TOTAL QUALITY MANAGEMENT ON SUPPLY CHAIN MANAGEMENT: A STUDY ON LOGISTICS COMPANIES IN MALAYSIA

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and the
due acknowledgement has been given in the references to ALL sources of
information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any
application for any other degree or qualification of this or any other university,
or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the
research project.

(4) The word count of this research project is 10,126.

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DEDICATION

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

TQM	Total Quality Management
LD	Leadership
SP	Strategic Planning
CF	Customer Focus
HR	Human Resource Management
PM	Process Management
IA	Information Analysis
SCM	Supply Chain Management
LS	Lean System
IM	Information Management
PR	Partnership Management
SO	Strategy and Organization
MBNQA	Malcolm Baldrige National Quality Award
IV	Independent Variable
DV	Dependent Variable
TDM	Total Design Method
R^2	Coefficient of Determination
VIF	Variance-Inflation Factor

PREFACE

Customers are having higher purchasing power nowadays and they are seeking for better quality products and services. As a result, many organizations are taking initiative to integrate a quality process into their daily operation in order to meet customers' expectations. It is a fact that every organization cannot avoid dealing with suppliers and customers in their daily operation.

Supply chain management (SCM) is considered as a complete set of business process which includes every party in the business. Quality should be integrated into every stage of SCM in order to boost the company's performance. Therefore, we will discuss the relationship between six total quality management (TQM) practices and SCM in this paper. Logistics industry was chosen as our target of studies because it plays a very significant role in supply chain.

This paper serves as guidance to top management in logistics companies of Malaysia, who seek to enhance their company's performance through the implementation of TQM practices in providing supply chain services. Furthermore, the proposed conceptual model serves as a benchmark for practitioners to perform their TQM programmes more efficiently and effectively in their own respective companies. All these can ease the top management in focusing their efforts on the practices that ensure the companies' ability to establish a competitive SCM.

ABSTRACT

The purpose of this research study is to come up with a conceptual framework that examines the relationship between different practices of total quality management (TQM) and supply chain management (SCM). Six TQM practices, namely leadership, strategic planning, customer focus, human resource management, process management and information analysis were adopted from Malcolm Baldrige National Quality Award (MBNQA) to test the relationship between TQM and SCM. This was a cross-sectional study where the results were based on logistics companies in Malaysia. Self-administered survey questionnaires were distributed to the logistics managers through online and walk-in to the companies. 218 survey questionnaires were collected out of 340 survey questionnaires distributed which represented a response rate of 64.12%. The results revealed that leadership, strategic planning, customer focus and human resource management were found significantly related to SCM. However, it was found that process management and information analysis were insignificantly related to SCM. This study had greatly contributed to the logistic firms that focusing on or planning to implement SCM. The results of this study can bring a deeper and better understanding of the relationship between TQM practices and SCM to top management so that the related TQM practices can be applied in establishing a systematic and competitive SCM. Besides, companies which have not implement the two management systems together can gain a better understanding and able to implement the two systems together efficiently and effectively through this study.

CHAPTER 1: RESEARCH OVERVIEW

1.0   Introduction

This research aimed to study the relationship of total quality management (TQM) and supply chain management (SCM) in logistics companies in Malaysia. This chapter started with a brief background which consisted of the importance of SCM and TQM and how quality can be integrated into SCM in logistics companies. Subsequently, research problems, research objectives and contributions of the research were identified.

1.1   Research Background

In recent years, working collaboratively with suppliers and customers became essential because cooperative relationship between members of supply chain helped to achieve competitive advantage (Kushwaha & Barman, 2010). This collaboration had led to the forming of supply chain management (SCM) (Casadesus & Castro, 2005). According to Council of Logistics Management in the United States, SCM was defined as the systematic and strategic coordination of the traditional business operations among members of supply chain for the purpose of enhancing long-term performance of the individual organizations and the supply chain as a whole (Li, Ragu-Nathan, Ragu-Nathan & Rao, 2004).

Supplying at the correct time, place and cost was considered as an important competitive advantage (Vanichchinchai & Igel, 2010). The essence of the competitive advantage was pursuing the performance of the whole supply chain

system instead of product quality and process quality (Chang, 2009). Therefore, total quality management (TQM) was increasingly being adopted by the organizations to improve competitiveness (Bandyopadhyay & Sprague, 2003). It had been broadly accepted as the means for maintaining supply chain quality throughout the entire organization or the supply chain to achieve a competitive edge in the global market (Bandyopadhyay & Sprague, 2003).

The modern approach of TQM can be explained in a broader way by which quality is emphasized at each stage, at source or process control, to ensure there is no any mistakes which could lead to flaws (Vanichchinchai & Igel, 2010). To strengthen its organizational competitiveness, TQM mainly focused on the six major fundamental practices, namely leadership (LD), strategic planning (SP), customer focus (CF), human resource management (HRM), process management (PM) and information analysis (IA), which were generally applied in companies honoured with Malcolm Baldrige National Quality Award (MBNQA) (Vanichchinchai & Igel, 2010). MBNQA was a useful indicator of successful TQM implementation (Bailey, 2011). It was recognized by the Global Excellence Model (GEM) Council as an international quality leader because nearly 100 quality programmes were modelled after MBNQA, including the Japan Quality Award established in Japan in 1996 (NIST, 2012).

On the other hand, as according to Monczka, Robert, Trent and Handfield (1998), logistics had been developed into the concept of supply chain and had a significant impact on the supply chain concept (Mentzer, Dewitt, Keebler, Min, Nix, Smith & Zacharia, 2001). Generally, as cited in Gundlach, Bolumole, Eltantawy and Frankel (2006), logistics was defined as the inbound and outbound flow and storage of goods, services and information within and between organizations (Ali, Jaafar & Mohamad, 2008). In order to create an ideal logistic hubs in Malaysia to support its growing trade and outstanding trade infrastructure,

the Malaysian Logistics Council was set up to encourage and boost logistics
industry (MIMA, n.d.).

1.2   Problem Statement

The main research problem of this study was to integrate quality into SCM since
quality had become the first priority of all organizations. The lack of quality found
in later stage of SCM was much more costly than the one found in earlier stages
since more resources had been invested. Without quality in SCM, the ultimate
goal of customer satisfaction cannot be achieved because products were not
delivered on time, damaged and companies unable to satisfy customer
requirements. Besides, the interlinking between SCM and TQM was limited
(Kushwaha & Barman, 2010). Vanichchinchai and Igel (2010) had argued that a
simultaneous implementation of TQM and SCM required many resources because
of the enlarged scope that contained the internal functions as well as the
operations of external parties. Moreover, both TQM and SCM were often
analyzed individually (Gunasekaran & McGaughey, 2003; Robinson & Malhotra,
2005; Casadesus & Castro, 2005; Vanichchinchai & Igel, 2010) and only a few
researches combined and studied these two concepts together (Talib, Rahman &
Qureshi, 2010).

Furthermore, past studies which investigated the relationship between TQM and
SCM of companies were mostly conducted internationally such as in the United
States (Gowen III & Tallon, 2002), Spain (Casadesus & Castro, 2005), India
(Talib, Rahman & Qureshi, 2010), Taiwan and Hong Kong (Lin, Chow, Madu,
Kuei & Yu, 2005). There were only a few studies had been carried out in the
ASEAN region (Zakuan, 2010) such as in Taiwan, Hong Kong and Malaysia (Lin
et al., 2005; Omar, Zailani & Sulaiman, n.d.; Agus, 2011).

Besides, there was a lack of research on the correlation between individual TQM practices and individual SCM practices and individual firm's supply performance (Vanichchinchai & Igel, 2010). Vanichchinchai and Igel (2010); Mohamed, Parry and Wharton (2008) and Noori (2004) had carried out the studies about the interconnection of TQM and SCM in automotive industry, electronic and aerospace sectors (Chang, 2009). In Malaysia, Omar et al. (n.d.) had conducted survey on electrical and electronic industry to determine their extent of SCQM practices while Agus (2011) examined relationships between SCM, product quality and business performance in Malaysian manufacturing firms.There was no any research examining the correlation between TQM and SCM of logistics companies in Malaysia.

1.3   Research Questions & Objectives

Table 1.1: General Research Objective and Question

General Research Objective	General Research Question
To determine TQM practices that affect SCM of Malaysian logistics companies.	What are the TQM practices that affect SCM of Malaysian logistics companies?

Source: Developed for the research

Table 1.2: Specific Research Objectives and Questions

Specific Research Objectives	Specific Research Questions
To examine the relationship between leadership (LD) and supply chain management in logistics companies within Malaysia.	Is there any relationship between leadership (LD) and supply chain management in logistics companies within Malaysia?
To analyze the relationship of strategic planning (SP) and supply chain management in logistics companies	Is there any relationship between strategic planning (SP) and supply chain management in logistics

within Malaysia.	companies within Malaysia?
To explore the relationship of customer focus (CF) and supply chain management in logistics companies within Malaysia.	Is there any relationship between customer focus (CF) and supply chain management in logistics companies within Malaysia?
To study the relationship of human resource management (HRM) and supply chain management in logistics companies within Malaysia.	Is there any relationship between human resource management (HRM) and supply chain management in logistics companies within Malaysia?
To determine the relationship of process management (PM) and supply chain management in logistics companies within Malaysia.	Is there any relationship between process management (PM) and supply chain management in logistics companies within Malaysia?
To examine the relationship of information analysis (IA) and supply chain management in logistics companies within Malaysia.	Is there any relationship between information analysis (IA) and supply chain management in logistics companies within Malaysia?

Source: Developed for the research

1.4   Significance of the Study

This research paper had discussed the implementation of TQM practices which promoted SCM in enhancing a logistics company's quality and supply performance. It is important for the top management in logistics companies to understand the correlation and implementation of TQM practices on SCM and apply them in improving companies' supply-related process and performance. Managers can make use of the results of this study to prioritize the application of these practices. Furthermore, organizations who have not yet considered implementing the two management systems together can utilize the results of this study to decide whether they want to promote TQM into SCM.

This research was an extended model of past researchers (Vanichchinchai & Igel, 2010), as past studies did not study the relationship of six TQM practices and

SCM in one research and tended to stress on one or few prospects only. Moreover, this research had further studied the relationship of TQM practices with SCM of logistics companies in Malaysia. It can also be a useful source to future researchers as it became a foundation relating the two management systems.

1.5   Chapter Layout

Chapter 1 introduced the relationship between TQM practices and SCM, described the problems, identified the research purpose and questions and provided the importance of the proposed study. The concepts of the theory, past literature review, proposed conceptual framework and development of hypotheses were to be done in Chapter 2. Next in Chapter 3, described the research's design, sampling procedures, data collection method, measurement of variables and techniques of data analysis. Lastly, data analysis was presented in Chapter 4 and Chapter 5 demonstrated the discussion, implications and conclusion of the research.

1.6   Conclusion

This chapter allowed researchers to have a brief understanding about the relationship between the IVs and dependent variable (DV) in this study. Also, an overview of research objectives, research questions as well as hypotheses to be tested. The next chapter provided a summary of significant findings from past studies and developed a theoretical conceptual and hypotheses testing.

CHAPTER 2: LITERATURE REVIEW

2.0   Introduction

In this chapter, a summary of past empirical studies explaining the relationship between each IV and DV were included as well as the theory and its dimensions were discussed. Besides, a conceptual framework that provided the theoretical foundation was developed. Lastly, hypotheses were formulated and tested scientifically in later chapter.

2.1   Review of the Literature

2.1.1   Supply Chain Management (SCM) (Dependent Variable)

The dependent variable in this study was SCM which included lean system (LS), information management (IM), partnership management (PM), strategy and organization (SO). There was no universal practice of SCM that fitted all organization and each organization organizes their SCM differently (Boute, Dierdonck & Vereecke, 2011). The 6 practices, namely customer relationship, material management, strategic supplier partnership, information and communication technology, corporate culture and close supplier partnership were treated as major practices of SCM based on their high frequency of occurrence in different research papers (Talib, Rahman & Qurenshi, 2010).

