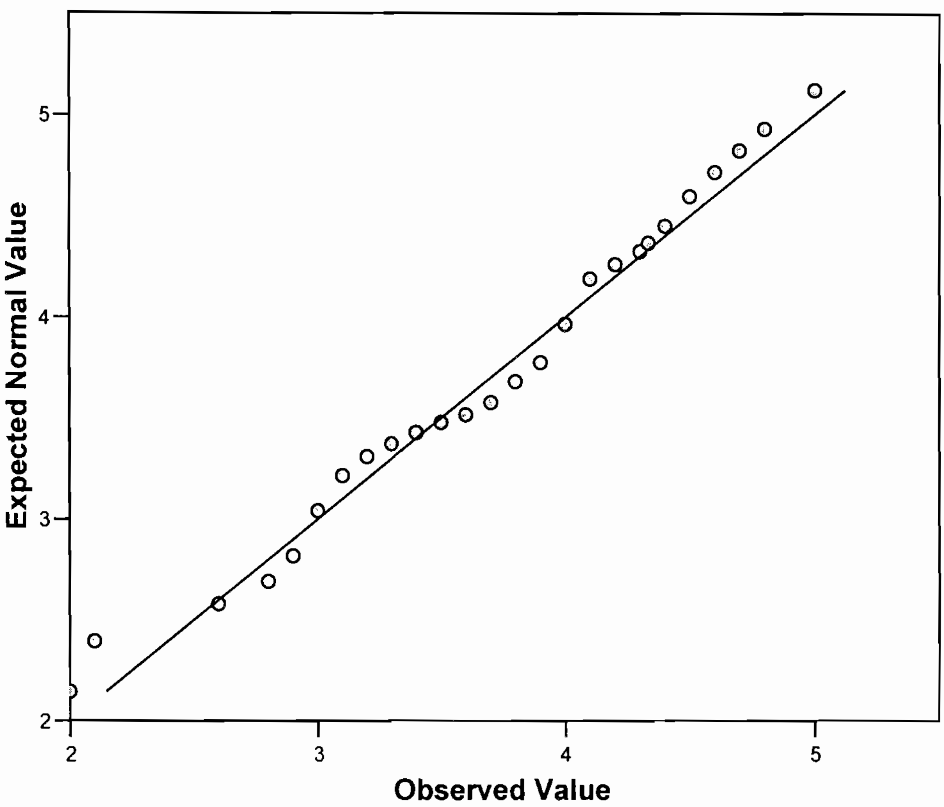
Normal Q-Q plot



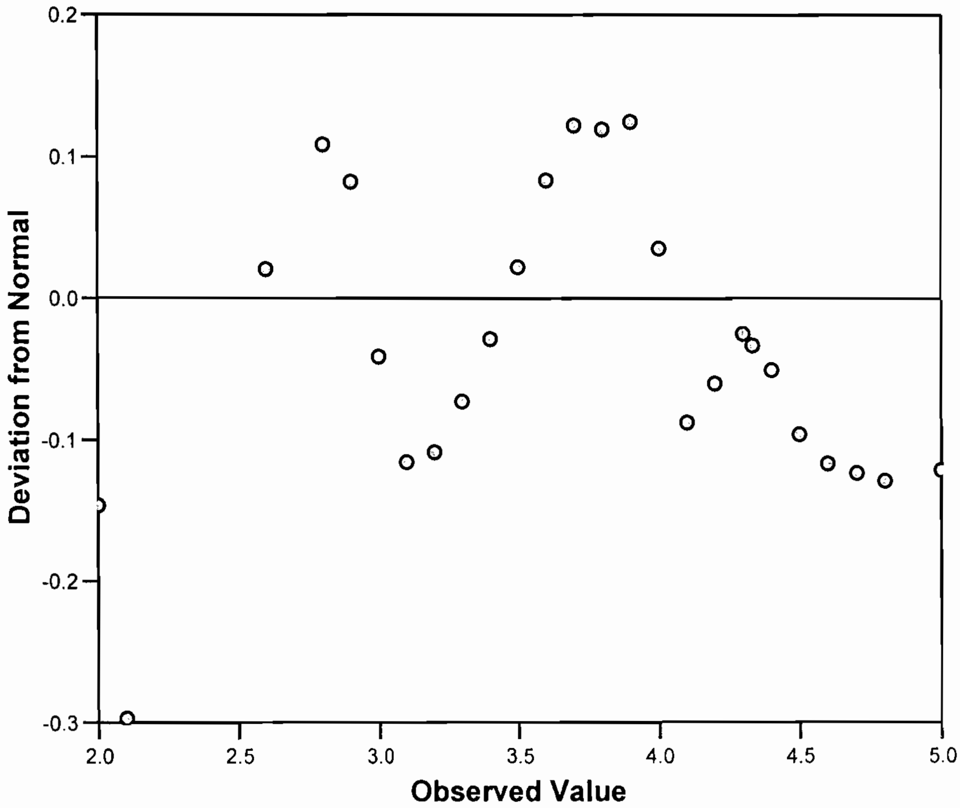
Detrended Normal Q-Q Plot of Mean Supply Chain Information Performance