After combining the Talib, Rahman and Qurenshi (2010) study with Vanichchinchai and Igel (2010) study, the four SCM practices were chosen because they had covered the 6 major SCM practices. They were unique and relevant for logistics companies. Lean system was significant to logistics companies as this would help to eliminate the waste and reduce the costs (Muckstadt, Murray, Rappold & Collins, 2003). Information management was essential for logistics companies as SCM's efficiency in managing the flow of material was highly dependable on the management of information (Francis, 1998). Partnership management can ensure the smoothness of logistics process as it was the key for successful SCM (IshtiaqIshaq, Khaliq, Hussain & Waqas, 2012). Lastly, strategy and organization was also an important SCM practice for logistics companies as the strategies of the organization could influence the logistics performance of the organization (Gunasekaran & Ngai, 2003).

2.1.2   Relationship between Leadership (LD) and SCM

As cited in Hoyt and Blascovich (2003), LD was a procedure of affecting individuals or groups to achieve group goals (Defee, Stank & Esper, 2010).

Defee, Stank and Esper (2010) examined the relationship of transformational supply chain leadership (SCL) to supply chain performance. Data was collected using survey data collected from 253 executives, managers and senior analysts who having multiple years of supply chain experience. Based on structural equation modeling, there was a positive relationship between transformational SCL and informal

communication, and no significant relationship between transformational SCL and information availability across the supply chains.

Li (2006) investigated the relationship between supportive LD and IT support capability for SCM. Data was collected using online survey sent to 5000 addresses obtained from Institute for Supply Management. Using structural equation modeling, results proved that an organization's supportive LD positively influences its IT support capability for SCM.

Danusantosa (2011) examined the effect of different LD structures on the relative profit of three-tier supply chain that consisted of a Contract Electronics Manufacturer (CEM), an Original Equipment Manufacturer (OEM) and a Retailer. Data was collected using comparative analysis with a centralized supply chain and a decentralized model. Three demand functions, namely linear, exponential and stochastic were considered. Results showed that supply chains in which the Retailer acts as the Stackelberg leader had the highest optimum profit regardless of the demand function.

2.1.3　Relationship between Strategic Planning (SP) and SCM

Steiner (1979) defined SP as a process of setting organizational goal, developing detailed plan and implementing strategy to achieve goal (Ridwan & Marti, 2012).

Soni and Kodali (2011) investigated the mediating role of supply chain

strategy between competitive strategy and supply chain performance in Indian manufacturing industry. Online survey was sent to 753 manufacturing companies through e-mail and 185 responses were received. The result of this study revealed that choices of competitive strategy and supply chain strategy affect business and supply chain performance.

Karim (2011) examined the extent to which management information system was implemented in strategic and tactical planning for decision making. 190 survey questionnaires were distributed equally to top managers, middle managers and normal staffs in one government financial institution and one private financial institution in Bahrain. Result revealed that management information system was primarily used in banks to enhance SP.

Heist (2011) analyzed the lack of SP for church's information technology management in the United States. 100 web-based questionnaires were distributed to volunteer and paid church information technology professionals. This research proved that there was a significant relationship between information technology management effectiveness and SP.

2.1.4   Relationship between Customer Focus (CF) and SCM

CF involved monitoring customer complaints, meeting customer expectations and assessing customer satisfaction (Das, Handfield, Calantone & Ghosh, 2000).

Lado, Paulraj and Chen (2011) tested a model in which CF drives supply-chain relational capabilities and financial performance. 952 questionnaires and mail surveys were sent to a sample of companies in US manufacturing industries. The analysis techniques used were analysis of non-response bias, descriptive statistics, construct validity and reliability. The finding showed a positive relationship between CF and SCM.

Chen and Paulraj (2004) determined and validated the supply chain initiatives and factors to develop SCM constructs, including CF. 232 responses of cross-sectional mail survey of target sample under 954 members of the Institute for Supply Management (ISM) in the United States were received. The result concluded that CF had a significant correlation with SCM.

Martin and Grbac (2003) identified whether the positive effects of strong supplier relationships were strengthened in market-oriented companies where customer responsiveness was one of the elements of market orientation. 1200 questionnaires were sent to CEOs/presidents randomly selected from the sample of industries of manufacturers, wholesalers and industrial service companies from the state of Ohio. Based on regression analyses, the result supported that supplier relationships were one of the way in leveraging a company's market orientation by improved customer responsiveness.

2.1.5 Relationship between Human Resource Management (HRM) and SCM

HRM was defined as a comprehensive approach to the management of the organization's human resources in which every aspect of that process was wholly integrated within the overall management of the organization (Fajana, Owoyemi, Elegbede & Sheriff, 2011).

Okeudo (2012) explored the relationship between HRM practices and logistics firm performance with logistics and SCM as the focus. 150 questionnaires were distributed to human resource managers and other staff among the four selected logistics companies within the South-Eastern region of Nigeria. Using hierarchical regression analysis, this study proved that HRM practices were effective in building logistics and supply chain capabilities.

Gowen III and Tallon (2002) examined the impact of human resource factors on the competitive advantage of SCM practices. The authors collected the data using questionnaires survey sent to all of the corporations on Fortune's list of the 1000 largest US firms. Based on correlation assessment and partial correlation analysis, two important human resource factors, namely management and employee support, positively affected the competitive results of SCM practices.

Furthermore, Doerflein (2005) investigated the relationship between HRM and effective SCM in United States. Data was collected using questionnaires sent to 1500 management professionals randomly selected from Penton Lists. The analysis technique was Statistical Program for

Social Science (SPSS). The findings showed that HRM had a significant relationship with effective SCM.

2.1.6   Relationship between Process Management (PM) and SCM

As cited in Lee and Dale (1998), PM was defined as a structured, analytical, cross-functional and continuous improvement process (McAdam & McCormack, 2001).

Forslund and Jonsson (2008) examined the extent to which supplier relationship and operational tool obstacles affect PM process integration. Data was collected by sending 705 web-based questionnaires to purchasing managers of manufacturing companies listed in Swedish Postal Service's database. Result showed that supplier relationship and operational tool obstacles significantly hindered PM process integration.

Ittner and Larcker (1997) studied the effects of PM techniques on company performance and profitability. Secondary data was adopted from a survey done by a consulting company in 1991 whereby 249 survey questionnaires were distributed and collected from automobile and computer industries in Canada, Germany, Japan and the United States. The researchers identified 61 questions from the survey that were relevant to their research and applied the results in their research. The researchers found that value chain management such as long-term relationship with suppliers and customers can lead to process and performance improvements in both industries.

Neubauer (2009) determined the current status of business PM in the market and analyzed the strategic, organizational and technical aspects of business PM in the participating companies. Questionnaires were distributed online to 185 medium and large IT-driven enterprises in Austria, Germany and Switzerland selected from business directories. One of the results from this study showed that IT-applications must be selected and implemented appropriately in order to execute business processes efficiently.

2.1.7 Relationship between Information Analysis (IA) and SCM

IA covered information and knowledge management, measurement and analysis of organizational performance (Rampersad, 2005; Ju et al. 2006).

Samuel, Goury, Gunasekaran and Spalanzani (2011) studied the relationship between knowledge management and SCM. Questionnaires were distributed to logistics managers, supply chain managers and engineers in private sector of the Rhone-Alpha region of France. 179 responses were received and analyzed using descriptive statistics. The findings showed that knowledge management enhances the SCM competitiveness.

Vanichchinchai and Igel (2010) studied the impact of TQM on SCM and firm's supply performance. 415 questionnaires were distributed and returned from the managing director or president of the automobile

company. The analysis techniques used were Chi-Square, p-value, Cronbach's Alpha test and confirmatory factor analysis. The findings showed that IA had direct effect on SCM practices.

Forker, Mendez and Hershauer (1997) also studied the impact of TQM (including IA) in the supply chain performance. Survey instruments were mailed to 421 suppliers of electronic components industry. The data analysis techniques used were descriptive statistics and linear regression analysis. The findings encouraged manufacturers to continue promoting TQM practices throughout the supply chain as certain practices did lead to better performance, which include IA.

2.2   Review of Relevant Theoretical Models

The Malcolm Baldrige National Quality Award (MBNQA) was adopted as theoretical foundation. It was an award given annually by the President of the United States to organizations that demonstrate quality excellence in the manufacturing company, service company, small business, healthcare, education and non-profit sectors (Bailey, 2011). MBNQA was established by Congress in 1987, and was named after the late Secretary of Commerce Malcolm Baldrige.

George and Weimerskirch (1994) champion the Baldrige criteria as the leading model of total quality management (TQM) as there is no other model had gained such widespread global acceptance. MBNQA's recipients were selected according to their achievement in seven areas, namely leadership (LD), strategic planning (SP), customer focus (CF), information analysis (IA), human resource management (HRM), process management (PM) and business results (BR). The

MBNQA model acts as guidance to improve organization performance and represents a medium of communication for sharing best practices worldwide.

The six functionally related major criteria in MBNQA which comprised of LD, SP, CF, IA, HR and PM were inter-related. According to Prybutok and Cutshall (2004), LD was the category that embodied all other MBNQA criteria (Sullivan, 1992) while SP examined the organization's strategic business planning and implementation processes (Marquardt, 1992). Based on Prybutok and Cutshall (2004), CF was concerning on how an organization organizes its customers (Desatnick, 1992). Besides, in accordance to Prybutok and Cutshall (2004), IA was the category that supported all the other categories (Forza, 1995) as it measured performance to ensure the organization's operations were aligned with its strategic objectives. Referring back to Prybutok and Cutshall (2004), HR analyzed the procedure by which an organization developed and realized the full potential of its workforce (Leifield, 1992). PM addressed design, production, support systems, supplier quality and quality assessment (Heaphy, 1992).

Figure 2.1: MBNQA Model
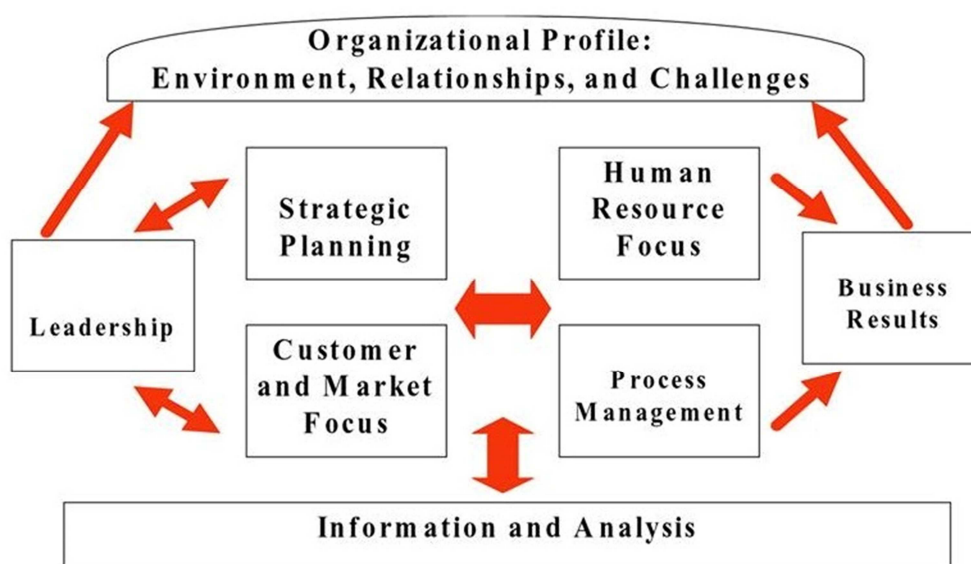
MBNQA Model (NIST, 2002)

Source: NIST, 2002

2.3 Proposed Conceptual Framework

Figure 2.2: TQM Practices Affecting Supply Chain Management in Logistics Companies
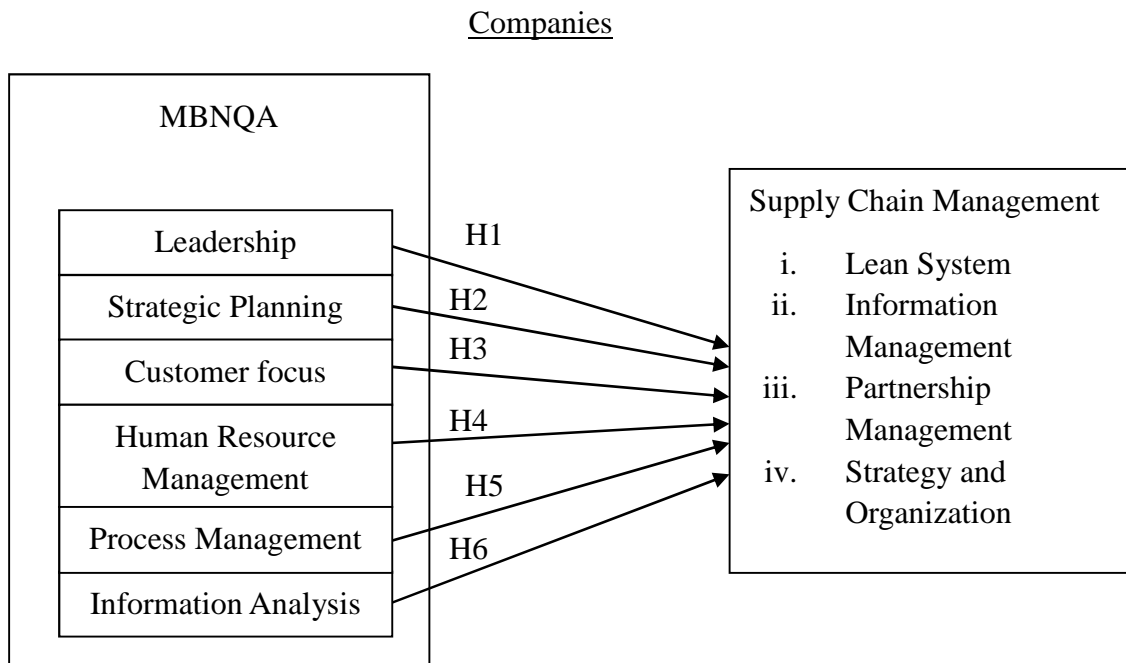
Adapted from: Kushwaha & Barman, 2010; Sadikoglu, 2008

2.4 Hypotheses Development

H1: There is a relationship between leadership and supply chain management in Malaysian logistics companies.

H2: There is a relationship between strategic planning and supply chain management in Malaysian logistics companies.

H3:   There is a relationship between customer focus and supply chain management in Malaysian logistics companies.

H4:   There is a relationship between human resource management and supply chain management in Malaysian logistics companies.

H5:   There is a relationship between process management and supply chain management in Malaysian logistics companies.

H6:   There is a relationship between information analysis and supply chain management in Malaysian logistics companies.

2.5   Conclusion

This chapter focused on reviewing past empirical studies to explain the relationship between TQM practices and SCM. Subsequently, related theoretical model was examined to serve as foundation to develop a conceptual framework. Lastly, 6 hypotheses had been developed to provide directions of the relationships among variables. Chapter 2 served as a guideline to have a better understanding towards the methodology of this study that will be further discussed in chapter 3.

CHAPTER 3: RESEARCH METHODOLOGY

3.0   Introduction

In chapter 3, an overview of the research methodology was explained through eight sections which included research design, data collection method, sampling design, research instrument, construct measurement, data processing and data analysis techniques. Subsequently, a summary of this chapter was provided.

3.1   Research Design

This research was aimed to determine whether there was any linkage between Total Quality Management (TQM) and Supply Chain Management (SCM) in logistics industry of Malaysia. This was a cross-sectional study because it involved collection of data at one specific point of time.

Survey questionnaires were used to collect data regarding the perceptions of logistics managers towards relationship between TQM and SCM because questionnaires can cover broad geographical field with lower cost and shorter time (Kwak & Radler, 2002). Self-administered questionnaires adopted from past studies had been implemented in this study because standardized and structured questionnaires could minimize the target respondents' bias (THCU, 1999). The unit of analysis was set at the organization level since the relationship between TQM and SCM was analyzed on logistics companies.

3.2   Data Collection Methods

3.3.1   Primary Data

Self-administered questionnaires were distributed so that the data were standardized and easy to make comparison (Saunders, Lewis & Thornhill, 2009). Surveys forms were sent to the managers of logistics companies in Malaysia by using e-mail questionnaires and walk-in. The target companies were identified through Malaysia Logistics Directory. The modified Dillman's Total Design Method (TDM) was a procedure that included a personalized cover letter, a questionnaire and a follow-up mailing to send to the target respondents. Higher response rate can be produced by using this Dillman's TDM (Anema & Brown, 1995; Hurst & Niehm, 2010).

Pilot test was conducted to test the normality and reliability of data, refine the questionnaire and ensure the validity of the data collected (Saunders, Lewis & Thornhill, 2009). 35 sets of questionnaires were sent and addressed to managers of manufacturing companies in Malaysia.

3.3   Sampling Design

The population of this study was logistics companies in Malaysia. According to Malaysia Logistics Directory (2011), there were 931 logistics companies in Malaysia. It was the only published directory by certification bodies in Malaysia. Sampling was needed as it was impractical to gather data from the entire

population due to time and budget constraints. Since the sampling frame had been known, probability sampling technique was being used in this study. Cluster sampling method was selected because it was cost-effective as the amount of data collected can be maximized within the resources available. Besides, fewer travel expenses required as the location of the sample was clearly identified (Saunders, Lewis & Thornhill, 2009). By using this method, the population was divided into 14 clusters based on geographical location. Sample was chosen randomly from each of the clusters.

The surveys for this study were confined to specific types of people who can provide the desired information (Sekaran & Bougie, 2010). Questionnaires were distributed to logistics managers of targeted companies because they were more experienced and familiar with the company's daily operations.

As cited in Hinkin (1995), Rummel (1970) and Schwab (1980) found that the best scale for item-to-response ratios was ranging from at least 1:4 to 1:10. A sample size of at least 212 logistics companies had been drawn from the 931 logistics companies based on the 1:4 item-to-response ratios since there were 53 questions provided in the questionnaires. In this study, 340 survey questionnaires were distributed to the target respondents which represented 36.52% of the population. According to Dierckx (2013), this was enough to represent the entire population as it was more than 20% of the population.

218 survey questionnaires were collected back out of the 340 survey questionnaires distributed which represented a response rate of 64.12%.

3.4   Research Instrument

Questionnaire was used in this study as a means to collect data. According to Saunders et al. (2009), questionnaire was pre-determined same set of questions that each person was asked to respond.

3.4.1   Instruments and Procedures Used

To increase the feedback and respond rate from target respondent, modified Dillman's Total Design Method (TDM) was applied while designing the survey questionnaire (Dillman, 1991). A mixed mode of survey was used to collect data which were walk-in and e-mail questionnaires. There were few steps to be carried out in the TDM. First, it was required to include the cover letter of survey questionnaire to explain the purpose of the survey and the categories of respondent. Besides, confidentiality was included in the cover letter to safeguard the respondent's interest. Furthermore, it was necessary to telephone the company to make appointment before we walk-in the company to distribute the questionnaire. A follow up e-mail was necessary to send to target respondents to remind them to response to the online questionnaires. Other than TDM, seven-point Likert scale was used in constructing the questionnaire because it gave a good balance between having enough points of discrimination without having to maintain too many response options.

3.4.2   Pilot Studies

As cited in Thabene, Ma, Chu, Cheng, Ismaila, Rios, Robson, Thabene, Giangregorio and Goldsmith(2010), the Concise Oxford Thesaurus defined a pilot study as an experimental, exploratory, pre-test, preliminary, trial or try out investigation. The main purpose of conducting pilot test in this study was to test the normality and reliability of data, identify design flaws of the questionnaires and prevent issues such as duplicate item being asked in questionnaires (Beebe, 2007). 35 sets of questionnaires were sent and addressed to managers of manufacturing companies in Malaysia. The 35 respondents were randomly chosen from Malaysia manufacturers from different categories (e-directory, n.d.). Out of the 35 questionnaires collected back, only 32 questionnaires usable and the remaining 3 incomplete questionnaires were extracted out. After collecting back the questionnaires, normality test and reliability test were carried out to check the normality, validity and reliability of the data.

3.5   Constructs Measurement

The independent variables used in this study (TQM practices) were derived and adapted from MBNQA. There were five to seven questions asking for each TQM practices. The questionnaire containing 33 items to test on TQM practices (IV's) were adopted from Sila and Ebrahimpour (2005).

The dependent variable used in this study was SCM which comprised of four practices, which were lean system, information management, partnership management, strategy and organization. The framework was derived from the

previous study (Vanichchinchai & Igel, 2010). There were five questions asking

for each SCM practices and a total of 20 items to test on SCM.

This study used a seven-point Likert scale for all dimensions of TQM practices

and SCM practices ranging from 1= strongly disagree to 7 = strongly agree.

Table 3.1: Measurements of Independent and Dependent Variables

	Variables	Measurement	Scale of Measurement
Section A Demographic profile	Gender	Nominal	
	Age	Ordinal	
	Education	Ordinal	
	Postion	Nominal	
	Experience	Ratio	
Section B Company Profile	ISO status	Nominal	
	Implementation of SCM	Nominal	
	Age	Ordinal	
	Owernership	Nominal	
	Number of employees	Ordinal	
	Type of services	Nominal	
Section C	IV1 : Leadership	Interval	7-point Likert Scale
	IV 2 : Strategic Planning	Interval	
	IV 3 : Customer Focus	Interval	
	IV 4 : Human Resource Management	Interval	
	IV 5 : Process management	Interval	
	IV 6 : Information Analysis	Interval	
Section D Supply Chain Management	Lean System	Interval	7-point Likert Scale
	Information Management	Interval	
	Partnership Management	Interval	
	Strategy and Organization	Interval	

Source: Developed for the research

3.6 Data Processing

Before analyzing the data collected, some procedures were needed to be performed to ensure the data collected were reliable and valid. Data processing included data checking, data editing, data coding and data transcribing.

3.6.1 Data Checking

Data checking was a process of ensuring the data collected were complete and usable for our analysis by making sure the respondent of questionnaires was our target respondent and all questions were answered in a questionnaire (Saunder et al., 2009).

3.6.2 Data Editing

Data editing was to exclude all incomplete or fault questionnaire that cannot be used in analysis. The incomplete questionnaires were either disregarded or allocated with the missing values (Saunder et al., 2009). In this research, out of 340 questionnaires collected back (excluding non-response), there were 122 incomplete questionnaires and were extracted out, so left with 218 useable questionnaires.

3.6.3   Data Coding

Data coding was a systematic process of condensing a large data sets into smaller units via the formation of categories and concepts deduced from the data (Saunder et al., 2009). In this research, the data were coded accordingly before the descriptive data were entered into SAS for further analysis. For example, the independent variable 'Leadership' had been decoded into 'LD' before transcribing the collected data into SAS.

3.6.4   Data Transcribing

Data transcription was a process of data entry where the collected data was keyed. It involved transferring the coded data from survey into the computer by punching the keys on keyboard (Saunder et al., 2009).

3.6.5   Data Cleaning

A process to check the correctness of data input (Saunder et al., 2009).

3.7   Data Analysis

The compiled data was analyzed using Statistical Analysis System (SAS).

3.7.1 Descriptive Analysis

Mean, standard deviation, frequency and percentage of every item in the questionnaire were calculated.

3.7.2 Scale Measurement

3.7.2.1 Normality Test

Skewness and kurtosis was used in this study to test the normality of result.

Table 3.2: Assumptions for normality test

Assumption	Test
Normality test	A variable was normally distributed if its skewness and kurtosis had value between -2.0 and +2.0.

Source: Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5[th]ed.). New York: McGraw Hill.

3.7.2.2 Reliability Test

Cronbach's Alpha was used in this study to test the data reliability.

Table 3.3: Assumptions for reliability test

Assumption	Test
Reliability Test	Cronbach's Alpha was used to test the reliability of data. It was recommended to have a reliability coefficient higher than 0.70.

Source: Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5[th]ed). Harlow, England: Prentice Hall.

3.7.2.3 Multicollinearity Test

To avoid multicollinearity problem between IV's, Pearson correlation coefficients value should not be more than 0.9 (Wheeler & Tiefelsdorf, 2005). Other than that, Multicolinearity problem can also be assessed based on the value of tolerance and Variance inflation factor (VIF). According to Hair, Babin, Money & Samuel (2003), the value of tolerance and VIF should be above 0.10 and below 10 respectively in order to avoid multicolinearity problem.

3.7.3   Inferential Analysis

Since the DV consisted of interval data, parametric tests were conducted. The inferential statistics tests used in this research were Pearson Correlation Analysis and Multiple Linear Regressions (MLR).

3.7.3.1 Pearson Correlation Analysis

Pearson Correlation Analysis was used to measure the strength of a linear relationship between two variables (Saunders, Lewis & Thornhill, 2009). The number representing the Pearson

correlation was referred to as a correlation coefficient. Table 3.4 shows the meanings of the different range of correlation coefficient.