Normal Q-Q Plot of Mean Information Quality Delivery

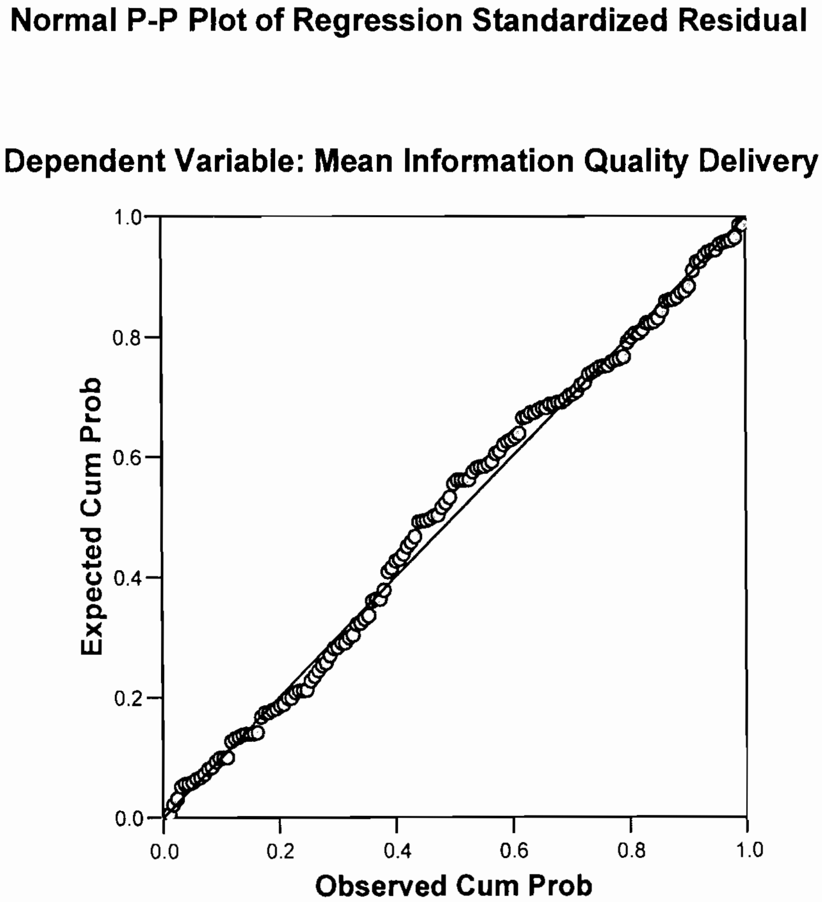


Detrended Normal Q-Q Plot of Mean Information Quality Delivery

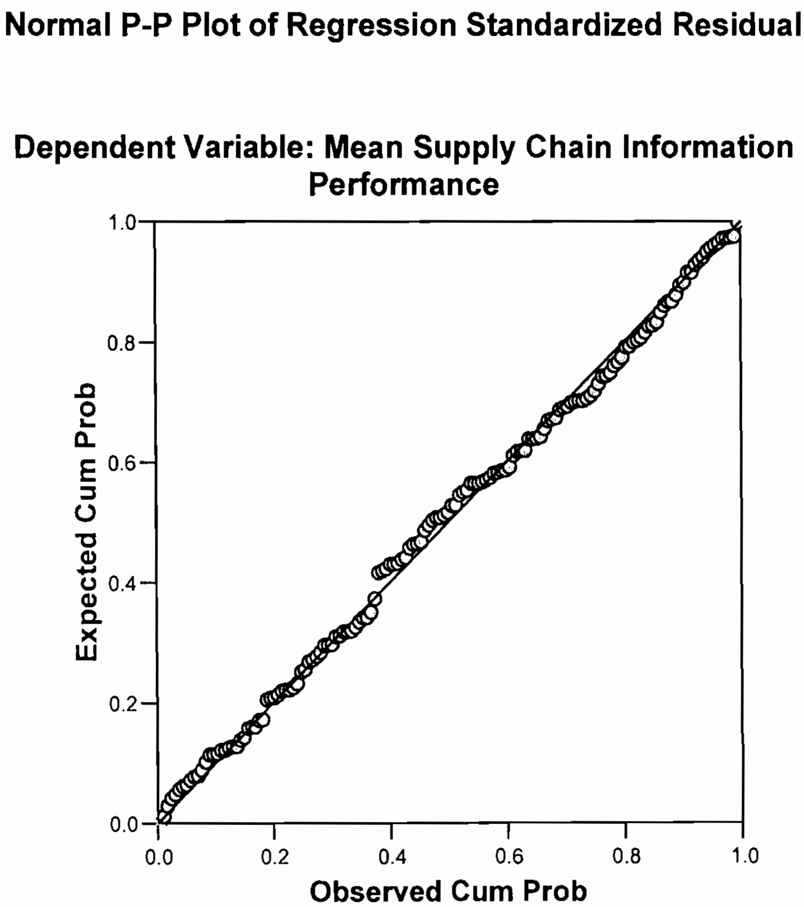


Normal P-P plot

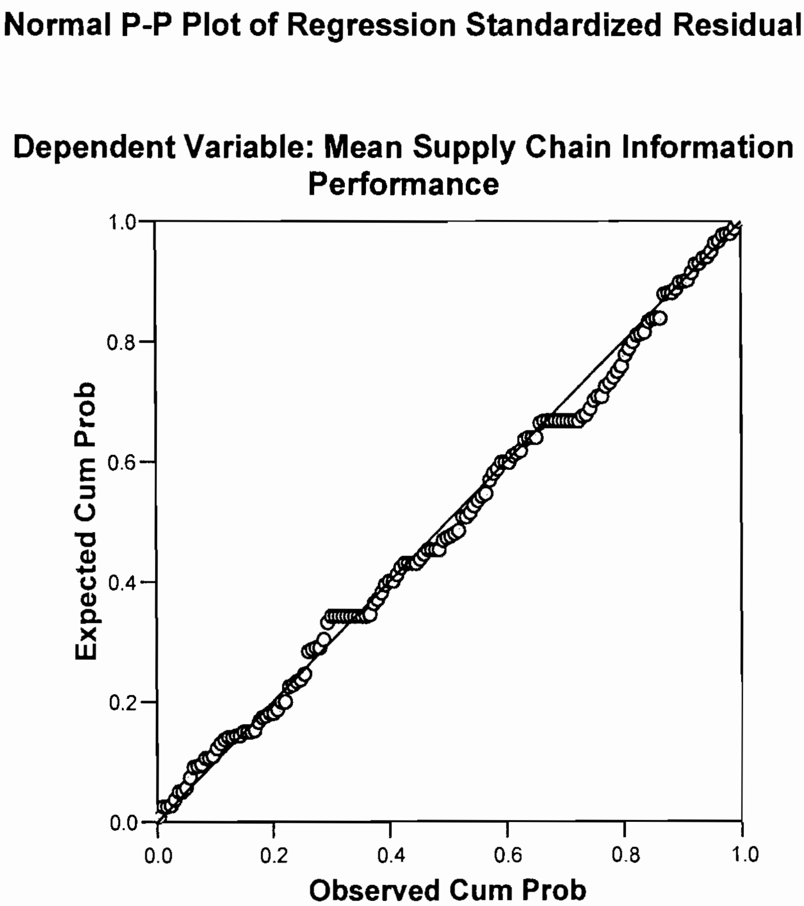
Regression between antecedent and IQD