Table 3.4: Correlation Coefficient

Coefficient range	Strength
+0.91 to +1.0	Very Strong
+0.71 to +0.90	High
+0.41 to +0.70	Moderate
+0.21 to +0.40	Small but definite relationship
0 to +0.20	Slight, almost negligible

Source: Hair, J.F., Babin, B., Money, A.H., & Samuel, P. (2003). *Essentials of business research methods.* USA: Wiley.

3.7.3.2   Multiple Linear Regressions (MLR)

MLR was used to calculate multiple regression coefficients and regression equation using at least two IV's to show the extent by which TQM practices can explain SCM (Saunders et al., 2009).

The equation of MLR will be as below:

Table 3.5: Multiple Linear Regressions Equation

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Whereby,

Y= Dependant variable

X= Independent variables

α= Constant Coefficient

$\beta_1 \dots \beta_6$ = Regression Coefficient for $X_1 \dots X_6$

Source: Developed for the research

For this study, the equation was as below:

Supply Chain Management= α + β_1(Leadership) + β_2(Strategic Planning) + β_3(Customer Focus) + β_4(Human Resource Management) + β_5(Process Management) + β_6(Information Analysis)

3.8   Conclusion

This chapter highlighted the methodologies conducted in this study. It also explained the research design, data collection method which consisted of primary and secondary data, sampling design, constructs measurement, data processing description and the techniques used in data analysis. The following chapter will illustrate the results by presenting them in tables form for better understanding.

CHAPTER 4: DATA ANALYSIS

4.0   Introduction

This chapter presented the results of questionnaires that had been distributed to the 218 logistics companies. Statistical Analysis System (SAS) was being used in analyzing and presenting the result. The results included descriptive analysis of the demographic profile of the respondents, central tendencies measurement of constructs, reliability test, normality test, Pearson Correlation and Multi Linear Regression (MLR).

4.1   Pilot Test

A pre-testing of questionnaire was conducted among 32 ISO 14001 certified manufacturing firms to measure reliability and normality of each variable. Table 4.1 illustrated the result of reliability test of the 32 questionnaires in pilot testing.

Table 4.1: Normality Test on Pilot Test

Total Quality Management Practices (TQM)

Variables	Item	Skewness	Kurtosis
Leadership	LD1	-0.7761332	1.77994563
	LD2	-0.9288298	1.56005367
	LD3	-0.3746465	0.87012602
	LD4	0.33613751	-0.7443268
	LD5	-0.5770114	0.00536579

Variables	Item	Skewness	Kurtosis
Strategic Planning	SP1	0.0686	-0.4507
	SP2	0.7319	1.6904
	SP3	0.6190	-0.0901
	SP4	0.2913	-0.3568
	SP5	0.3726	-0.1344
Customer Focus	CF1	0.0146	1.4640
	CF2	-0.2025	0.9670
	CF3	-0.0799	-0.3607
	CF4	0.6254	1.0252
	CF5	0.1699	1.1667
	CF6	0.7340	0.0748
Human Resource Management	HR1	0.0908	-0.4922
	HR2	0.0892	0.2598
	HR3	0.3552	0.1244
	HR4	0.2913	-0.3568
	HR5	-0.3436	-0.3052
	HR6	0.0977	-0.5389
	HR7	0.2874	0.7695
Process Management	PM1	0.8373	0.4521
	PM2	0.4983	-0.9148
	PM3	-0.4645	1.1248
	PM4	0.1896	-0.0916
	PM5	0.4707	-0.5212
Information Analysis	IA1	0.5164	-0.5923
	IA2	0.4336	-0.0493
	IA3	0.1419	-0.1470
	IA4	0.1972	-0.7006
	IA5	0.3320	-0.0026

Source: Developed for the research

Supply Chain Management (SCM)

Variables	Item	Skewness	Kurtosis
Information Management	IM1	-0.3233	-0.5553
	IM2	-0.0961	0.2335
	IM3	-0.6599	0.1702
	IM4	-0.4332	0.4649
	IM5	0.0110	-0.4924
Lean System	LS1	0.1250	0.4640
	LS2	0.3880	-0.6072
	LS3	0.0412	0.5731
	LS4	0.0296	-1.1235
	LS5	-0.1221	-0.8260
Partnership Management	PR1	-0.1797	-1.0353
	PR2	0.0154	-0.2488
	PR3	-0.7113	-0.2430
	PR4	0.0170	-0.7445
	PR5	-0.9004	1.1865
Strategy and Organization	SO1	0.2478	-0.5275
	SO2	-0.0899	0.4294
	SO3	0.3509	-0.0221
	SO4	-0.3674	-0.4913
	SO5	-0.0717	-0.4139

Source: Developed for the research

According to Gujarati and Porter (2009), a variable was normally distributed if its values of skewness and kurtosis were between -2.0 and +2.0. Based on the table above, it showed that the values of skewness and kurtosis were between -2.0 and +2.0. Thus, the pilot test result was assumed to be normally distributed.

Table 4.2: Reliability Test on Pilot Test

Variables	Number of items	Cronbach's Alpha
Leadership	5	0.8572
Strategic Planning	5	0.7401
Customer Focus	6	0.7993
Human Resource Management	7	0.7885
Process Management	5	0.7192
Information Analysis	5	0.8212
Supply Chain Management	20	0.9056

Source: Developed for the research

It appeared from the table above that the value of Cronbach's Alpha of all IVs and DV ranged between 0.70 and 0.90 which exceeded the limit of 0.70. Hence, it can be concluded that the constructs met the acceptable level of reliability (Nunnally, 1978) to check the constructs' internal consistency and validity.

4.2   Descriptive Analysis

4.2.1   Demographic Profile of the Respondents

Table 4.3 showed the statistic results on the respondents' gender, age,
highest education completed, current job position, length of time in logistic
industry, the ISO status of the organizations, whether the organizations had
implemented supply chain management, age of the organizations, types of
ownership, number of employees and types of services provided by the
organizations.

Table 4.3: Demographic Profile of the Respondents

Variables	Frequency	Percentage
Gender:		
Male	127	58.26
Female	91	41.74
Age:		
20 - 30	31	14.22
31 - 40	124	56.88
41 - 50	59	27.06
More than 50	4	1.83
Highest education completed:		
High School	10	4.59
Diploma	35	16.06
Degree/ Professional qualifications	151	69.27
Master / PHD	22	4.05
Current Job Position:		
Manager / Head of Department	164	75.23

General Manager / CEO / Director	54	24.77
Length of time in logistic industry: Less than 1 year	36	16.51
1 – 5 years	64	29.36
6 – 10 years	84	38.53
More than 10 years	34	15.60

Source: Developed for the research

Based on the results collected, male respondents occupied 58% while female respondents occupied the remaining 42%. Majority of the respondents' age were between 31 to 40 years old which made up of 57% respondents. Most of the respondents were of degree/professional qualifications, which occupied 69% out of total results. Besides, 75% of respondents were manager or head of department, while the remaining 25% of respondents were general manager or CEO or director. 39% respondents worked 6 to 10 years, 29% respondents worked 1 to 5 years, 17% respondents worked less than 1 year, and the remaining 16% respondents worked more than 10 years.

Variables	Frequency	Percentage
Status of the organization: ISO certified	134	61.47
Planning to ISO certification	84	38.53
Whether the company implements supply chain management: Yes	218	100.00
Age of firm: ≤ 10 years	63	28.90

> 10 years	155	71.10
Ownership:		
Foreign owned company	39	17.89
Stated owned company	81	37.16
Local private family owned company	98	44.95
Number of employee:		
≤ 50	82	37.61
50 – 200	97	44.50
201 or above	39	17.89
Types of services provided:		
Airfreight	53	24.31
Land and rail transport	120	55.05
Seafreight	45	20.64

Source: Developed for the research

Among all the respondents, majority of the respondents' status of organization were ISO certified (61.47%) and the remaining 34 firms (38.53%) were planning to ISO certification. All of the respondents' implements supply chain management. Majority of the respondents' age of firms were more than 10 years, which comprised of 155 (71.1%) respondents. The remaining 63 (28.9%) were more than 10 years. Majority of the respondents' ownership of firms were local private family owned company, which comprised of 97 (44.5%) respondents. Most of the firms' number of employees were 50 - 200 (44.5%), followed by less than 50 (37.61%) and 201 or above (17.89%). Most of the firms' types of services provided were land and rail transport, which comprised of 120 (55.50%) respondents, followed by airfreight (24.31%) and seafreight (20.64%).

4.2.2   Central Tendencies Measurement of Constructs

Table 4.4: Descriptive Statistics (n=218)

Variables	Item	Mean	Std. Deviation
Leadership (LD)	LD 1	4.6743	0.9105
	LD 2	4.6972	0.8747
	LD 3	5.2477	0.8496
	LD 4	5.1560	0.9075
	LD 5	5.1147	0.7978
Strategic Planning (SP)	SP 1	5.2615	0.8905
	SP 2	5.3807	0.7782
	SP 3	5.3119	0.7823
	SP 4	5.2615	0.9161
	SP 5	5.3624	0.8324
Customer Focus (CF)	CF 1	5.0505	1.0394
	CF 2	5.3028	0.9308
	CF 3	5.2248	0.8640
	CF 4	5.0734	0.9427
	CF 5	5.2431	0.8749
	CF 6	5.1697	0.8498
Human Resource Management (HR)	HR 1	5.3486	0.8411
	HR 2	5.0963	0.8613
	HR 3	5.2202	0.8243
	HR 4	5.1743	0.8297
	HR 5	5.1743	0.8939
	HR 6	5.1009	0.8688

	HR 7	5.2706	0.8452
Process Management (PM)	PM 1	5.5000	0.8600
	PM 2	5.2798	0.7618
	PM 3	5.1972	0.8493
	PM 4	5.2110	0.9064
	PM 5	5.3532	0.8528
Information Analysis (IA)	IA 1	5.1927	0.7308
	IA 2	5.0321	0.9425
	IA 3	5.1009	0.9051
	IA 4	5.1422	0.8495
	IA 5	5.2110	0.9216
Supply Chain Management	IM 1	4.9174	1.0035
	IM 2	5.2018	0.9579
	IM 3	5.1881	0.8011
	IM 4	4.9220	0.7965
	IM 5	4.9541	0.8734
	LS 1	4.6927	0.9514
	LS 2	4.8761	0.9544
	LS 3	4.9541	0.9685
	LS 4	4.7569	0.8854
	LS 5	4.6789	0.8786
	PR 1	4.9220	0.8843
	PR 2	5.0000	0.8533
	PR 3	5.2018	0.7891
	PR 4	4.7156	1.1568
	PR 5	4.7615	0.8841
	SO 1	5.2339	0.8005
	SO 2	5.1606	0.8297
	SO 3	5.2477	0.9470

| | SO 4 | 5.1789 | 0.8641 |
| | SO 5 | 5.2844 | 0.8269 |

Source: Developed for the research

The table revealed that the highest mean among the seven variables was PM1 by getting 5.5000 where majority agree to the item. The lowest mean was LD1 with 4.6743 which explained the respondents somehow agree the item to certain extent. Besides, PR4 had the highest standard deviation among all the items which indicated different range of opinion. On the other hand, IA1 had the lowest standard deviation among the variables which indicated a high consistency of opinion for the item.

4.3   Scale Measurement

4.3.1   Normality Test

Table 4.5: Normality Test

Total Quality Management Practices (TQM)

Variables	Item	Skewness	Kurtosis
Leadership	LD1	-0.3064	1.3245
	LD2	-0.4112	0.9177
	LD3	-0.0433	-0.2304
	LD4	-0.5753	1.2298
	LD5	-0.0444	0.0480

Strategic Planning	SP1	-0.1837	-0.0550
	SP2	0.1667	-0.0131
	SP3	-0.1446	-0.3474
	SP4	-0.1436	-0.0406
	SP5	0.0093	0.1062
Customer Focus	CF1	-0.5985	0.9380
	CF2	-0.3277	0.2369
	CF3	-0.2358	-0.0089
	CF4	-0.4139	0.3758
	CF5	-0.2034	0.5784
	CF6	0.03134	-0.3087
Human Resource Management	HR1	-0.4517	0.6069
	HR2	0.03119	0.4392
	HR3	-0.2301	-0.1373
	HR4	-0.0918	-0.3583
	HR5	-0.2723	0.4116
	HR6	-0.2824	0.5845
	HR7	-0.4097	0.7755
Process Management	PM1	-0.0658	-0.2134
	PM2	-0.1419	0.0191
	PM3	-0.1161	0.6388

	PM4	-0.3929	0.4181
	PM5	0.0164	-0.0282
Information Analysis	IA1	0.3270	0.0256
	IA2	0.0023	-0.4501
	IA3	-0.1634	0.0047
	IA4	-0.3219	0.1063
	IA5	-0.0042	-0.0407

Source: Developed for the research

Supply Chain Management (SCM)

Variables	Item	Skewness	Kurtosis
Information Management	IM1	-0.1369	-0.1395
	IM2	-0.1289	-0.0788
	IM3	-0.2445	-0.0811
	IM4	-0.2456	-0.5745
	IM5	-0.1200	0.3181
Lean System	LS1	-0.2570	1.2447
	LS2	-0.4234	0.9983
	LS3	-0.4606	0.9262
	LS4	-0.1058	0.0921
	LS5	-0.2702	0.5625

Partnership Management	PR1	-0.0484	-0.2016
	PR2	-0.1347	-0.0215
	PR3	-0.0909	0.0173
	PR4	-0.6708	0.1218
	PR5	-0.2806	0.4919
Strategy and Organization	SO1	-0.0126	0.3953
	SO2	-0.3571	0.3563
	SO3	-0.2516	0.0032
	SO4	-0.0087	-0.2331
	SO5	-0.3752	0.3677

Source: Developed for the research

Based on Table 4.5 showed the values of skewness and kurtosis of 218 respondents were between -2.0 and +2.0. Thus, normality of the standardized residual was assumed.

4.3.2   Reliability Test

Cronbach's Alpha was used to test reliability of the 53 items in measuring seven constructs. According to the rule of thumb, the value of Cronbach's Alpha which had exceeded 0.7 was considered as reliable and good.

Table 4.6: Reliability Test

Variables	Number of Items	Cronbach's Alpha
Leadership (LD)	5	0.7753
Strategic Planning (SP)	5	0.7206
Customer Focus (CF)	6	0.8666
Human Resource Management (HR)	7	0.8343
Process Management (PM)	5	0.7512
Information Analysis (IA)	5	0.8588
Supply Chain Management (SCM)	20	0.8930

Source: Developed for the research

Table 4.6 showed SCM had the highest reliability with Cronbach's Alpha value of 0.8930, followed by CF, IA, HR, LD, PM and SP with Cronbach's Alpha value of 0.8666, 0.8588, 0.8343, 0.7753, 0.7512 and 0.7206 respectively. In comparison, there was a moderate range of 0.1724 between the highest and the lowest Cronbach's Alpha value. Generally, all variables were considered reliable as the Cronbach's Alpha of each variable had exceeded 0.7.

4.4 Inferential Analysis

4.4.1 Pearson Correlation Coefficient Analysis

Table 4.7: Correlation Matrix for Supply Chain Management (SCM)

		LD	SP	CF	HR	PM	IA	SCM
LD	Pearson Correlation	1.0000						
	Sig.							
SP	Pearson Correlation	0.5341	1.0000					
	Sig.	<.0001						
CF	Pearson Correlation	0.4755	0.5920	1.0000				
	Sig.	<.0001	<.0001					
HR	Pearson Correlation	0.4207	0.6775	0.6914	1.0000			
	Sig.	<.0001	<.0001	<.0001				
PM	Pearson Correlation	0.6218	0.6963	0.6192	0.6719	1.0000		
	Sig.	<.0001	<.0001	<.0001	<.0001			
IA	Pearson Correlation	0.4143	0.6325	0.6289	0.7109	0.6255	1.0000	
	Sig.	<.0001	<.0001	<.0001	<.0001	<.0001		
SCM	Pearson Correlation	0.5009	0.6648	0.6960	0.7608	0.6535	0.7343	1.0000
	Sig.	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	

Source: Developed for the research

Note: LD=Leadership, SP=Strategic Planning, CF=Customer Focus, HR=Human Resource Management, PM=Process Management, IA=Information Analysis, SCM=Supply Chain Management

According to Toh, Marthandan, Yee, Ooi, and Arumugam (2009), correlation coefficient should not be more than 0.80 to avoid multicollinearity problem (Field, 2005). Since the highest correlation coefficient was 0.7608, which was less than 0.8, there was no multicollinearity problem in this study.

Based on the above table, all the associated pairs of variables were found to be statistically significance at the level of p<.0001. The analysis result implied that LD (r=0.5009, p=<.0001), SP (r=0.6648, p=<.0001), CF (r=0.6960, p=<.0001), HR (r=0.7608, p=<.0001), PM (r=0.6535, p=<.0001)and IA (r=0.7343, p=<.0001) were correlated to SCM. The correlation between HR and SCM is the strongest (r=0.7608, p=<.0001) whereas the relationship between LD and IA(r=0.4143, p=<.0001) is the weakest.

4.4.2 Multiple Linear Regressions (MLR)

Table 4.8: Model Summary

Model	R Square (R^2)	Adjusted R Square
1	0.6917	0.6830

Source: Developed for the research

The coefficient of determination R^2 is 68.30%. Thus, the TQM practices can significantly account for 68.30% in the SCM.

Table 4.9: Analysis of Variance

Source	Analysis of variance	
	F Value	Pr > F
Model	78.91	<.001

Source: Developed for the research

The F-statistics produced (F value = 78.91) was significant at 1% level (Sig. F = <.0001), thus confirming the fitness for the model. Therefore, there was a statistically significant relationship between the TQM practices and SCM.

Table 4.10: Coefficients

Variable	Parameter Estimate	Pr > |t|	Standardized Estimate	Tolerance	Variance Inflation
Parameter Estimates					
Intercept	0.8717	<.001	0		0.0000
Leadership (LD)	0.0867	0.0364	0.1059	0.5779	1.7305
Strategic Planning (SP)	0.0914	0.0907	0.1024	0.4053	2.4840
Customer Focus (CF)	0.0875	0.0365	0.1206	0.4452	2.2460
Human Resource Management (HR)	0.2843	<0.001	0.3322	0.3377	2.9610
Process Management (PM)	0.0316	0.5689	0.0367	0.3536	2.8282
Information Analysis (IA)	0.2152	<0.001	0.2908	0.4224	2.3673

Source: Developed for the research

Based on the Table 4.10, the least square prediction will be as below:-

SCM= 0.8717 + 0.0867 (LD) + 0.0914 (SP) + 0.0875 (CF) + 0.2843 (HR) + 0.0316 (PM) + 0.2152 (IA)

In order to test for multicollinearity problem among variables, variance inflation factor (VIF) and tolerance were applied. The multicollinearity statistics showed that the tolerance indicator for LD, SP, CF, HR, PM and IA were greater than 0.1, and their VIF values were less than 10. The result indicated that no multicollinearity problem had occurred (Ott & Longnecker, 2001).

The results showed that LD (p=0.0364), CF (p=0.0365), HR (p=<0.001) and IA (p=<0.0001) significantly affected the SCM. Based on Table 4.10, it indicated that the most important TQM practices that affected the SCM

were HR and IA followed by CF and LD. However, SP (p=0.0907) and PM (p=0.5689) were found to be not significantly related to SCM.

4.5   Conclusion

This chapter summarized and interpreted the output of SAS data collected from the survey. The major results, findings and interpretations will be used in next chapter for discussion, implications and conclusion of the overall research. Recommendations for future research on the limitation would also be included in Chapter 5.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATION

5.0 Introduction

In chapter 5, it provided a summary of statistical analyses that had been presented in previous chapter. Subsequently, major findings of study, implications and limitations were discussed. Recommendations for future researchers and conclusion were drawn at the end of this chapter.

5.1 Summary of Statistical Analysis

218 sets of questionnaires were analyzed for further study and summarized based on the statistical results in chapter 4. The analysis used included descriptive analysis, reliability test, normality test, Pearson Correlation Coefficient Analysis and Multiple Linear Regressions (MLR).

5.1.1 Descriptive Analysis

Based on the result, 127 of the respondents were male and 91 were female. Majority of the respondents' age were around 31 to 40 years old and only 4 of the respondents' age were more than 50. 151 of the respondents were holding a degree or professional qualifications. Most of the job position of the respondents was Manager/Head of Department, following by 54

General Manager/CEO/Director. 84 of the respondents have 6 to 10 years of experience in logistic industry, 64 respondents have 1 to 5 years of experience, 36 respondents have less than 1 year experiences and 34 respondents were in the logistic industry for more than 10 years. 63 of the respondents' age of firms were less than 10 years and 155 were more than 10 years. Majority of respondents' were ISO certified which consist of 134 respondents. 84 of the respondents were planning to apply for ISO certification. All 218 companies are implementing supply chain management in their company practices. Besides, 82 firms having equal or less than 50 employees, 97 firms having 51-200 employees and 39 firms having 201 or more employees. Furthermore, majority of the ownership of the firms were private, which comprised of 98 firms, following by 81 state-owned and 39 foreign-owned. Besides, most of the services provided by company was land and rail transport which comprises of 120 companies, follow by 53 company providing airfreight services and 45 companies with seafreight.

5.1.2 Scale Measurement

Skewness and kurtosis had values between -2.0 and +2.0, the result was normally distributed (Gujarati & Porter, 2009).

Table 5.1: Reliability Test (n=218)

Variables	Number of Items	Cronbach's Alpha
Leadership (LD)	5	0.7753
Strategic Planning (SP)	5	0.7206

Customer Focus (CF)	6	0.8666
Human Resource Management (HRM)	7	0.8343
Process Management (PM)	5	0.7512
Information Analysis (IA)	5	0.8588
Supply Chain Management (SCM)	20	0.8930

Source: Developed for the research

The above table showed SCM had the highest reliability with Cronbach's Alpha value of 0.893, following by CF, IA, HRM, LD, PM and SP with Cronbach's Alpha value of 0.8666, 0.8588, 0.8343, 0.7752, 0.7512 and 0.7206 respectively. Generally, all variables were deemed to be reliable as the Cronbach's Alpha of each variable had exceeded 0.70 (Nunnally, 1978).

5.1.3   Inferential Analysis

Table 5.2: Pearson Correlation Coefficient Analysis (n=218)

		LD	SP	CF	HR	PM	IA	SCM
LD	Pearson Correlation	1.0000						
	Sig.							
SP	Pearson Correlation	0.5341	1.0000					
	Sig.	<.0001						
CF	Pearson Correlation	0.4755	0.5920	1.0000				

	Sig.	<.0001	<.0001				
HR	Pearson Correlation	0.4207	0.6775	0.6914	1.0000		
	Sig.	<.0001	<.0001	<.0001			
PM	Pearson Correlation	0.6218	0.6963	0.6192	0.6719	1.0000	
	Sig.	<.0001	<.0001	<.0001	<.0001		
IA	Pearson Correlation	0.4143	0.6325	0.6289	0.7109	0.6255	1.0000
	Sig.	<.0001	<.0001	<.0001	<.0001	<.0001	
SCM	Pearson Correlation	0.5009	0.6648	0.6960	0.7608	0.6535	0.7343	1.0000
	Sig.	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	

Source: Developed for the research

Table 5.02 showed that p-value of all the associated pairs of variables were <.0001, which indicated that all the IVs were moderately and positively correlated to Supply Chain Management. Besides, all the correlation coefficients were below 0.80, which indicated that there was no multicollinearity problem.

Table 5.3: Multiple Linear Regression

	Parameter Estimate	Pr > |t|
Intercept	0.8717	<.0001
Leadership (LD)	0.0867	0.0364
Strategic Planning (SP)	0.0914	0.0907

Customer Focus (CF)	0.0875	0.0365
Human Resource Management (HR)	0.2843	<0.001
Process Management (PM)	0.0316	0.5689
Information Analysis (IA)	0.2152	<0.001
R^2		0.6917
Adjusted R^2		0.6830
F		78.91
Sig.		<.001

Source: Developed for the research

The result showed that the IVs had significant relationship with Supply Chain Management since the coefficient of LD, CF, HR and IA were 0.0364, 0.0365, <0.001 and <0.001 respectively, except SP and PM (p=0.1241) which had coefficient of more than 0.05, had no significant relationship with Supply Chain Management.