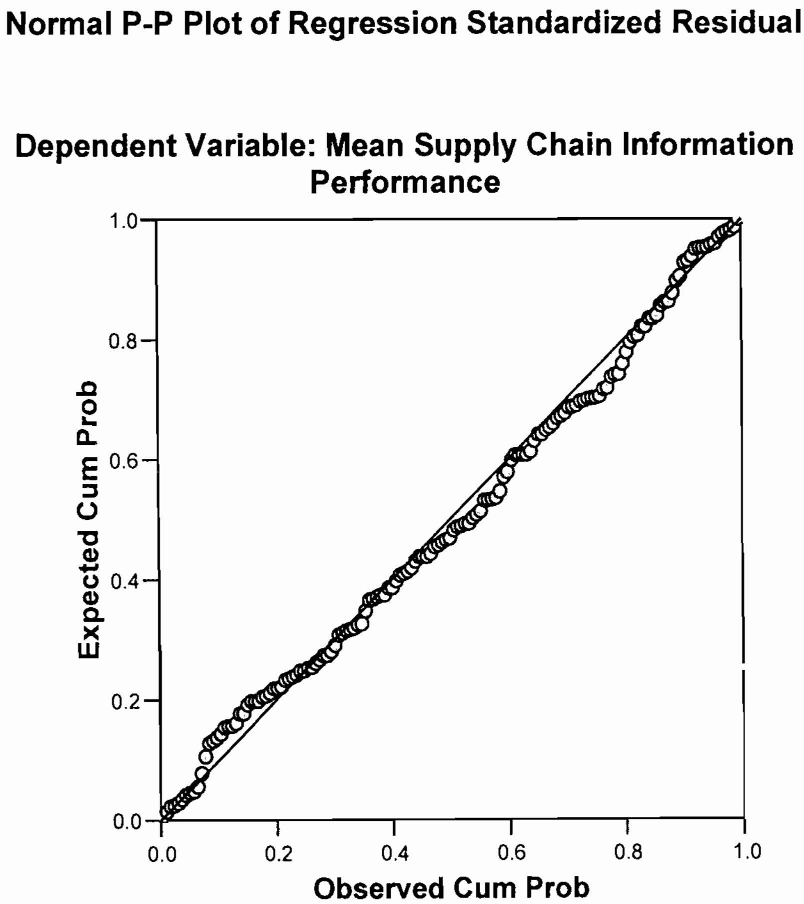
Regression between antecedent and SCIP



Regression between QID and SCIP

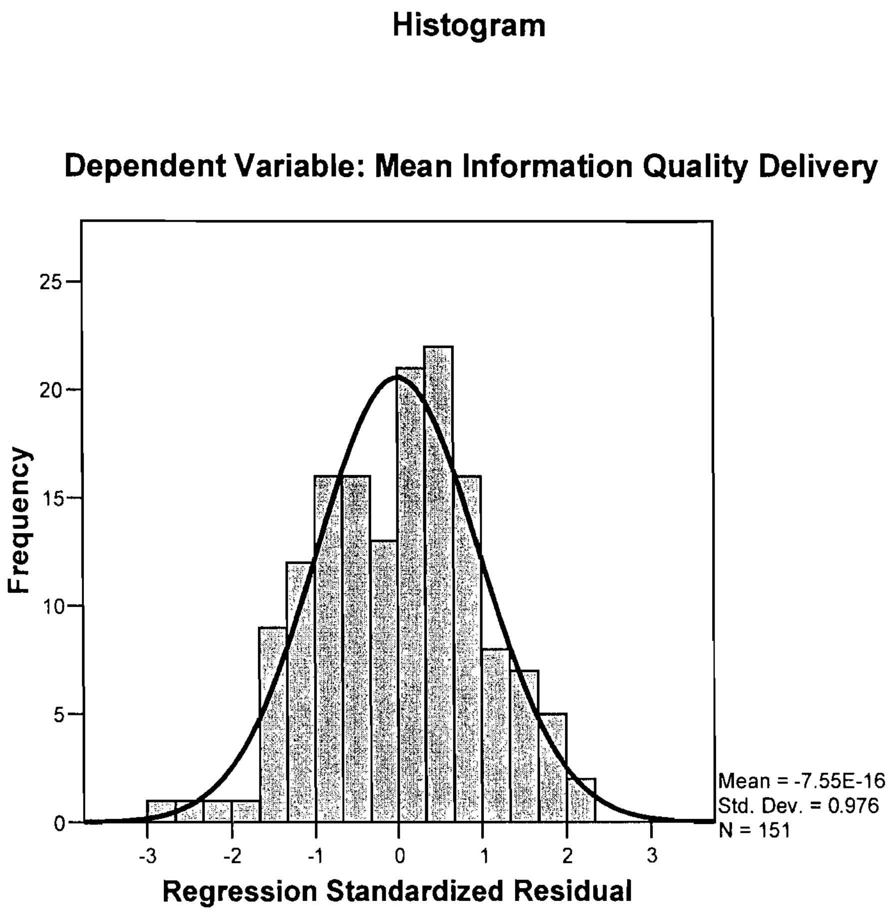


Hierchical Regression analysis on mediating effect of quality information

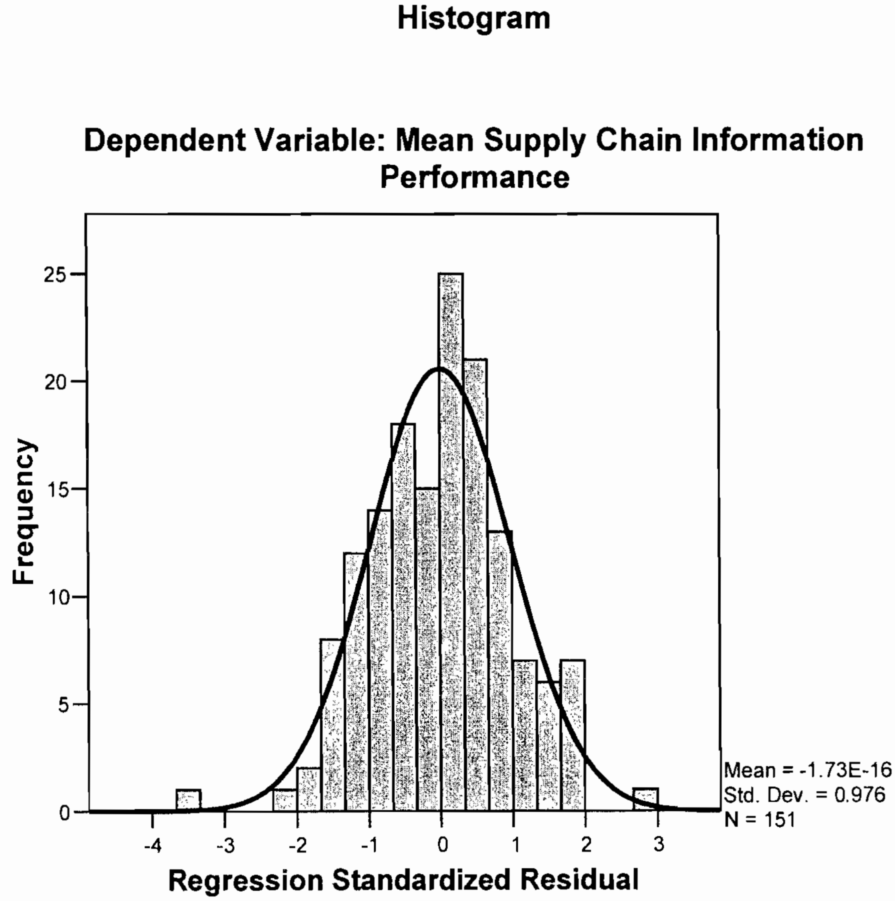