The formula of MLR is as below:

SCM = 0.8717 + 0.0867 (LD) + 0.0914 (SP) + 0.0875 (CF) + 0.2843 (HR) + 0.0316 (PM) + 0.2152 (IA)

HR had the greatest influence on SCM as it had the greatest predicting power (Parameter Estimate=0.2843). Overall, 68.30% of the variation of Supply Chain Management can be explained by all the IVs.

5.2   Discussions of Major Findings

5.2.1   Leadership (LD)

Based on the Multiple Linear Regression (MLR) results, LD exhibited a significant relationship with supply chain management (SCM) (p-value = 0.0364 which is <0.05). Hence, the hypothesis in this research was supported. There was a significant relationship between LD and SCM.

Our result was consistent with prior researchers that found out transformational supply chain leadership positively influence supply chain performance (Defee, Stank & Esper, 2010), and with the encouragement of quality management from superiors, a firm was more likely to achieve the highest optimum profit (Danusantosa, 2011). Besides, since information management was part of SCM (Talib, Rahman & Qurenshi, 2010), it was found that supportive LD positively influences its IT support capability for SCM (Li, 2006).

LD had positive influence on SCM because having strong commitment and encouragement from top level managers was essential for quality performance. Besides, the allocation of adequate resources by top management helped to improve quality in SCM. The positive relationship between LD and SCM also implied that management placed more emphasis on quality than cost and viewed improvement in quality as a way to boast profits.

5.2.2   Strategic Planning (SP)

The result of p-value for SP was 0.0907 based on the MLR results (p-value = 0.0907 which is >0.05). The H2 in this study was not supported. There was no significant relationship between SP and SCM in Malaysian logistic companies.

Our result was contradicted with prior researchers that found out SP had direct influence on the firm's supply chain performance (Soni & Kodali, 2011). However, it was consistent with Rudd, Greenley, Beatson and Lings (2007) which stated that flexibility mediates the relationship between SP and performance. As according to Shrader, Taylor and Dalton (1984); Pearce, Freeman and Robinson (1987), there were also evidence suggesting that no positive relationship exists between SP and performance (Rudd et al., 2007). Even though SP is a process for anticipating environmental turbulence, the logical sequential process often prescribed in the literature, was not enough to affect performance. Flexibility in decisions was needed to change operational issues and financial issues to impact on financial performance. Similarly, flexibility in decisions was needed to change structural issues and technological issues to impact on non-financial performance such as supply chain performance (Rudd et al., 2007).

It was surprising that SP was found to be not significant in improving supply chain performance even though the mean value for each item tested for SP was on average of 5.3156. It was possible that many tools for SP failed to improve supply chain performance because organizations may have their own unique culture, thus increasing the complexity of planning process to focus on quality in SCM (Wirkkula, 2007). Besides, the large

size of institution, resistance to the planning process, integration of other planning processes with the strategic plan and having too many goals pose a great challenge to organizations to ensure the high quality of SCM (Wilcoxson, 2012). Moreover, supply chain options were often ignored during strategic planning because most companies focused on qualitative, managerial judgments about future directions of the firm and the markets in which they compete (Shapiro, 2003).

5.2.3   Customer Focus (CF)

The MLR's result showed a positive relationship between CF and SCM with the p-value 0.0365, which was <0.05. In other words, H3 was supported and there was a significant relationship between CF and SCM.

Our result was in line with past studies of Lado, Paulraj and Chen (2011), which proved that CF could positively influence SCM by improving supply-chain relational capabilities and financial performance. Besides, Chen and Paulraj (2004) also revealed that CF had a significant correlation with SCM. Moreover, Martin and Grbac (2003) stated that positive effects of strong supplier relationships were enhanced in market-oriented companies where customer responsiveness was one of the elements of market orientation.

Based on the result, the positive relationship between CF and SCM reflected the importance of introducing "customer focus" philosophy in organization. Collecting complaints from customers and communicating customers' requirement to employees were essential for a successful SCM

because when employees understand customers' needs, they could satisfy them easily thus lead to greater performance in SCM. Besides, following up with customers helped organizations to receive prompt and actionable feedback, and these feedbacks could allow organizations to reset their standards to fit customer needs and expectations. Having CF in organizations also implied that organizations had actively seek ways to improve customer services to achieve a good supply chain performance.

5.2.4   Human Resource Management (HR)

According to the Multiple Linear Regression (MLR) result, it showed that the p-value for HR was <0.001, which was less than the value of 0.05. This indicated that the H4 was supported. In other words, there was a significant relationship between HR and firm's supply chain performance.

Result showed there was a positive relationship between HR and firm's supply chain performance, this was consistent with the past empirical study of Okeudo (2012) which proved that HRM practices were effective in building logistic and supply chain capabilities. Furthermore, Gowen III and Tallon (2002) found out that two important human resource factors, namely management and employee support, positively affect the competitive results of SCM practices. Our result also supported by past researcher which stated that HRM had a significant relationship with effective SCM (Doerflein, 2005).

HR has positive influence on SCM because providing training and training resources to employees was important in implementing quality in SCM. Implementation of employees' suggestions and providing awards for

excellent suggestions also suggested that valuable suggestions from employees were crucial for top management's decision in improving supply chain performance. In addition, the positive impact of HR on SCM was due to employees were responsible for the quality of their own work and actively involved in quality management-related activities. Moreover, results also proved that if organizations had many active improvement teams and provided assistance mechanism to solve quality problems, supply chain performance could be enhanced.

5.2.5   Process Management (PM)

There was no significant relationship between PM and SCM (p-value = 0.5689, which is >0.05) based on the MLR result. Therefore, H5 was not supported.

Our result was contradicted with prior researchers that found out value chain management such as long-term relationship with suppliers and customers could lead to process and performance improvements in both industries (Ittner & Larcker, 1997).

However, it was consistent with Grzybowska (2012) which concluded that continuous improvement (enabler 11) was weak driver and weak dependent and did not have much influence on the sustainability in the Supply Chain. The researcher identified 16 enablers and determined contextual relationship among enablers with respect to which pairs of variables would be examined. The researcher then marked dependencies using expert opinion and prepared Structural Self-Interaction Matrix (SSIM).

Although the mean value for each item tested for PM was on average of 5.3082, it was surprising to found that there was no significant relationship between PM and supply chain performance. The possible reason why many tools for PM failed to improve supply chain performance was due to continuous process improvement could be an administrative burden (Hamm, 2013). Besides, PM alone was difficult to improve supply chain performance, it required senior leader commitment for an organization to enjoy the benefits of continuous process improvement (Hamm, 2013).

5.2.6   Information Analysis (IA)

The MLR's result showed a positive relationship between IA and SCM with the p-value <0.001, which was <0.05. In other words, H6 was supported and there was a significant relationship between IA and SCM.

Our result was in line with past studies of Samuel, Goury, Gunasekaran and Spalanzani (2011), which showed that knowledge management, which was part of IA, enhances the SCM competitiveness. Besides, Vanichchinchai and Igel (2010) also proved that IA has direct effect on SCM practices. Moreover, Forker, Mendez and Hershauer (1997) stated that manufacturers are encouraged to promote TQM practices, which include IA, throughout the supply chain in order to have a better performance.

IA had a positive effect on SCM because when there was information sharing among functions, employees from different departments shared the same objective for quality improvement, hence supply chain performance

could be improved eventually. Based on the result, it implied that if organizations made effort to enhance quality such as using quality improvement tools and examining customer-related data, organizations could develop priorities for improvement and lead to a successful SCM. Furthermore, keeping information technology current with changing business needs helped to ensure that organizations were constantly up-to-date to the changing environment in order to satisfy the latest needs and achieve a high supply chain performance.

5.3   Implication

Recently, quality has become a major issue for organization as well as working collaboratively with suppliers and customers. In order to achieve a better performance, organization should understand the correlation of TQM and SCM as well as implementing these two management system in the organization. Hence, by using the derived results in analysis, the firm may implement TQM practices which have positive influences on SCM to enhance organizational performance.

5.3.1   Theoretical Implications

This study provided several implications. First of all, this research was an extended model of past researchers (Vanichchinchai & Igel, 2010). This research had studied the implementation of TQM practices which promotes SCM in enhancing logistic company's quality and supply performance. Past researches have not individually examined the correlation between the TQM and SCM of logistic companies, which was

seen to be the core of supply chain as quality has occupied an increasingly decisive position in the organizational performance of logistic companies. Its significance was not only constrained to logistic companies because both of TQM and SCM are equally important to enhance the operational efficiency in every industry.

Furthermore, this study is the first research that study on the logistic companies in Malaysia and it is also the first research adopting the six major fundamental practices of MBNQA model as TQM practices. MBNQA is an international quality leader which recognized by Global Excellence Model (GEM) Council while its practices had been broadly recognized and adopted in worldwide companies.

In addition, it had been found out that there were no prior research of TQM and SCM conducted in the ASEAN region, therefore it can be a useful start for foreign researchers that plan to conduct research on TQM and SCM in Asian countries. It normally can be used for multi-country comparison in research paper since this research was conducted in Malaysia.

5.3.2 Managerial Implications

This study had greatly contributed to the logistic companies that focus or plan to implement SCM as quality was currently in the trend of priority of all organization. Top management of logistics companies can gain from this study in prioritizing the implementation of TQM practices on SCM and applying them in improving companies' performance. Besides, those

companies which have not implemented both of the management principles can further understand the concepts through this study and implement them efficiently in their operating systems.

Since HR and IA were the most significant attributes among all IVs, logistic companies should start to focus these two elements into their operation. HR was found as the most significant determinant in improving supply chain performance among the six factors because the ways organizations manage their people had exerted a great impact throughout the supply chain. It is undeniable that successful management of supply chain rests mainly on the performance of people as managing the people is equally important with managing overall strategy. Fully incorporation of HRM into SCM can lead to a business with a clearer definition of its overall strategy by employing HRM practices to align a whole connected workforce whereby the long term improvements in productivity and efficiency could be achieved.

The significance of IA which found in this study implied that a fast data transfer and information technology in supply chain resulting in increased cooperation between the supply chain and finally increased efficiency throughout the supply chain. Furthermore, the information sharing with customers, suppliers and within organization can directly affect SCM as information systems which are now the creator of value information systems had played the role of integration and coordination between different parts of the supply chain and had great impact on the efficiency of SCM. Thus, for the improvement of supply chain performance, company managers should take initiative to get the information technology up-to-date to enable IA to generate a more accurate and value information for company operations.

Besides, the findings also reflected the importance of CF in improving SCM. Since supply chains are designed to deliver superior value to customers in terms of customer satisfaction, the positive relationship between CF and SCM imply that organization managers can improve customers' services, following up with customers and take actionable feedback in order to improve quality in SCM. It is vital for top management of logistics firm to focus on customers need and ensure customers satisfaction.

In addition, the result showed that LD had positive influence on supply chain management. Literally, increasing in productivity within supply chain and enhancement in overall business performance could be achieved through a top down approach which means everything rises and falls on leadership. Therefore, commitment from top management was essential in improving supply chain performance. They must be able to formulate a comprehensive plan to incorporate the workforce into the culture of supply chain by emphasizing ways in which employees and management may improve their workplace strategies and execution in SCM.

However, SP and PM were found to be insufficient to have positive influence on SCM. Even though they had no direct relationship with SCM but they did play vital role in implementing successful SCM in organization. The future planning of the organization should be clearly stated by top management to ensure the smoothness of the organization operation. Therefore, further research maybe taken to improve the SP and PM practices in future in order to fully enhance successful SCM in organization.

5.4 Limitations and Recommendations for future research

The main limitation of this study is that the research was focusing on companies from a single sector with a relatively small sample size. The focus on ISO certified logistics companies in Malaysia had excluded those organizations without formal quality management certification but may have well developed supply chain control programs. Hence, the findings cannot be generalized to all organizations in Malaysia. Future research is suggested to cover a larger size of sample as the comparison with results based on a larger sample would help to verify the validity of the results. Samples from various sectors should be included in future research to allow the detailed cross-sectorial comparisons (Jabbour, Filho, Viana & Jabbour, 2011).

Besides, this study has only targeted one country which is Malaysia and the consistency of the results with foreign countries had to be verified in future research. Thus, future study should endeavour to carry out a multi-country comparison to test the relationship between TQM practices and SCM as well as the moderating factors such as behavioural or culture issues in other countries (Vanichchinchai & Igel, 2009; Jabbour et al., 2011)

Another drawback of this study was that the e-mail questionnaires method used in the data collection may suffer from response bias. It was due to several factors such as survey questionnaires may pass to different target respondents. Since the data were collected through online survey, the identity of respondents could not be identified. According to Kawulich (2005), it would be useful to include interviews, site visits and documents research to increase the research reliability and validity. It had been found out that there were many organizations including their people

still had limited understandings about the concept of TQM and SCM in terms of knowing what had to be implemented and what area to focus on (Sharma & Kodali, 2008). Therefore, future researchers should collect data through field observations and interview of managers (Sit, Ooi, Lin & Chong, 2009) instead of online survey so that the definitions of the terms could be explained and the doubts could be answered on the spot.

Furthermore, this study was a cross-sectional study, which collected data from population at a single specific point in times and lack trends or changes. Hence, future research can carry out a longer term of longitudinal study to provide and generate more reliable result (Loh, 2008). When there is no time and budget constraint, a longitudinal study would be more useful in promoting a better understanding of sustainability trends.

5.5   Conclusion

In this continually changing global market with rapid economic growth, many countries especially China were facing serious quality problem. The subject of TQM practices and their impact on business performance had been addressed repeatedly in this twenty first century to solve the quality problem. Due to this, Sila et al. (2006) had shown that TQM and SCM have both played an increasingly important role in strengthening organizational competitiveness in every dimension (Vanichchinchai & Igel, 2009). This paper explored the current status and relationship of TQM practices and SCM of logistics companies with ISO certification in Malaysia.

Among the 6 antecedents sorted in this study, the empirical results showed that LD (p=0.0364) have a significant relationship with SCM (Defee, Stank & Esper,

2010). It was considered to be the crucial roles for achieving successful quality performance which contributed to improve SCM (Sharma & Kodali, 2008). However, the empirical results showed that SP (p=0.0907) had no direct relationship on SCM (Rudd et al., 2007). On the other hand, CF (p=0.0365) was proved to be included as part of SCM as the companies must understand the expectations and needs of customers to achieve customer satisfaction (Sharma & Kodali, 2008). HRM was also proved to have some significant relationship with SCM (Okeudo, 2012; Doerflein, 2005). On the other hand, it was also proved that there was no any significant relationship between PM (p=0.5689) and SCM (Grzybowska, 2012). It may be caused by the high investment cost in designing and improving the production process which had led to managerial burden. Besides, the empirical results also showed that IA had a direct relationship with SCM (Samuel et al., 2011; Vanichchinchai & Igel, 2010; Forker et al., 1997).

In general, this research was one of the few researchers to study TQM practices and SCM in Malaysia. Hence, future researchers should invest more effort to carry out such research in other sectors in developing countries such as Malaysia in order to explore how the strengths of TQM principles could be integrated into SCM at the same time provide a more useful insight from both a practical and research perspective.

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Appendices

Appendix A

*Summary of Past Empirical Studies on Total quality management (Leadership,
Strategic Planning, Customer Focus, Human Resource Management, Process
Management and Information Analysis) on supply chain management*

Leadership

Study	Country	Data	Findings
Defee, Stank & Esper, 2010	United States	Experimental design via a simulated supply chain environment and survey data collected from 253 executives, managers and senior analysts who having multiple years of supply chain experience	Based on structural equation modelling, findings showed that transformational SCL and SCF were positively related to informal communication and holistic rewards across the supply chain. Results also revealed that the relationship between transformational SCL and information availability was not significant, whereas the relationship between transformational SCF and information availability was significant.
Li, 2006	Spain	Online survey sent to 5000 addresses obtained from Institute for Supply Management	The result of equation modelling proved that an organization's supportive leadership positively influences its IT support capability for supply chain management.
Danusantosa, 2011	United States	Comparative analysis with a centralized supply chain, where CEM, OEM and Retailer were all within one firm.	Results showed that supply chains in which the Retailer acts as the Stackelberg leader have the highest optimum profit regardless of the demand function.

Strategic Planning

Study	Country	Data	Findings
Soni & Kodali, 2011	India	Online survey was sent to 753 manufacturing companies through e-mail to manufacturing companies	Choice of competitive strategy and supply chain strategy affected business and supply chain performance.
Karim, 2011	Bahrain	190 survey questionnaires were distributed equally to the two financial institutions	Management information system was primarily used in banks to enhance strategic planning.
Heist, 2011	United States	100 web-based survey questionnaires were distributed to volunteer and paid church information technology professionals	Result showed a significance relationship between information technology management effectiveness and strategic planning.

Customer focus

Study	Country	Data	Findings
Lado, Paulraj, & Chen, 2011	United States	952 surveys were sent to the companies in US manufacturing industries	The finding shows a significant positive relationships between customers focus and supply chain management.
Chen & Paulraj, 2003	United States	952 Cross-sectional mail survey of target sample under members of the Institute for Supply Management	The result concluded that customer focus has a significant correlation with SCM.

		(ISM) in the United States was utilized for data collection	
Martin & Grbac, 2003	Ohio, United States	1200 Cross-sectional survey of a broad sample of industries of manufacturers, wholesalers and industrial service companies from the state of Ohio was randomly selected	The result supports the notion that supplier relationships are one way of leveraging a company's market orientation through improved customer responsiveness (customer focus).

Human Resource Management

Study	Country	Data	Findings
Okeudo, 2012	Nigeria	150 questionnaires to human resource managers and other staffs in four selected logistics companies within South-Eastern region of Nigeria	Using hierarchical regression analysis, this study showed that core practices of HRM, which are recruitment and selection, performance appraisal, training and development, health and safety of employee, and compensation and benefits were effective in building logistics and supply chain capabilities.
Gowen III & Tallon, 2002	United States	Questionnaires to all of the corporations on Fortune's list of the 1000 largest US firms	Based on statistical analysis, two important human resource factors, namely management and employee support, positively and significantly affect the competitive results of all five SCM practices.
Doerflein, 2005	United States	Questionnaires to 1500 potential respondents randomly selected from a mailing list obtained from Penton Lists	The result of the Statistical Program for Social Science (SPSS) showed that HRM had a significant relationship with effective SCM.

Process Management

Study	Country	Data	Findings
Forslund & Jonsson, 2008	Sweden	705 web-based questionnaires were sent to purchasing managers in manufacturing companies	Supplier relationship and operational tool obstacles significantly hindered performance management process integration.
Ittner & Larcker, 1997	United States	Secondary data was taken from a past survey results in automobile and computer industries	Value chain management can lead to process and performance improvements in automobile and computer industries.
Neubauer, 2009	Austria	185 questionnaires were distributed to medium and large IT-driven enterprises in Austria, Germany and Switzerland	IT-applications must be selected and implemented appropriately in order to execute corporate business processes efficiently.

Information Analysis

Study	Country	Data	Findings
Samuel, Goury, Gunasekaran & Spalanzani, 2010	France	Questionnaires were distributed to the logistics managers, supply chain managers and engineers in the private sector	The findings show that knowledge management enhances the SCM competitiveness.
Vanichchinchai & Igel, 2010	Thailand	Questionnaires were sent to the managing director or	The findings showed that information analysis do have direct effect on supply chain management practices.

		president of the automobile company.	
Forker, Mendez & Hershauer, 1997	United States	The target respondents were the electronic components industry. Survey instruments were mailed to 421 suppliers and the responses rate was 292	The findings encourage manufacturers to continue promoting TQM practices throughout the supply chain as certain practices do lead to better performance, which include information analysis (quality data and reporting).

Appendix B

Variables and Measurement

Variables, Descriptions, References and Measurements of Questionnaires for Total Quality Management on Supply Chain Management of logistics companies in Malaysia.

TQM

Variable	Item	Description	References	Measurement
Leadership	LD 1	Our top level managers strongly encourage employee (worker) involvement in quality management	Sila and Ebrahimpour (2005)	Interval scale
	LD 2	Our top management allocate adequate resources toward efforts to improve quality	Sila and Ebrahimpour (2005)	Interval scale
	LD 3	Our top management takes responsibility for quality performance	Sila and Ebrahimpour (2005)	Interval scale
	LD 4	Our top management views improvements in quality as a way to increase profits	Sila and Ebrahimpour (2005)	Interval scale
	LD 5	Our top management places more emphasis on quality than cost	Sila and Ebrahimpour (2005)	Interval scale
Strategic Planning	SP 1	Our mission has a clear focus on quality	Sila and Ebrahimpour (2005)	Interval scale
	SP 2	We take a clear long-term view on how to achieve our goals	Sila and Ebrahimpour (2005)	Interval scale

	SP 3	We set and review our short and long-term goals through a comprehensive planning process	Sila and Ebrahimpour (2005)	Interval scale
	SP 4	We allocate sufficient resources for the successful implementation of strategies focused on quality	Sila and Ebrahimpour (2005)	Interval scale
	SP 5	At each level of the company, teams are assigned to set objectives and devise action plans	Sila and Ebrahimpour (2005)	Interval scale
Customer Focus	CF 1	We have a system for collecting complaints or suggestions from customers	Sila and Ebrahimpour (2005)	Interval scale
	CF 2	We have actively seeks ways to improve our services in order to achieve greater customer satisfaction	Sila and Ebrahimpour (2005)	Interval scale
	CF 3	We have introduced and maintained the "customer focus" philosophy for a long time	Sila and Ebrahimpour (2005)	Interval scale
	CF 4	We reset our standards whenever customer needs and expectations change	Sila and Ebrahimpour (2005)	Interval scale
	CF 5	Customers requirement are communicated to employees	Sila and Ebrahimpour (2005)	Interval scale

	CF 6	We follow up with customers on services provided to receive prompt and actionable feedback	Sila and Ebrahimpour (2005)	Interval scale
Human Resource Management	HRM1	We provide training and training resources to employees (workers) and encourage them to attend these training programs	Sila and Ebrahimpour (2005)	Interval scale
	HRM 2	We have many active improvement teams	Sila and Ebrahimpour (2005)	Interval scale
	HRM 3	We actively evaluate and implement employees' suggestions related to quality and supply chain management, if they are suitable	Sila and Ebrahimpour (2005)	Interval scale
	HRM 4	Our line employees (workers) are responsible for and inspect the quality of their own work (self-inspection)	Sila and Ebrahimpour (2005)	Interval scale
	HRM 5	We have an assistance mechanism (problem solving network) to help line employees solve quality problems	Sila and Ebrahimpour (2005)	Interval scale
	HRM 6	Our employees (workers) are actively involved in quality management-related activities	Sila and Ebrahimpour (2005)	Interval scale
	HRM	We provide awards to	Sila and	Interval scale

	7	individuals and groups for excellent suggestions	Ebrahimpour (2005)	
Process Management	PM 1	Our service specification are clear	Sila and Ebrahimpour (2005)	Interval scale
	PM 2	Every attempt has been made to ensure that our process design is fail-safe so that the possibility of employee errors is reduced	Sila and Ebrahimpour (2005)	Interval scale
	PM 3	We give clear, standardized work or process instructions to employees	Sila and Ebrahimpour (2005)	Interval scale
	PM 4	We continually use internal or external audits to make sure we deliver quality services	Sila and Ebrahimpour (2005)	Interval scale
	PM 5	We emphasize the continuous improvement of quality in all work processes	Sila and Ebrahimpour (2005)	Interval scale
Information Analysis	IA 1	We have information sharing among functions for the objectives of quality improvement	Sila and Ebrahimpour (2005)	Interval scale
	IA 2	We display information on quality performance at most of the work stations and everybody knows it	Sila and Ebrahimpour (2005)	Interval scale
	IA 3	We use quality improvement tools and techniques extensively for process	Sila and Ebrahimpour (2005)	Interval scale

		management and improvement		
	IA 4	We examine customer-related/market data to develop priorities for improvement	Sila and Ebrahimpour (2005)	Interval scale
	IA 5	We keep our information technology current with changing business needs and directions	Sila and Ebrahimpour (2005)	Interval scale

SCM

Variable	Item	Description	References	Measurement
Information Management	IM 1	We contact the end users of our services to get feedback on service performance	Vanichchinchai and Igel (2010)	Interval scale
	IM 2	We evaluate formal and informal complaints as well as satisfaction of our trade partners.	Vanichchinchai and Igel (2010)	Interval scale
	IM 3	We apply advanced information technology in our supply chain.	Vanichchinchai and Igel (2010)	Interval scale
	IM 4	We have a common standard for information sharing for our trade partners to follow.	Vanichchinchai and Igel (2010)	Interval scale
	IM 5	We have information sharing among functions for the objectives of supply chain management.	Vanichchinchai and Igel (2010)	Interval scale