APPENDIX J: HISTOGRAM

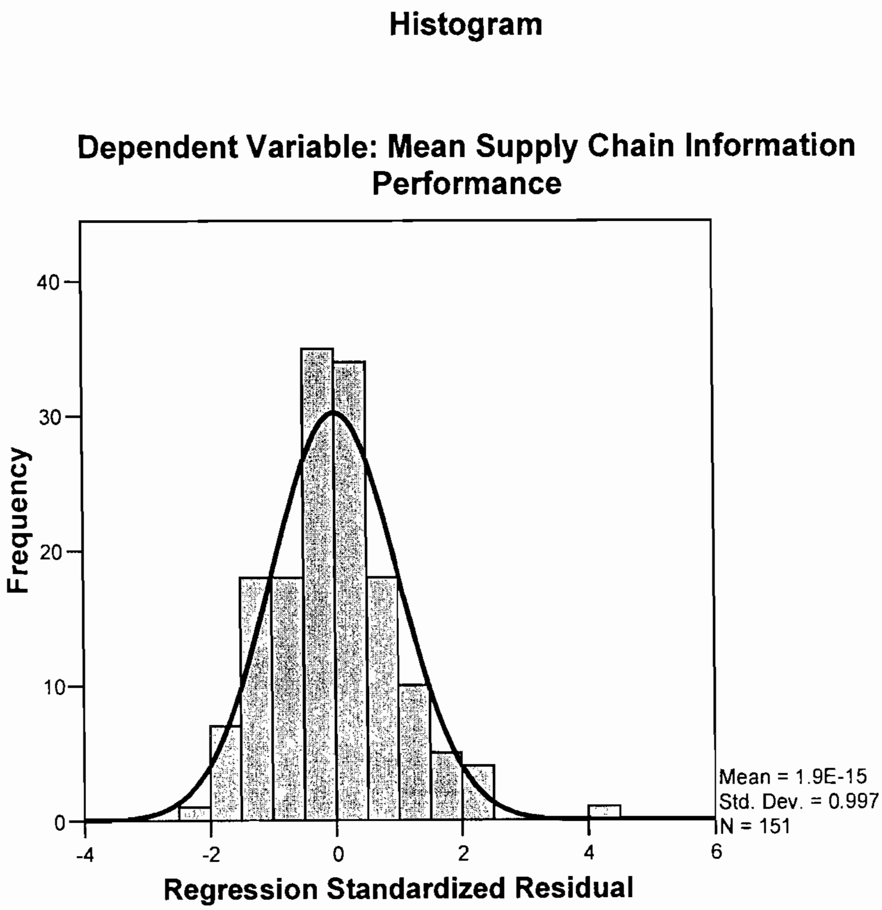
Regression between antecedent and IQD



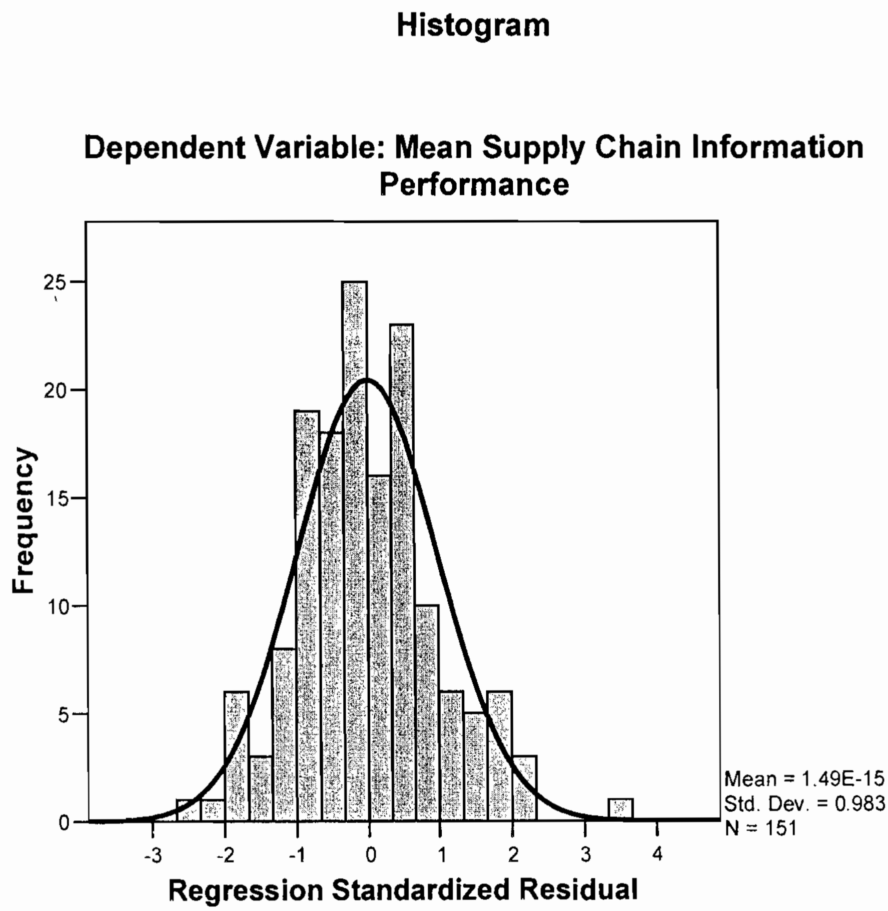
Regression between antecedent and SCIP



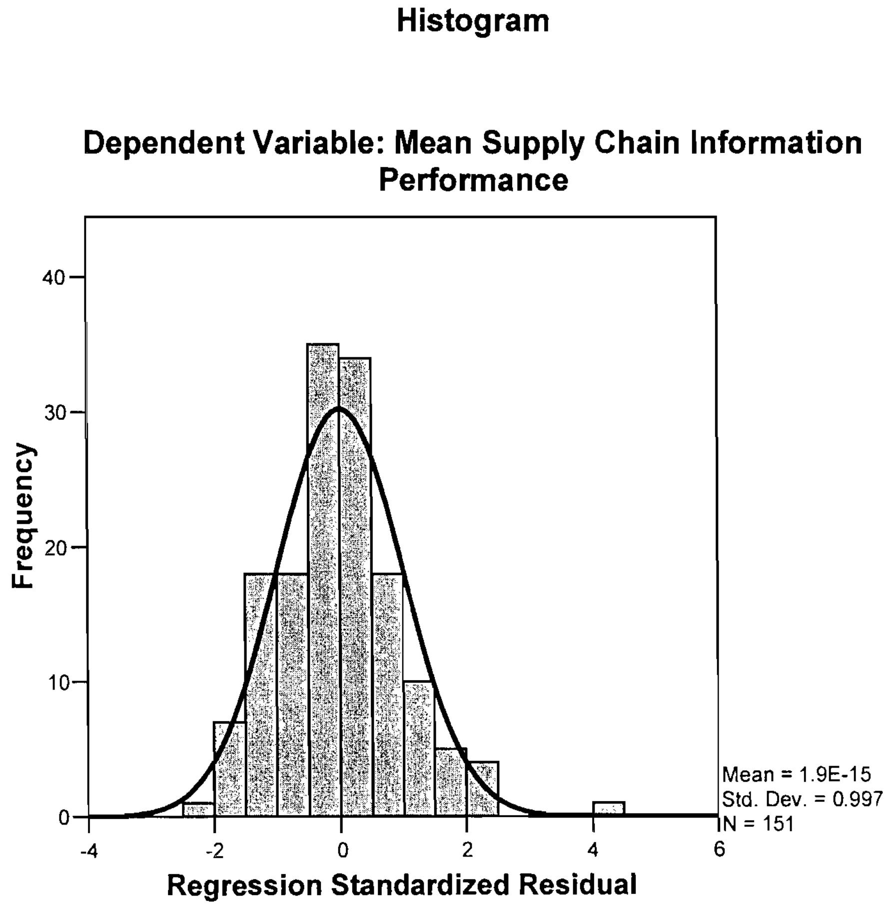
Regression between QID and SCIP



Hierchical Regression analysis on mediating effect of quality information



Regression between QID and SCIP



Appendix K: Cover Letter

UNIVERSITI UTARA MALAYSIA
06010 UUM Sintok, Kedah Darul Aman, Malaysia. Tel:604-4000

"KEDAH SEJAHTERA"

UUM/KP/A-3(91228)

01 July 2008
27 Jamadilakhir 1429H

TO WHOM IT MAY CONCERN

Sir/Madam

DATA COLLECTION PROJECT PAPER/ TESIS

This is certify that **Abdullah Yahya Moqbel Ahmed** (Matric Number: 91228) is a Full time graduate student in PhD programme at Universiti Utara Malaysia, Sintok, Kedah.

He needs to collect data for his project paper/ thesis in order to fulfill the partial requirement of this thesis.

Duly we hope that your organization will be able to assist him in distributing questionnaire for his research

Thank you

"ILMU BUDI BAKIT"
Yours faithfully

(JAFRI ISHAK)
Assistant Registrar
Research and Post Graduate
College of Business