Lean System	LS 1	We streamline business processes (e.g. ordering, shipping, receiving, and other paperwork) with our trade partners	Vanichchinchai and Igel (2010)	Interval scale
	LS 2	We reduce response time.	Vanichchinchai and Igel (2010)	Interval scale
	LS 3	We have continuous improvement activity.	Vanichchinchai and Igel (2010)	Interval scale
	LS 4	We involve in teams our trade partners to improve our supply chain.	Vanichchinchai and Igel (2010)	Interval scale
	LS 5	We have contingency management system for unexpected events (e.g. order change or cancellation, computer network down).	Vanichchinchai and Igel (2010)	Interval scale
Partnership Management	PR 1	We share knowledge about core business processes with our trade partners.	Vanichchinchai and Igel (2010)	Interval scale
	PR 2	We share improvement benefits as well as other risks and rewards with our trade partners	Vanichchinchai and Igel (2010)	Interval scale
	PR 3	We develop a long-term relationship and trust with our trade partners.	Vanichchinchai and Igel (2010)	Interval scale
	PR 4	We rely on a small number of quality trade partners	Vanichchinchai and Igel (2010)	Interval scale
	PR 5	We have common goals agreed with our trade	Vanichchinchai and Igel (2010)	Interval scale

		partners.		
Strategy and Organization	SO 1	We have a supply chain performance measurement system.	Vanichchinchai and Igel (2010)	Interval scale
	SO 2	We have organizational structure which facilitates business process integration with our trade partners.	Vanichchinchai and Igel (2010)	Interval scale
	SO 3	Our top level managers strongly encourage employee (worker) involvement in supply chain management.	Vanichchinchai and Igel (2010)	Interval scale
	SO 4	Our employees (workers) are actively involved in supply chain management-related activities.	Vanichchinchai and Igel (2010)	Interval scale
	SO 5	Our organization has an open, trusting culture with low bureaucracy. Our working environment is very good for supply chain management.	Vanichchinchai and Igel (2010)	Interval scale

Appendix C: Permission Letter to Conduct Survey

UNIVERSITI TUNKU ABDUL RAHMAN

Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

UTAR

22nd July 2013

To Whom It May Concern

Dear Sir/Madam

Permission to Conduct Survey

This is to confirm that the following students are currently pursuing their *Bachelor of Commerce (HONS) Accounting* program at the Faculty of Business and Finance, Universiti Tunku Abdul Rahman (UTAR) Perak Campus.

I would be most grateful if you could assist them by allowing them to conduct their research at your institution. All information collected will be kept confidential and used only for academic purposes.

The students are as follows:

Name of Student	Student ID
PHUAH YAN YING	10ABB05209
PHUAH WEN HAO	10ABB05506
KEVIN TAN KAH SENG	10ABB05661
NG HUI PING	10ABB04752
TAN CHIN WERN	10ABB05192

If you need further verification, please do not hesitate to contact me.

Thank you.

Yours sincerely

....
Mr Mahendra Kumar a/l Chelliah
Head of Department,
Faculty of Business and Finance
Email: mahendra@utar.edu.my

....
Ms Lee Voon Hsien
Supervisor,
Faculty of Business and Finance
Email: leevh@utar.edu.my

Address: 9, Jalan Bersatu 13/4, 46200 Petaling Jaya, Selangor Darul Ehsan, Malaysia **Postal Address:** P O Box 11384, 50744 Kuala Lumpur, Malaysia
Tel: (603)7958 2628 **Fax:** (603) 7956 1923 **Homepage:** http://www.utar.edu.my

UNIVERSITI TUNKU ABDUL RAHMAN

Faculty of Business and Finance

BACHELOR OF COMMERCE (HONS) ACCOUNTING

FINAL YEAR PROJECT

Total Quality Management on Supply Chain Management: A study on logistics companies in Malaysia.

Survey Questionnaire

The purpose of this survey is to examine the relationship of total quality management (TQM) and supply chain management (SCM) in your organization. Please answer all questions to the best of your knowledge. There are no wrong responses to any of these statements. All responses are completely confidential.
We seek respondents who have knowledge in TQM and SCM. Thank you for your participation.

Instruction:

1) There are SIX (6) sections in this questionnaire. Please answer ALL questions in ALL sections.

2) This will only take you approximately 15 to 20 minutes.

3) Please feel free to share your comment in the space provided. The contents of this questionnaire will be kept **strictly confidential**.

Section A Personal Profile

*In this section, we are interested in your background in brief. Please tick your answer and
your answers will be kept strictly confidential.*

QA1: Gender:

      Male

      Female

QA2: Age:

      20-30

      31-40

      41-50

      More than 50

QA3: Highest education completed:

      High School

      Diploma

      Degree/ Professional qualifications

      Master/PHD

      Other (please specify): _____

QA4: Current job position:

      Executive

      Manager/Head of Department

      General Manager/ CEO/ Director

      Other (please specify):_____

QA5: Length of time in logistic industry:

      Less than 1 year

      1-5 years

      6-10 years

      More than 10 years

Section B: Company Profile

*In this section, we are interested in your company background in brief. Please tick your
answer and your answers will be kept strictly confidential.*

QB1: Status of your organization:

    ISO Certified

        If yes, how long has your organization been committed to the certification?

        Please specify:_____

    Planning to ISO Certification

    Non- ISO Certified

QB2: Does your company implement supply chain management?

    Yes

    No

QB3: Age of firm:

    ≤ 10 years old

    > 10 years old

QB4: Ownership:

    Foreign owned company

    State owned company

    Local private family owned company

      Chinese

      Non-Chinese

    Other:_____

QB5: Number of employee:

    ≤ 50

    51-200

    201 or above

QB6: Type of services provided in your company:

    Airfreight

    Land and rail transport

    Seafreight

Section C: Total Quality Management Practices (TQM)

This section is seeking your opinion regarding the Total Quality Management (TQM) practices in your company. Please indicate [(1) = Strongly Disagree; (2) = Disagree; (3) = Neutral; (4) Agree; (5) Strongly Disagree]

C1 – Leadership (LD)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
LD1	Our top level managers strongly encourage employee (worker) involvement in quality management	1	2	3	4	5	6	7
LD2	Our top management allocate adequate resources toward efforts to improve quality	1	2	3	4	5	6	7
LD3	Our top management takes responsibility for quality performance	1	2	3	4	5	6	7
LD4	Our top management views improvements in quality as a way to increase profits	1	2	3	4	5	6	7
LD5	Our top management places more emphasis on quality than cost	1	2	3	4	5	6	7

C 2 – Strategic Planning (SP)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
SP1	Our mission has a clear focus on quality	1	2	3	4	5	6	7
SP2	We take a clear long-term view on how to achieve our goals	1	2	3	4	5	6	7
SP3	We set and review our short and long-term goals through a comprehensive planning process	1	2	3	4	5	6	7
SP4	We allocate sufficient resources for the successful	1	2	3	4	5	6	7

	implementation of strategies focused on quality							
SP5	At each level of the company, teams are assigned to set objectives and devise action plans	1	2	3	4	5	6	7

C3 – Customer Focus (CF)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
CF1	We have a system for collecting complaints or suggestions from customers	1	2	3	4	5	6	7
CF2	We have actively seeks ways to improve our services in order to achieve greater customer satisfaction	1	2	3	4	5	6	7
CF3	We have introduced and maintained the "customer focus" philosophy for a long time	1	2	3	4	5	6	7
CF4	We reset our standards whenever customer needs and expectations change	1	2	3	4	5	6	7
CF5	Customers requirement are communicated to employees	1	2	3	4	5	6	7
CF6	We follow up with customers on services provided to receive prompt and actionable feedback	1	2	3	4	5	6	7

C4- Human Resource Management (HR)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
HR1	We provide training and training resources to employees (workers) and encourage them to attend these training programs	1	2	3	4	5	6	7

HR2	We have many active improvement teams	1	2	3	4	5	6	7
HR3	We actively evaluate and implement employees' suggestions related to quality and supply chain management, if they are suitable	1	2	3	4	5	6	7
HR4	Our line employees (workers) are responsible for and inspect the quality of their own work (self-inspection)	1	2	3	4	5	6	7
HR5	We have an assistance mechanism (problem solving network) to help line employees solve quality problems	1	2	3	4	5	6	7
HR6	Our employees (workers) are actively involved in quality management-related activities	1	2	3	4	5	6	7
HR7	We provide awards to individuals and groups for excellent suggestions	1	2	3	4	5	6	7

C5- Process Management (PM)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
PM1	Our service specification are clear	1	2	3	4	5	6	7
PM2	Every attempt has been made to ensure that our process design is fail-safe so that the possibility of employee errors is reduced	1	2	3	4	5	6	7
PM3	We give clear, standardized work or process instructions to employees	1	2	3	4	5	6	7
PM4	We continually use internal or external audits to make sure we deliver quality services	1	2	3	4	5	6	7

PM5	We emphasize the continuous improvement of quality in all work processes	1	2	3	4	5	6	7

C6 – Information Analysis (IA)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
IA1	We have information sharing among functions for the objectives of quality improvement	1	2	3	4	5	6	7
IA2	We display information on quality performance at most of the work stations and everybody knows it	1	2	3	4	5	6	7
IA3	We use quality improvement tools and techniques extensively for process management and improvement	1	2	3	4	5	6	7
IA4	We examine customer-related/market data to develop priorities for improvement	1	2	3	4	5	6	7
IA5	We keep our information technology current with changing business needs and directions	1	2	3	4	5	6	7

Section D: Supply Chain Management

This section is seeking your opinion regarding the Supply Chain Management (SCM) practices in your company. Please indicate [(1) = Strongly Disagree; (2) = Disagree; (3) = Neutral; (4) Agree; (5) Strongly Disagree]

D1- Information Management (IM)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
IM1	We contact the end users of our services to get feedback on service performance.	1	2	3	4	5	6	7
IM2	We evaluate formal and informal complaints as well as satisfaction of our trade partners.	1	2	3	4	5	6	7
IM3	We apply advanced information technology in our supply chain.	1	2	3	4	5	6	7
IM4	We have a common standard for information sharing for our trade partners to follow.	1	2	3	4	5	6	7
IM5	We have information sharing among functions for the objectives of supply chain management.	1	2	3	4	5	6	7

D2- Lean System (LS)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
LS1	We streamline business processes (e.g. ordering, shipping, receiving, and other paperwork) with our trade partners	1	2	3	4	5	6	7
LS2	We reduce response time.	1	2	3	4	5	6	7
LS3	We have continuous improvement activity.	1	2	3	4	5	6	7
LS4	We involve in teams our trade partners to improve our supply	1	2	3	4	5	6	7

	chain.							
LS5	We have contingency management system for unexpected events (e.g. order change or cancellation, computer network down).	1	2	3	4	5	6	7

D3- Partnership Management (PR)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
PR1	We share knowledge about core business processes with our trade partners.	1	2	3	4	5	6	7
PR2	We share improvement benefits as well as other risks and rewards with our trade partners.	1	2	3	4	5	6	7
PR3	We develop a long-term relationship and trust with our trade partners.	1	2	3	4	5	6	7
PR4	We rely on a small number of quality trade partners	1	2	3	4	5	6	7
PR5	We have common goals agreed with our trade partners.	1	2	3	4	5	6	7

D4- Strategy and Organization (SO)

No.	Questions	Strongly Disagree	Partially Disagree	Disagree	Neutral	Agree	Partially	Strongly
SO1	We have a supply chain performance measurement system.	1	2	3	4	5	6	7
SO2	We have organizational structure which facilitates business process integration with our trade partners.	1	2	3	4	5	6	7
SO3	Our top level managers strongly encourage employee (worker) involvement in	1	2	3	4	5	6	7

	supply chain management.							
SO4	Our employees (workers) are actively involved in supply chain management-related activities.	1	2	3	4	5	6	7
SO5	Our organization has an open, trusting culture with low bureaucracy. Our working environment is very good for supply chain management.	1	2	3	4	5	6	7

Thank you for your time, opinions and comments.

~ The End ~